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Domestic Climate Policies and the WTO

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Abstract

Experience with existing multilateral environmental agreements (MEAs) shows that trade measures agreed to within the MEAs themselves may not necessarily lead to a dispute between parties. On the contrary, there is a great chance that disputes may arise from national measures undertaken to fulfil those obligations under the MEAs. This possibility of conflict with their WTO obligations may well arise in implementing the Kyoto Protocol, given that Article 2 of the Protocol gives Annex 1 countries considerable flexibility in the choice of domestic policies to meet their greenhouse gas emissions commitments. It is highly likely that Annex 1 governments with differentiated legal and political systems might pursue their domestic policies in such a way as to unfairly favour domestic producers over foreign ones. Such differential treatments could occur in governing eligibility for, and the amount of, the subsidy, in establishing energy efficiency standards, in the determinations of the category of eco-labelled products and the procedures of establishing eco-labels, in the specifications in tenders, and in specifying condition for participating in government procurement bids. In case where a country unilaterally imposes a carbon tax, it may adjust taxes at the border to mitigate competitiveness effects of cheaper imports not subject to a similar level of the carbon tax in the country of origin. Measure of this sort may well raise complex questions with respect to the WTO consistency and the conditions under which border taxes can be adjusted to accommodate a loss of international competitiveness. All this clearly indicates the necessity of addressing policy coordination between the trade and climate regimes.

Against this background, this paper discusses carbon/energy taxes, subsidies, energy efficiency standards, eco-labels and government procurement policies, and explores the potential interaction between these domestic climate policies and WTO rules. It highlights their potential conflicts, and argues that such conflicts can be avoided or at least minimized if WTO rules are carefully scrutinised at the time Annex 1 governments undertake measures to achieve the required reductions in emissions. The paper suggests an early process of pursuing consultations between WTO members and the Parties to the Climate Change Convention and points to the need of further exploring ways to enhance synergies between the trade and climate regimes.

Keywords: carbon taxes; energy taxes; subsidies; energy efficiency standards; eco-labels; government procurement; WTO; climate change

JEL no. Q28, Q25, Q48, Q43, F18

1. Introduction

Climate change as a result of increased atmospheric concentrations of the so-called greenhouse gases is an externality. To date, such an externality has not been internalised in production processes, input costs, consumer choices and energy markets. The continuingly unconstrained reliance on fossil fuel energy bears witness to the neglect of the climate change externality: current energy policies fail to consider the costs of stabilising greenhouse gas concentrations in the atmosphere at a level which would prevent potential catastrophic damages (and hence future economic costs). Part of the reason for this policy failure resides in that climate change is treated as an isolated environmental issue whereas climate change is essentially a cross-sectoral economic problem. Given the multitude of greenhouse gas emission sources in both developed and developing economies, policy responses will require a fundamental change in the way that energy is produced and the way it is used.

The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) marks the first step towards an international determination to limit emissions of greenhouse gases. It can be an important mechanism towards correcting the climate policy failure and a major push towards the internalisation of the climate change externality. The Protocol has set legally binding reduction targets for greenhouse gases emissions to countries listed in its Annex B and introduced three international flexibility mechanisms, namely international emissions trading, joint implementation, and the clean development mechanism (CDM).¹ However, the Articles defining the flexibility mechanisms carry wording that their use must be supplemental to domestic actions.² Although interpretations of these supplementarity provisions are still open to questions, they at least indicate that domestic climate policies will have an important role to play in meeting Annex B countries' emissions commitments.

Article 2 of the Kyoto Protocol gives Annex 1 countries considerable flexibility in the choice of domestic policies to meet their emissions commitments. Possible climate policies include carbon/energy taxes, subsidies, energy efficiency standards, eco-labels, and government procurement policies. In order to meet their Kyoto emissions targets with minimum adverse effects on their economies, it is highly likely that Annex 1 governments with differentiated legal and political systems might pursue these policies in such a way as to unfairly favour domestic producers over foreign ones. Such differential treatments could occur in governing eligibility for, and the amount of, the subsidy, in establishing energy efficiency standards, in the determinations of the category of eco-labelled products and the procedures of establishing eco-labels, in the specifications in tenders, and in specifying condition for participating in government procurement bids. In

¹ Annex B countries are the OECD countries and countries in transition to a market economy. The Kyoto Protocol includes six greenhouse gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs). The Protocol will become effective once it is ratified by no less than 55% of the countries to the Convention whose CO₂ emissions represent at least 55% of the total from Annex 1 countries in the year 1990.

² This is the so-called supplementarity provisions. See Zhang (2000, 2001) for detailed discussion on these provisions and on the assessment of the European Union (EU) proposal for ceilings on the use of Kyoto flexibility mechanisms

case where a country unilaterally imposes a carbon tax, it may adjust taxes at the border to mitigate competitiveness effects of cheaper imports not subject to a similar level of the carbon tax in the country of origin. Measure of this sort may well raise complex questions with respect to the WTO consistency and the conditions under which border taxes can be adjusted to accommodate a loss of international competitiveness. All this clearly indicates that these domestic climate policies may have the potential to bring countries into conflict with their WTO obligations.

However, Article 3.5 of the UNFCCC states the underlying principle that “measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade”. It is again carefully restated in Article 2.3 of the Kyoto Protocol.³ Thus, the real challenge for a country being both a WTO member and a Party to the Kyoto Protocol is to pursue both the Uruguay Round and Kyoto Protocol objectives through enhancement of synergy among policies and avoidance of conflict arising from unilateral discriminatory trade measures. After all, a conflict between the trade and climate regimes, if it breaks out, helps neither trade nor the global climate.

To date, however, such a policy coordination between the two regimes has not been addressed in a sufficiently serious manner. This paper aims to fill this gap by discussing carbon/energy taxes, subsidies, energy efficiency standards, eco-labels, government procurement policies, and exploring the potential interaction between these domestic climate policies and WTO rules.⁴ It highlights their potential conflicts, and argues that such conflicts can be avoided or at least minimized if WTO rules are carefully scrutinised, and efforts are made early on to ensure that the proposed climate policies comply with them. It suggests an early process of pursuing consultations between WTO members and the Parties to the Climate Change Convention and points to the need of further exploring ways to enhance synergies between the trade and climate regimes.

2. Subsidies

Under the Agreement on Subsidies and Countervailing Measures (the Subsidies Agreement), a subsidy is defined as a financial contribution or benefit conferred by a government to its domestic industries. More specifically, it can take the form of direct transfers, loan guarantees, fiscal incentives such as tax credits, provision of goods and services other than general infrastructure, or direct payments to a funding mechanism. In the context of combating global climate change, the possibilities for fuel

³ Article 2.3 of the Kyoto Protocol states that “The Parties included in Annex 1 shall strive to implement policies and measures under this Article in such a way as to minimize adverse effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties and in particular those identified in Articles 4.8 and 4.9 of UNFCCC”.

⁴ This paper focuses exclusively on the relationship between domestic climate policies and WTO rules (see also Assuncao (2000)). For a discussion on the relationship between greenhouse gas emissions trading and WTO rules, see Zhang (1998), Parker (1998), Peterson (1999), Werksman (1999).

substitution and technical innovation are essential to the success of Annex 1 countries meeting their national emissions targets. However, clean technologies are relatively capital and knowledge-intensive, and renewable technologies are not yet competitive with conventional technologies. Thus, it is most likely that Annex 1 governments may use either of the above subsidy options or a combination of these options to promote energy conservation, the use of renewable energy, and/or the increased adoption of less carbon-emitting technologies. By encouraging producers to take environmentally beneficial actions, such subsidies contribute positively to the environment.⁵ In the WTO jargon, these subsidies “capture positive environmental externalities”.

It is conceivable that in introducing subsidy incentives to domestic firms, governments will obviously attempt to foster industrial development and, at the same time, achieve reductions in present or future greenhouse gas emissions. However, if the sector where such subsidies are introduced is significantly open to foreign trade, such subsidies could potentially be challenged under WTO rules. The question is then the conditions under which such subsidies would run against WTO rules.

Article 3.1 of the Subsidies Agreement prohibits government subsidies that are contingent on export performance or use of domestic over imported products. Subsidies of this sort are prohibited regardless of whether they are applied generally or to specific industries and regardless of whether they are going to cause adverse effects to foreign competitors or not. Accordingly, subsidies made available for firms to use domestic low carbon-emitting products over foreign, high carbon-emitting like products are considered GATT-illegal. A subsidy is still actionable if it is granted to certain enterprises and if it causes injury to the domestic industry of another member or serious prejudice to the interests of another member (Article 5 of the Subsidies Agreement). Put another way, a subsidy is actionable either if it is found either *de jure* or *de facto* specific or if it causes injury or serious prejudice to interests of foreign competitors.

Let us first examine the specificity requirement. Under Article 2.1(a) of the Subsidies Agreement, a subsidy is considered *de jure* specific if only “certain” enterprises are eligible. Aimed at helping reduce carbon emissions, subsidies are most likely to be granted to few energy-intensive sectors rather than to be made available economy-wide. Thus, they could be challenged under the *de jure* specificity requirement of the Subsidies Agreement. If they are found to be *de jure* specific, the specificity analysis terminates. However, even if they pass the *de jure* specificity test, they could still be considered specific under the *de facto* specificity if it is found that there is a predominant use or a disproportionate use of such subsidies. For example, in the case of Dutch Flowers, a subsidy scheme nominally available to all agricultural producers was found not *de jure* specific. But the subsidies received by horticulture firms were deemed *de*

⁵ Subsidies can contribute negatively to the environment, too. The typical example is energy and transport subsidies, which are widely considered to distort trade, and in most instances to cause environmental degradation. Thus, reforming energy and transport subsidies and getting the price right to reflect their production cost and environmental externality is the win-win strategy that first needs to be pursued in mitigating carbon emissions. For example, OECD (1997c) estimates that subsidy reform could deliver 1-8% CO₂ emission reductions in the energy and electricity sector and 10-15% emission reductions in the transport sector while improving economic welfare.

facto specific because horticulture received 50% of the subsidy, while accounting for only 24% of Dutch agricultural production (quoted in Parker (1998)).

Because the Subsidies Agreement is intentionally vague on how the “certain” is to be interpreted, to ascertain whether a subsidy is specific in practice has to be based on a case-by-case determination. Experience shows that this is not an easy matter. However, to determine the extent of injury that a subsidy causes is even more difficult. Under Article 15.1 of the Subsidies Agreement, determinations of injury are to be based on “positive evidence and involve an objective examination of both (a) the volume of the subsidized imports and the effect of the subsidized imports on prices in the domestic market for like products and (b) the consequent impact of these imports on the domestic producers of such products” (WTO, 1995). Although, in practice, providing the objective investigation of adverse effects is rather complicated, it would not prevent a country home to foreign competitor’s products from initiating a WTO dispute if it estimates that the subsidy impairs its market share or discriminates against its exports. It is indeed conceivable that in key economic sectors several of the subsidy schemes currently envisaged to reduce specific industries’ emissions would run against WTO rules. Potential conflict with trade rules could then become a reality -- and a real obstacle to climate change policy. This risk of conflict will be high depending on how relevant a certain sector is for Annex 1 Party emission reductions and how significant trade flows are in that specific sector.

There is, however, a particular type of subsidy which is non-actionable and consistent with WTO rules. Article 8.2 (c) of the Subsidies Agreement allows an exception for a one-time subsidy introduced to offset increases in production costs of firms adjusting to new environmental regulations. Unfortunately, such an exception clause imposes limitations to the use of subsidies for climate change purposes. For example, the subsidy must be restricted to new equipment and investments and be limited to 20 per cent of the adaptation costs incurred.⁶ This could be useful for mitigating economic effects of undertaking climate actions, particularly in helping domestic industrial firms to adjust to the “first shock” resulting from the Kyoto Protocol implementation. A concrete example could be a subsidy to encourage industry sectors to adopt new combined heat and power facilities, which have significant emissions reduction potential.⁷ Such a subsidy measure to increase industrial co-generation would be WTO-legal⁸ and at the same time, be a highly cost-

⁶ Under Article 8.2 (c) of the Subsidies Agreement, assistance to promote adaptation of existing facilities to new environmental requirements imposed by law is considered *non-sanctionable*, provided that it: (1) is a one-time non-recurring measure; (2) is limited to 20% of the cost of adaptation; (3) does not cover the cost of replacing and operating the existing investment; (4) is directly linked and proportionate to environmental objectives and does not cover any resulting cost savings; and (5) is available to all firms which can adopt the new technology (WTO, 1995).

⁷ IPCC (1996) estimates that the adoption of co-generation could lead to annual CO₂ emissions by 2020 in the industrial sector 15% less than what would otherwise have occurred.

⁸ In this regard, it is worth mentioning state aid under Article 87 of the European Commission (EC). In order to ensure the proper functioning of the Internal Market and true competition, the general Commission’s policy is to forbid all kinds of state aid. However, in the document “Community Guidelines on State Aid for Environmental Protection” recently released by the Commission, supports for co-generation and renewables are exempt from the general state aid regime within certain limits, thus effectively allowing the use of support schemes for these technologies (Gogen Europe, 2001).

effective means of reducing CO₂ emissions from industry. However, this kind of measure would be only one component of a country's comprehensive greenhouse gas reduction strategy. Moreover, its use is further complicated by methodologically challenging with respect to the appropriate base for determining the adaptation cost incurred. It is unclear whether it would be interpreted to mean the cost of purchasing the permits needed to comply with the emissions targets, or the compliance cost incurred in undertaking abatement to meet the emissions targets.

If and when WTO members acknowledge the fundamentally economic nature of the Climate Change Convention and its Kyoto Protocol, other types of non-actionable subsidies could be allowed, possibly through an interpretative statement, or amendment, of Article 8.2 (c) of the Subsidies Agreement. The so-called *ex ante* approaches were proposed by some WTO members in the lead up to the WTO ministerial conferences at Singapore (December 1996) and Seattle (November 1999), meaning that rules and procedures are established to prevent a dispute from arising in the first place by amending the GATT or by adopting an Understanding on the interpretation of GATT (Ewing and Tarasofsky, 1997; Schwartz, 2000).⁹ However, the amendment procedure in the WTO is cumbersome and could create legal complications if not every member adopts it. Thus, in reconciling trade and environmental issues within the WTO, of great policy relevance is the drafting of a non-binding Understanding on the interpretation of GATT Article 8.2(c). Such an Understanding aims to help clarify for dispute resolution panels when subsidies are not actionable. It might offer some of the benefits of an amendment without the difficulty of securing formal consent of all the Parties, and would be an authoritative expression of the WTO members, to be referred to in cases of dispute between members.

In addition to the above exception, Article 2.1 (b) of the Subsidies Agreement allows for some additional flexibility regarding its strict specificity rule. Under the Article, a subsidy is considered not "specific", hence not actionable, if there are objective and legally enforceable criteria governing eligibility for, and the amount of, the subsidy and if eligibility is automatic for any company meeting the criteria. These criteria or conditions need to be neutral, meaning that they would not favour certain firms over others, and be economic in nature and horizontal in application. It could be argued that if eligibility for, and the amount of, a subsidy were linked directly to concrete criteria -- for example energy efficiency or intensity -- the subsidy

⁹ By contrast, many WTO members view that GATT rules as they currently stand are sufficient to accommodate environmental concerns. This school of thought asserts that GATT rules do not preclude a member of the WTO from establishing non-discriminatory trade-related environmental measures at the domestic level. With regard to environmental problems beyond national jurisdiction, GATT laws simply urge States to rely on multilateral solutions rather than resorting to coercive, unilateral trade measures. The so-called *status quo* approach is built on the premise that only a small number of multilateral environmental agreements (MEAs) incorporate trade measures and thus far there has not been any conflict between MEAs and the WTO (Ewing and Tarasofsky, 1997; Schwartz, 2000). Besides, the third approach proposed by some WTO members is the so-called waiver approach, meaning that in exceptional circumstances, a waiver to a WTO obligation could be granted under the provisions of Article IX of the WTO, subject to approval by a minimum of three-quarters of the WTO members. The waiver approach seems to imply that the WTO takes precedence over MEAs (OECD, 1996). It is not considered to be the optimal solution by some WTO members as an annual review of waivers is required.

might not be considered “specific” even if it were only applied to one firm and industry, and therefore be perfectly consistent with WTO rules and climate change policies.

Moreover, Annex 1 Parties may seek to support efforts by their industries to develop climate-friendly products and technologies through joint research and development projects like the US Clean Car Initiative or incentive programs such as the US “Golden Carrot” awards.¹⁰ Within certain limits specified under Article 8.2 (a) of the Subsidies Agreement, such research assistance is permitted by the WTO subsidy rules, although typically such measures do not seem to be too effective in terms of the amount of greenhouse gas emissions reductions achieved.¹¹

From the preceding discussion, it would appear that there is a clear need for close scrutiny of WTO rules when Annex 1 Parties to the Kyoto Protocol formulate their climate change measures, particularly if they are also global players in the multilateral trading system. No doubt, a number of thorny cases will haunt policy makers during the Kyoto Protocol compliance phase. The first hypothetical case signals the possibility of an importing country imposing countervailing duties on exports from a country which introduced subsidies in some of its manufacturing sectors to reduce greenhouse gas emissions occurring in the production process of these exports. For example, if a subsidy were granted to an energy carrier, the products produced using that energy carrier might be considered subsidized. From a WTO perspective, countries without an indigenous supply of either that energy carrier or the subsidized product are unlikely to complain of such subsidies when importing either that energy carrier or the subsidized product. However, countries that have domestic producers of that energy carrier or the subsidized product and need to import that energy carrier or the subsidized product may impose countervailing duties on that energy carrier or the subsidized product. This is closely related to the border tax adjustments controversy, and it boils down to whether the use of countervailing duties would be appropriate in such cases or a special exception should be carved out for multilaterally-agreed and non-discriminatory climate change measures.

The second case relates to the lack of meaningful environmental rules in an exporting country and the resulting “unfair import competition” perceived by the importing country. Under Article 1.1 of the Subsidies Agreement, a subsidy is defined as including “government revenue that is otherwise due is foregone or not collected” (WTO, 1995). Although a narrow interpretation of this clause would limit claims to cases in which taxes are levied but not collected, its broad interpretation would expose the absence of environmental taxes or regulations to charges of unfair subsidisation (Esty, 1994). So importing countries could claim that the absence of climate change policies in their trading partners would be equivalent to

¹⁰ In the US “Golden Carrot” program, whereby utilities offer financial incentives for manufacturers to make major advances in energy efficiency and product performance. In the first scheme, 24 utilities pooled US\$ 30 million in the Super Efficient Refrigerator Program and a competition was launched to find the manufacturer who could build the most efficient CFC-free refrigerator at the lowest cost. The winner received guaranteed rebates from the pool to offset the incremental product development cost. Fourteen manufacturers responded to the challenge by submitting proposals. As a result of the competition, several of the manufacturers, although they failed to win the competition, have introduced efficiency improvements to their standard commercial models (CTI, 1998).

¹¹ See UNFCCC (1996) report on the in-depth review of the national communication of United States of America.

giving an implicit unfair export subsidies biased towards their energy-intensive sectors (the so-called ecological dumping), because the costs of environmental degradation are not part of the prices of those exported products. Let alone whether such an interpretation of lax environmental regulation as a countervailable subsidy is accepted,¹² imposing countervailing duties on this ground poses a “slippery slope problem” closely related to the whole processes and production methods (PPMs) controversy (Jackson, 1992).¹³ Similarly, an exporting country may claim that the absence of climate change policies in an importing country poses *de facto* a competitiveness barrier to its export, and thus could be seen as an effective protectionist device.

The existing WTO rules on subsidies are much needed for a variety of reasons and changing them may be undesirable. Close scrutiny of WTO rules is a necessary and imperative condition for the avoidance of trade conflicts resulting from Kyoto Protocol implementation but it may not be sufficient. In this regard, further analytical work to clarify the complex situations arising from the climate change regime and its interface with the multilateral trade regime is required.

3. Energy efficiency standards

Standards refer to regulations stipulating the minimum energy efficiency standards for products. Standards of this sort are set by governments and are mandatory. Given that the perceived political costs of introducing standards are much lower than the costs of the introduction or raising of energy taxation, energy efficiency standards may be seen as more attractive and feasible (Brack *et al.*, 2000). Thus, it is conceivable that in attempting to fulfil their Kyoto obligations, Annex 1 governments may set high energy efficiency standards for products, such as automobiles sold in their countries, either domestically produced or imported. The result would be less energy consumed and fewer energy-related greenhouse gas emissions emitted into the atmosphere.

In principle, this practice would not infringe WTO rules if applied consistently with the principle of national treatment. Nevertheless, problems could arise if such regulations were designed in such a way as to effectively penalise foreign firms in favour of domestic ones. A potentially serious conflict has erupted in the context of fuel efficiency standards proposed by the Japanese Ministry of Transport to control CO₂ emissions, allegedly as part of Japan’s policy to meet its Kyoto commitments. Such a proposal suggested lowering the rates of two of the eight taxes currently applied to vehicles in Japan for vehicles of

¹² Since environmental issue was simply not a public issue in 1947 when GATT was signed, exploring the environmental exceptions to the general free trade requirements in GATT depends as much on interpretation as on the actual clauses (Charnovitz, 1991). Given the fact that a three-fourths vote of the entire membership is required for the membership to adopt legal interpretation of any WTO agreement (WTO, 1995), the above interpretations might stand a little chance of being accepted.

¹³ Discrimination based on how a product is produced has traditionally had a rough ride in the WTO. Under WTO rules, an imported product is not allowed to be treated differently to a “like product” (i.e. a product

small engine size and high fuel efficiency. In December 1998, EU officials said that they would challenge Japan in the WTO if such new emission standards were implemented. European carmakers claim that standards are actually based on the weight of vehicles, and that almost 90% of European car sales in Japan fell into the three medium- to heavyweight categories. Thus, they view that the planned Japanese rules would most severely affect exports of their medium-range and luxury cars to the Japanese market, precisely a market segment where Europeans have a comparative advantage. At the same time, Japanese cars with higher fuel consumption rates would easily meet the standards.¹⁴ On 11 January 1999, Japan pursued the issue further by notifying the WTO Agreement on Technical Barriers to Trade (TBT) Committee, indicating that by April 1999 it would introduce new energy efficiency standards for passenger cars.¹⁵ Japan justified the measure as a means of promoting energy efficiency in order to cope with rising energy consumption and climate change concerns.

In principle, WTO rules do not allow for unilateral measures which are more trade-restrictive than necessary. Article 2.2 of the TBT Agreement, for example, requires that technical regulations affecting imported products not be “prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade”.¹⁶ If, however, regulations are “not more trade-restrictive than necessary to fulfil a legitimate objective”, they *may* be allowed under the TBT Agreement. Article 2.2 of the TBT Agreement offers some flexibility to regulations introduced pursuant to a few “legitimate objectives”, which are defined as including “national security requirements, prevention of deceptive practices, protection of human health or safety, animal or plant life or health, or the environment” (WTO, 1995). The question then would be to prove that a specific regulation is the least-trade restrictive and necessary to combat climate change. This could be done by, for example, establishing multilaterally agreed energy efficiency standards, given that Article 2.5 of the TBT Agreement states that a regulation is presumed not to contain any unnecessary obstacles to international trade if it is established in accordance with “relevant international standards”.

Looking into a concrete dispute may help to further clarify the interpretation of the WTO-consistency. In the recent “Auto Taxes Panel”, the EU challenged the US Corporate Average Fuel Economy (CAFE) requirements (1994) and the US “gas guzzler tax” on the basis that these laws had an adverse impact on EU car manufacturers. CAFE penalises car manufacturers that do not meet average efficiency standards for their sales in the US. The gas guzzler tax is levied on car models with fuel consumption levels below 22.5 miles per gallon. Both laws allow manufacturers to do some averaging, which arguably allows US manufacturers to

with the same physical characteristics) produced domestically, only on the ground of process and production method employed to produce the product.

¹⁴ See European Carmakers to Challenge Japan at WTO, *Journal of Commerce*, 22 December 1998; and BRIDGES Weekly Trade News Digest, Vol. 3, Nos.1&2, 18 January 1999, International Centre for Trade and Sustainable Development, Geneva.

¹⁵ See WTO TBT Notification G/TBT/Notif.99.3, 11 January 1999.

¹⁶ Under Article 2.2 of the TBT Agreement, to ensure technical regulations do not create unnecessary obstacles to international trade, technical regulations must “not be more trade-restrictive than necessary to fulfil a legitimate objective, taking account of the risks non-fulfilment would create” (WTO, 1995).

avoid the tax.¹⁷ Given the limited lines of luxury models built by many European manufacturers, European carmakers would be unable to take full advantage of the averaging provisions. As a result, they would have been penalised and taxed.

The panel upheld the gas guzzler tax because it was applied equally to all cars no matter where they were manufactured, but not the CAFE standards. In analysing the gas guzzler tax, the panel did not consider cars which could run more than 22.5 miles per gallon as “like” cars to those which consume more and run under 22.5 miles per gallon, hence they could be treated differently under Article III of the GATT. On this, some analysts (e.g. Goldberg, 1995) think that this could “suggest that, in the future, trade restrictions that discriminate between products based on their energy efficiency should not conflict with the WTO rules”.¹⁸

In the above panel ruling, it appears that “the panel seemed most concerned about the creation of categories of products based on origin and ownership. Thus, although foreign and domestic cars arguably are treated the same (or at least in parallel fashion), and despite the fact that the panel could not demonstrate that foreign cars suffer a greater disadvantage under the law than domestic cars, it found that the CAFE law violates GATT” (Goldberg, 1995) since it is specific to foreign cars sold in the US market. The lesson for future unilateral measures is simple: distinctions based on a product’s origin, ownership, manufacturer, or importer should be avoided. It appears from the Auto Taxes case that there could be many WTO-consistent trade measures that a country can adopt unilaterally to implement its Kyoto Protocol commitments. The main question boils down to whether such measures are designed for, or result in, a discriminatory protection of domestic production. If it does not, it would not transgress WTO rules.

An alternative and less conflictive route than unilateral measures to comply with Kyoto Protocol targets is the implementation of energy efficiency standards by Annex 1 Parties in concert.¹⁹ From a trade perspective, a harmonised approach is clearly advantageous. First, harmonised measures are less likely to be discriminatory, at least between the Parties involved, since negotiators would seek to make them trade-neutral to gain the maximum number of adherents to the agreement. Goldberg (1995) argues, however, that “the history of the CAFE law suggests that the requirement of trade neutrality could make implementation by national legislatures more difficult”. Second, future WTO panels may favour regulations or standards that are explicitly mandated and multilaterally agreed upon by the post-Kyoto climate change regime.²⁰ Indeed, as

¹⁷ CAFE allows manufacturers to average across their full product line. The gas guzzler tax allows manufacturers to average the fuel efficiency of cars within a “model type”, i.e. those with the same chassis and engine size.

¹⁸ However, this should be interpreted with great caution because “GATT and WTO panels are not bound by previous panel decisions and have been known to reach diametrically opposite conclusions about identical matters” (Goldberg, 1995).

¹⁹ To some extent, the UNFCCC already requires such a harmonization. Specifically, Article 4.2(e)(i) requires Parties to coordinate their economic and administrative instruments *as appropriate*. However, it is not clear how strong this mandate is. It seems unlikely that it provides a basis to challenge unilateral measures like the US CAFE standards or the above Japanese proposal for fuel efficiency standards for vehicles.

²⁰ In this regard, it is worth mentioning the Tuna-Dolphin I dispute, which concerned Mexico’s complaint about the application of the US Marine Mammal Protection Act to ban the importation of tuna from eastern tropical Pacific Ocean if caught using seine nets. The dispute panel found that the trade ban could not be

discussed above, Article 2.5 of the TBT Agreement provides that a technical regulation which is adopted in accordance with a relevant international standard “shall be presumed not to create an unnecessary obstacle to international trade”.

In practice, the attraction of harmonized energy efficiency standards is obvious, because the harmonization of standards would lower the costs of information on, and adjustments to, different requirements involved in exporting to different markets (OECD, 1996).²¹ However, past experience shows that the negotiation of international standards is usually a long process requiring considerable efforts. For example, in the EU, measures to promote energy efficiency have been under serious discussion since mid-1970s, but only in the early 1990s did the EU succeed in introducing energy labelling, and the first energy efficiency standards are only now beginning to enter force (Brack *et al.*, 1999). Even for the optimistic estimate, the time needed for researching, planning and negotiating common standards at Annex 1 country level could take about 5 years (Mullins, 1996). Moreover, common standards may not always be appropriate for different countries. It is the recognition of the difficulty and of the differences in member countries that led the European Union to permit national environmental protection levels to exceed a minimum level set by the Union (under Articles 36, 100a(4) and 130t of the EC Treaty). Even if it is very difficult for the EU member countries at comparably economic and technological levels to harmonize their energy standards, the prospects for the harmonization of energy efficiency standards among Annex 1 countries seem remote. Even if common standards had eventually been established internationally, they would be expected to be driven down towards the lowest common denominator among the countries involved. Annex 1 Parties would, nevertheless, be entitled under Article 2.4 of the TBT Agreement to set higher standards on their own if they demonstrated that international standards would be inappropriate to achieve the concerned climate objective.

Alternatively, instead of attempting the wide-ranging harmonization of performance standards, a strategy of harmonizing procedural standards should be pursued. Procedural standards set internationally agreed guidelines to be respected when defining performance standards. The ISO 14000 series of environmental management standards is a good example for procedural standards. In our view, the case for the harmonization of procedural standards is much stronger.

4. Eco-labels

considered “necessary” within the meaning of GATT Article XX (b), in part because the United States had not first sought to negotiate international cooperative arrangement, suggesting that the GATT prefers actions taken pursuant to multilateral agreement. However, it should be pointed out that the dispute settlement report was not adopted. It may, nevertheless, be looked to as unofficial, persuasive interpretations of the GATT (Ewing and Tarasofsky, 1997).

²¹ For example, in the US, the development of energy efficiency standards has been led by individual states (particularly California). After a number of states had introduced such standards, the manufacturers tended to accept the need to retool to produce more efficient products, and indeed in some cases started to support the development of harmonized federal standards so as to avoid the administrative costs and complexity of meeting different requirements in different states (Brack *et al.*, 1999).

Eco-labelling is to use a seal on a product to identify it as environmentally preferable to its alternative in the same category. Its purpose is to promote the production, consumption and disposal of more environmentally friendly products. Eco-labelling gives the consumer the choice of whether to buy a product contributing to environmental degradation or to buy an environmentally friendly alternative. As a consequence, producers are encouraged to apply for the eco-label in order not to lose its market share to eco-labelled rivals. By certifying that certain products involve exceptionally low greenhouse gas emissions, eco-labelling thus provides governments a useful tool to use consumer preference to help meet their Kyoto emissions targets.

This voluntary nature makes eco-labelling an attractive alternative to costly regulatory measures. The existing eco-labelling schemes are designed to apply to a small percentage of products in a product category, which represent no more than 30% and no less than 5% of the market share (OECD, 1997a). These schemes indicate the overall environmental qualities of such eco-labelled products in order to encourage consumers to purchase them. Once a large proportion of products within a group are eco-labelled, the criteria for eco-labelling are revised to increase their stringency of environmental quality. All previous eco-labelled products have to apply for the eco-label once again, and only those that meet the new revised criteria can remain eco-labelled. This constant upward revision of environmental criteria is considered essential to ensure continuously improved environmental performance (OECD, 1997a).

The eco-label criteria developed for such schemes as the German Blue Angel, the Japanese Eco-Mark, and the Canadian Environmental Choice Programme generally aim to promote products that reduce environmental damages during the use and disposal phases of the products (OECD, 1997a). However, given that eco-labels are increasingly based on a life-cycle analysis of environmental effects of products from cradle to grave that may contain process and production related criteria, their rapid spread has given rise to fears and concerns about their potential trade effects.

One trade aspect of particular concern is to use processes and production methods (PPMs) based distinctions. From the international trade perspective, whether distinctions based on how a product is produced are allowed touches on the question of whether eco-labels are covered by the TBT Agreement. Since eco-labels are considered as voluntary standards, it can be said that eco-labels are subject to the provisions of the TBT Agreement on standards. Thus, eco-labels would adhere to the WTO's Code of Good Practice, which governs the preparation, adoption and application of such standards. However, the extent to which the TBT Agreement can be applied to eco-labels is a matter of debate. Although some trade analysts (e.g. Tietje, 1995) argue that the TBT Agreement covers only standards that concern product characteristics and incorporated PPMs, there is a continuing controversy in the WTO as to whether the TBT Agreement covers unincorporated PPMs – those not reflected in final product characteristics -, and therefore as to their ultimate legitimacy (OECD, 1996; Assuncao, 1998a; Cosbey and Cameron, 1999).

Another concern is related to the determinations of the category of eco-labelled products, and the procedures of establishing eco-labels. In selecting eco-labelled products, it is likely that the country establishing the eco-label scheme could favour domestic producers by failing to include similar or

competing products from foreign producers, thus placing imports at a comparative disadvantage vis-à-vis the domestic products. Similarly, in developing eco-labels criteria, the country takes no consideration of the environmental conditions and preferences of the exporting countries. For instance, the relative abundance of environmental endowment in the foreign producer's country may be more capable of assimilating a given quantity of pollution than the environment of the importing country that establishes the eco-label scheme, although the impact of producing such products on the environment of the producer's country is perfectly acceptable. Consequently, the eco-label may constitute a *de facto* non-tariff barrier for the foreign products that do not comply with the eco-label criteria to get access to the importing country market. This market access barrier may be particularly acute for developing countries because they often do not have the technical or financial capacity to adapt their processes and production methods to those required in the importing countries (mainly the OECD countries) to allow an eco-label to be granted (OECD, 1995, 1996). In fact, this was cited as causing potential trade barriers to products produced in developing countries by a number of parties (including India, Korea, Morocco and Egypt) in the negotiations on the Kyoto Protocol.

To date, the only eco-labels that have been developed for product categories of particular export interest to developing countries are the eco-labels for textiles (OECD, 1997a). For example, the Nordic Swan and the EU eco-label for textiles contain criteria on the manufacturing process, such as the use of pesticides in the growing of cotton and the use of harmful substances during the process. Given that developing countries have not committed to legally binding greenhouse gas emissions targets as their developed counterparts have done, developed countries might use an eco-label as the criterion to purchase products from developing countries in the future. Consequently, this limited coverage of products of particular export interest to developing countries may change. This, combined with lack of participation and consultation of developing countries when eco-labelled products groups are selected and criteria for eco-labelling are established, will impede developing countries' ability to export their products to developed countries, thus forming a source of trade concerns.

5. Government procurement

Among the OECD member countries, government procurement expenditures for extremely diverse products and services account for 8 to 25% of GDP (OECD, 2000). The potential for public purchasing decisions to affect the environment is therefore considerable. By supporting innovation in and purchasing environmentally preferable products and services, government procurement potentially plays a crucial role in achieving reductions in greenhouse gas emissions. This explains why environmentalists generally support greener public purchasing.

Generally speaking, trade issues would be not expected to arise in the greening of public purchasing, provided that the principles of transparency, non-discrimination and national treatment are fully respected. However, given that the actual practice of public procurement differs widely among

countries, there are some concerns that green public purchasing schemes will add an extra layer of complexity to purchasing decisions, therefore reducing transparency and distorting free competition (Cameron and Buck, 1998; OECD, 1999). From this perspective, green public purchasing schemes could provide a pretext for undermining the WTO rules.

In order to green public purchases, the environmental characteristics of the products to be procured have first to be technically specified.²² Thus, specifying such characteristics is an essential part of any tendering process. Concerns about trade effects are raised with respect to differential treatment of local suppliers and foreign suppliers in the specifications in tenders. For example, by emphasising recycled content in the specifications in tenders for paper to be purchased, the criteria defining the characteristics of paper would favour domestic producers who are predominately based on recycled content over foreign producers whose products have a high virgin paper content. Another example is that by including transport-related specifications in tenders, e.g. specifying the mode of freight or limits on emissions for delivering tendered products, the local purchasing entities gives a preference for locally produced products. Although this practice is not yet widespread, given the trend towards decentralisation of purchasing decisions, it is potentially relevant to trade policy concerns.

Another trade aspect of particular concern is related to the practice of using eco-labels to designate environmentally preferable products for public procurement. Experience shows that public procurement has given a strong impetus to the increasing success of the eco-label schemes, such as the German Blue Angel (OECD, 1997a). Given that purchasing officers have mostly neither the time nor the expertise to gather all of the information needed to substantiate specifications, it is relatively easy to refer to existing eco-labels (i.e., design the greener products with an existing eco-label). But such a practice raises concerns about the possible over-reliance on eco-labels at the expense of objective consideration of underlying criteria (OECD, 1999). In case where adherence to an eco-labelling scheme is specified in tender documentation, the compliance costs associated with qualifying for the eco-label might be higher for foreign firms, especially for small and medium-size enterprises in developing countries. Moreover, the inability of producers to ensure that the materials used are produced in accordance with the criteria of the eco-label may present further hurdles for the participation of foreign producers in a public tender (OECD, 1999).²³ In order not to reduce the chances of purchasing imported products, the purchasing authorities should encourage to use the eco-label's underlying criteria and information gathered on the particular

²² In this regard, a distinction can be drawn between negative and positive approaches to the framing of specifications. Negative approaches aim to specify what are currently in use to eliminate those specifications that effectively hamper efforts to procure environmentally preferable products and services. By contrast, positive approaches aim to identify certain characteristics of products and services to ensure that procurement officers choose environmentally preferable ones over less environmentally preferable ones (Cameron and Buck, 1998).

²³ A study on the impacts of the EU eco-labelling scheme on Brazilian exports of textiles found that there was the severe difficulty complying with the criteria for the use of pesticides during the manufacturing process (OECD, 1997a). Although the use of pesticides in cotton grown in Brazil is low, the imports of cotton are increasing. It is very difficult for Brazilian textile producers to certify that the cotton they import was not manufactured with the use of pesticides.

environmental reference points, rather than the eco-labels themselves. In other words, eco-labels are regarded as an additional source of information, not as a pre-requisite for participation in government procurement.

The third aspect of trade concern is that government procurement-related purchasing specifications include production-related requirements. The national treatment provisions prohibit differentiation between otherwise “like products” on the basis of PPMs related requirements that do not change the physical characteristics of these products (OECD, 1995).²⁴ Thus, if a government treats differently imports that give rise to more greenhouse gas emissions in their production than their like domestic products, it could face a sanction under the WTO rules. A case in point would be the preference for electricity generated from hydropower and discrimination against those from coal-fired power. It is worth noting that the main body of international rules and procedures governing the relationship between green government procurement and free trade is currently found in the Agreement on Government Procurement 1994 (AGP). The AGP is one of the plurilateral agreements included in Annex 4 to the Agreement Establishing the WTO. Consequently, WTO signatories are not required to join in the AGP as a precondition to a WTO membership. Because the AGP is an agreement outside the WTO rules, however, whether the AGP allows to distinguish products and services to be procured on a basis of non-product related PPMs is a matter of debate. Some analysts, for example, Cameron and Buck (1998), have argued that the wording of Article VI.1 of the AGP does not explicitly exclude the use of technical specifications that make reference to non-product related PPMs. Moreover, they think that reference to non-product related PPMs would be in line with Article VI.2 (a) of the AGP, as technical specifications that refer to certain aspects of the life-cycle performance of a product or service are likely to be in terms of performance rather than design. If the reasoning held, public procurement based on, e.g. the maximal energy consumption or the overall greenhouse gas emissions during the life-cycle of a product would be allowed.

Fourth, trade concerns would emerge if the procurement rules require the suppliers’ green credentials as a condition for participating in government procurement bids. The United States Departments of Energy and Defense have been cited as considering ISO 14001 certification as a prerequisite for qualifying suppliers (UNCTAD, 1997). If the eligibility for a supplier to sell to a public entity is conditional on its compliance with an environmental management system, whether ISO 14001 or EMAS (the European Union Eco-audit and Management Scheme), this might be considered to amount to differential treatment of what are in fact “like products” (OECD, 1999). There are two ways to avoid potential trade effects of the specification. The first approach is that the purchaser may refer to, or demand adherence to, the specified environmental management standards, but may not do without adding “or equivalent”. Another approach is to apply the greener criteria only to products themselves, without reference to the environmental credentials of potential suppliers. It should be pointed out that

²⁴ In general, a distinction is drawn between product-related PPMs and non-product related PPMs. Product-related PPMs refer to the characteristics of the final product, for example, the environmental impact of a product when it is used or disposed, whereas non-product related PPMs refer to the characteristics of the processes or methods in manufacturing a product or providing a service (OECD, 1997b).

environmental management systems are just standards on company practices. A company having a certified environmental management system does not necessarily mean that its products are greener than those not having such a certification. From this perspective, conditioning the suppliers' eligibility to participate in government procurement bids on their green credentials may lead to the choice of high carbon-emitting products from the suppliers complying with an environmental management system over low carbon-emitting like products from those not having a certified environmental management system.

6. Carbon tax and its implications for international competitiveness

In recent years, both the European Union (EU) and the US attempted to implement a carbon tax, raising the price of energy to incorporate the costs of environmental externalities associated with its use, and both failed. But there is no doubt that compliance with the Kyoto greenhouse gas emissions targets is bound to make many developed countries have a second thought on this option.

By definition, a carbon tax is an excise tax imposed on the carbon emitted in the manufacturing process of a product according to the carbon content of fossil fuels and is thus restricted to carbon-based fuels only.²⁵ If the goal is to reduce CO₂ emissions, a carbon tax is preferred to an energy tax on the ground of cost-effectiveness (Zhang, 1997). The reason is that a carbon tax equalizes the marginal cost of CO₂ abatement across fuels and therefore satisfies the condition for minimizing the global cost of reducing CO₂ emissions. This implies that implementation of an energy tax will lead to poor target achievement or else to unnecessarily high costs as compared with a carbon tax. This can be explained by two factors: price-induced energy conservation and fuel switching (Manne and Richels, 1993). Carbon taxes reduce CO₂ emissions through both their price mechanism effects on energy consumption and fuel choice. By contrast, since the energy tax is imposed on fossil fuels and nuclear energy, the incentive for fuel switching is lower and the reductions in CO₂ emissions will be mainly achieved by price-induced energy conservation. Thus, a higher energy tax is required for achieving the same reduction target as compared with a carbon tax. In other words, it is more costly to reduce CO₂ emissions through an energy tax than through a carbon tax.

If imposed unilaterally, a carbon tax would raise the prices of energy and those products whose production gives rise to the large amount of CO₂ emissions, and thus has important implications for the international competitiveness of domestic products, particularly energy-intensive products. Although international competitiveness is not necessarily reduced over the long term by higher energy prices, in certain industries, the effects of introducing a unilateral carbon tax may be serious in the short term, because it exacts the penalty from domestic producers who must face imports that may not have had such a tax levied on them and who must compete with similarly untaxed products on the international market. This

²⁵ A carbon tax can be converted into a CO₂ tax, given the fact that a ton of carbon corresponds to 3.67 tons of CO₂.

issue has become the main stumbling block for the introduction of energy/carbon taxes (Barde, 1997), and thus has been a constant concern to policymakers.

Generally speaking, competitiveness at the firm level is the ability of a firm to maintain or even increase international or domestic market shares and profitability.²⁶ A firm's competitiveness is influenced both by 'micro' factors, such as cost structure, product quality, trademark, service and logistical networks, and by 'macro' factors, such as exchange rates, trade rules and political regime stability (Baron and ECON-Energy, 1997). A carbon tax affects a firm's competitiveness by changing its relative production costs. For example, if a firm makes intensive use of energy, *ceteris paribus*, then imposing a carbon tax will increase its production cost relative to those less energy-intensive firms in the short term. Thus, it would experience a decline in competitiveness, whereas less energy-intensive firms would obtain a relative cost advantage in the short term. The changes in relative competitive positions would lead to 'winners' as well as 'losers' from the imposition of carbon/energy tax. Not surprisingly, 'losers' lobby strongly against the imposition of carbon/energy taxes. They even threaten to relocate their business activities to those countries that have relatively lax environmental standards, if such a tax were put in place. This raises the question: do environmental taxes and regulations hurt firms' competitiveness so badly that they are forced to move to pollution havens? There is growing literature on this topic, and the existing studies on trade implications of environmental regulations might give us some indications.

Grossman and Krueger (1993), for example, have examined whether pollution abatement costs influenced the patterns of the U.S. bilateral trade and investment with Mexico and found that "the available evidence does not support the hypothesis that cross-country differences in environmental standards are an important determinant of the global patterns of international trade." Jaffe *et al.* (1995) review and analyse over 100 studies on the potential effects of environmental regulations on the competitiveness of American industry, and conclude that "studies attempting to measure the effect of environmental regulation on net exports, overall trade flows, and plant-location decisions have produced estimates that are either small, statistically insignificant or not robust to tests of model specification.". The Annex 1 Expert Group on the UNFCCC (Baron and ECON-Energy, 1997) undertakes a static analysis of the cost increases from a tax of \$100 per ton of carbon on four energy-intensive industries (iron and steel, non-ferrous metals, paper and pulp, and chemical products) in the OECD countries. These sectors represent 3 to 7% of GDP and 1 to 4% of labour force. As shown in Table 1, the average cost increase measured as percentage of total production value differs among countries and sectors, but is generally low (below 2%) except for Australia and Canada. This analysis concludes that other factors affecting price levels, such as exchange rate variations, may well dwarf the price effects of a carbon tax, at least at the rates that are generally proposed in the current climate debates.

However, the above findings are not necessarily going to be the case of energy/carbon taxes in future for the following reasons. First, environmental regulations and taxes applied to date have been relatively modest, and they fall short of the levels required to achieve the UNFCCC's ultimate objective of stabilizing greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous

²⁶ For a discussion of trade competitiveness impacts at the firm level, see Assuncao (1998b).

anthropogenic interference with the climate system. For example, if carbon taxes were used as the sole means of meeting the Kyoto emissions obligations, the level of the taxes would be very high and could thus have significant implications for competitiveness.

Second, in countries, such as Denmark, Norway and Sweden where carbon/energy taxes are already implemented, energy-intensive industries are generally exempted from the taxes, either totally or partially (which leads to a large gap between effective and nominal tax rates as shown in Table 2), and if not totally exempted, the revenues from environmental taxes are fully recycled back to the affected industries, for example, in the form of grants for energy saving investments and cuts in employers' social security contributions (cf. Baranzini *et al.*, 2000).

Table 1 Selected OECD Countries' Cost Increase^a from a Tax of \$100 per Ton of Carbon as Percentage of Production Value

	Total energy-intensive industries	Iron and steel	Non-ferrous metals	Chemical products	Pulp and paper
USA	2.8 (2.5)	2.3	3.1	2.8 (2.2)	3.2
Canada	4.1 (4.3)	6.2	3.7	4.1 (2.3)	5.0
Japan	1.2 (1.0)	2.0	0.7	1.0 (0.6)	0.6
Australia	5.2 (5.0)	5.8	11.4	1.7 (1.4)	2.6
France	1.4 (1.1)	2.4	1.4	1.3 (0.8)	0.6
Germany	1.6 (1.4)	2.6	1.2	1.4 (1.1)	1.0
UK	1.6 (1.3)	3.6	1.9	1.2 (0.8)	1.2
Italy	1.4 (1.2)	2.0	1.1	1.3 (0.9)	0.7
Belgium	2.3 (2.1)	7.3	0.8	1.6 (1.2)	0.6

^a The figures include carbon emissions through electricity generation and from process emissions in aluminium production.

Numbers in parentheses indicate cost increase when the carbon tax is applied only to fossil fuels used for energy purposes.

Source: Baron and ECON-Energy (1997).

Table 2 Effective and Nominal Tax Rates (1998) in Selected Sectors in Sweden, Denmark and Norway (ECU per Ton of CO₂ emissions, 1 ECU = US\$ 1.12)

Energy products	Sweden (nominal)	Denmark (nominal)		Norway (nominal)
	Manufacturing industry	Light processes	Heavy processes	Pulp/paper industry
Gas oil (heating)	20.9 (41.9)	11.2 (12.5)	3.1 (12.5)	9.9 (19.9)
Heavy fuel oil	18.8 (37.7)	11.6 (12.8)	3.2 (12.8)	8.8 (17.6)
LPG	20.2 (40.4)	11.5 (12.8)	3.2 (12.8)	0 (0)
Coal	21.5 (43)	11.9 (13.2)	3.3 (13.2)	23.4 (23.4)

Natural gas	19.3 (38.5)	11.3 (12.5)	3.1 (12.5)	0 (48.8)
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Source: Baranzini *et al.* (2000).

Potential high carbon taxes underline the importance to mitigate their competitiveness effects in designing the taxes. One commonly used way is to grant energy-intensive industries a lower tax rate than, e.g. households, or even to exempt these industries from coverage of the taxes. For example, the unimplemented CEC (1992) proposal provided for exemptions for the six energy-intensive industries, such as iron and steel, non-ferrous metals, chemicals, cement, glass, and pulp and paper. However, since a carbon tax is intended to fall most heavily on the products of carbon-intensive industries, the exclusion of these industries from coverage of the carbon tax on the ground of competitiveness reduces the effectiveness of the carbon tax in achieving its objective of reducing CO₂ emissions.²⁷ Therefore, it requires a higher tax rate for the non-exempt industries and increases the costs of achieving a given level of emissions reduction, while it does mean that the EU industries most vulnerable to competition are protected in their markets. For instance, Böhringer and Rutherford (1997) found that losses associated with exemptions can be substantial, even when the share of exempted sectors in overall economic activity and carbon emissions is small. Alternative recycling options, like wage subsidies to export- and energy-intensive sectors, can give better results in terms of employment and are less costly than tax exemptions.

Another means of mitigating competitiveness effects is through border tax adjustments (BTAs) whereby exporting countries rebate taxes levied on the products when exported, while the importing countries impose the taxes on imported products that have not been subjected to a similar level of taxes levied on their domestic products. The adjustments enable a country to tax its domestic energy-consuming industries for internal purposes while preserving its competitiveness internationally by allowing its exports to compete in untaxed markets abroad and domestically by taxing imports up to the same level. This kind of BTAs reflects the application of the destination principle to products, which suggests that products should be taxed in the country where they are consumed and not in the country where they are produced unless they are also consumed there.

From a WTO perspective, BTAs, if adopted, should not be used to provide a competitive advantage for domestic products. Thus, border taxes should not be in excess of taxes on like products manufactured and sold domestically. Clearly, such adjustments are intended to ensure that internal taxes on products are trade-neutral. BTAs have been used in the US in two important instances of environmental excise taxes: the Superfund Chemical Exercises (Superfund Tax) and the Ozone-Depleting Chemicals

²⁷ In addition to this, exemptions lead to two more problems. The first is that the industries which are exempt from paying the carbon tax will improve their competitive position in relation to those industries which are not. There will therefore be some switching of demand towards the products of these energy-intensive industries, which is precisely the reaction that a carbon tax should avoid. The other problem is that firms which find themselves paying the carbon tax will try to be reclassified as exempt or eligible for rebates if at all possible, thus limiting the impact of the tax on energy consumption and CO₂ emissions (cf. Barker *et al.*, 1993).

(ODC) Tax. With a modest rate of \$ 4.87 per ton, the Superfund Tax was designed to place the burden of such cleanup on those responsible for generating the wastes, but was not intended to influence behaviour through the price system. On the other hand, the ODC Tax aimed to harness market force to aid work of finding substitutes for the taxed chemicals, and thus was intended to influence behaviour through the price system, which turned out to be effective both in raising the price of taxed chemicals and in discouraging their production (Hoerner, 1998).

When considering BTAs for carbon taxes, it is necessary to distinguish energy products (e.g., coal, oil, and gas) from final products (e.g., cars, chemical products). As it would be expected, the application of BTAs to energy products is relatively straightforward. The GATT/WTO rules allow the same taxes to be imposed on imported like (energy) products and the rebate of indirect taxes on exported domestic products, as long as there is no discrimination against foreign energy products. However, the situation becomes much more complicated when the products to be imported or exported are not the energy products themselves, but a product whose production or distribution involves the use of taxed energy input. Let alone whether the adjustment for imports on the basis of the PPMs based BTAs is in conflict with the GATT/WTO principles (see, for example, Stewardson (1994); Zhang (1998); Brack *et al.* (1999)), there are formidable technical difficulties, if not entirely impossible, in identifying the appropriate energy/carbon contents embodied in virtually all traded products unless exporting countries that do not impose energy/carbon taxes are willing to cooperate in certifying how the products are produced.²⁸ In the absence of any information regarding the carbon content of the products from exporting countries, importing countries may prescribe the tax rates based on their domestically predominant method of production for the imported products. This practice is by no means without foundation. For example, the US Secretary of the Treasury has adopted the approach in the tax on imported toxic chemicals under the Superfund Tax (Poterba and Rotemberg, 1995; Hoerner, 1998). Such a practice seems very hard to justify in the case of energy/carbon taxes, given the wide range of technologies in use around the world and very different energy resource endowments and consumption patterns among countries. Even if the same technology were used to produce the same products among countries, the differing resource endowments could lead to a sharp difference in the energy consumption of their most economically efficient technology. For a country that relies on coal as its major source of energy, the larger amount of energy used by a coal-based technology per unit of output vis-à-vis oil/gas-based technologies occurs partly as a result of its high proportion of coal consumption, because coal-based technologies are less efficient than oil/gas-based technologies (Zhang, 1997). It seems unfair to penalize the country whose energy consumption is coal dominant, just because it is unfortunate to have less endowments of oil/gas that, if burned, emits less carbon than coal. Moreover, such a practice would violate the

²⁸ The use of a *de minimis* floor could substantially reduce the number of products that would be covered in the case of energy/carbon taxes, so that BTAs should be avoided where the tax is trivial percentage of the price. For example, in the case of the above Superfund Tax, BTAs are limited to primary products for which the share of taxable chemicals in production is at least 50%, while in the case of the ODC Tax a *de minimis* rule is applied to non-listed products (Hoerner, 1998). However, the desirability of the use of a *de minimis* floor to lower substantial administrative burden must be weighted against the environmental effectiveness of energy/carbon taxes.

WTO rules that do not allow to take trade measures on the basis of the differences in processes and production methods, and appear to deprive developing countries of enjoying the very basis of comparative advantage in their production. Furthermore, such tariffs would likely violate commitments made by the WTO contracting countries not to raise import taxes above ‘bound tariff’ levels, i.e. maximum tariffs for goods listed in an annex to the GATT (WTO, 1995).

In addition to the methodologically challenging, whether a tax levied on a product based on the carbon emitted in its production should be regarded as a direct tax or an indirect tax further complicates applying BTAs to imports. Although the GATT rules allow for BTAs, the only taxes eligible for adjustment are those levied directly on products, such as excise or value added taxes. Taxes not directly levied on products are not eligible for adjustment, such as social security charges and payroll taxes. Given that an emission from the manufacturing process is in no sense part of the product itself when the product arrives at a border, whether a tax on carbon emissions associated with the manufacturing process of imports may be deemed a direct tax is a matter of debate (Cosbey and Cameron, 1999).

The potential effects on competitiveness can be attenuated and even avoided if the introduction of carbon taxes is announced in advance and phased in gradually and increased over time. This will help to reduce economic effects of the tax by avoiding unduly early retirements of existing infrastructures and, at the same time, send a steady but strong price signal for a shift away from carbon-intensive choices. For example, the above ODC Tax in the US 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 (Hoerner, 1998).

Of course, another means of mitigating competitiveness effects is through the international harmonization of energy/carbon taxes. Up to now, our discussion has been restricted to domestic carbon tax. However, even if domestic emission reduction targets are achieved in cost-efficient ways, for example, through a domestic carbon tax, a global cost-efficient emission reduction target can only be achieved if CO₂ emissions are distributed among countries in such a way that the marginal cost of abatement is equalized among countries (cf. Hoel, 1991, 1992). This global cost efficiency may be achieved through either an international carbon tax or a tradable carbon emission permits regime. Hoel (1991) has shown that a tax administrated and collected by an international agency is too bureaucratic and would interfere with domestic sovereignty, while a tax implemented by each government would fall foul of free rider problems, since governments could easily offset a carbon tax by reducing other domestic taxes on fossil fuels. Therefore, the way out could be one in which the carbon tax should be globally imposed on each country by some international agency but nationally administrated and collected through its central government (cf. Hoel, 1991). The carbon tax would be set to be the same for each country. The revenues from the tax would be then reimbursed; handed back to the countries where the revenues are raised according to some agreed rule of allocation. Each country would then act to minimize the sum of its tax payments and abatement costs. Moreover, if an international carbon tax could be put in place, it will help avoid applying complex border tax adjustments among the countries where the common tax is imposed.

The European Commission is a champion in promoting the harmonization of energy/carbon taxes. As part of its comprehensive strategy to control CO₂ emissions and increase energy efficiency, it proposed in 1992 that member states introduced a carbon/energy tax of US\$ 3 per barrel oil equivalent in 1993, rising in real terms by US\$ 1 a year to US\$ 10 per barrel in 2000. After the year 2000, the tax rate will remain at US\$ 10 per barrel at 1993 prices. The tax rates were allocated across fuels, with 50% based on carbon content and 50% on energy content (CEC, 1992). The proposal was subject to intensive discussion. However, in the end, it failed to gain the unanimous support of its member states, mainly because some member states (e.g., the UK) opposed an increase in the fiscal competence of the Community and thus opposed the introduction at a European level of a new tax on the ground of fiscal sovereignty (Delbeke, 1997; Bill, 1999). Even if it had been agreed at the EU level, competitiveness concerns from the outside of the EU suggest that at least similar actions in other main OECD competitors, especially in the United States and Japan, should be undertaken (or some more general OECD-wide tax should be adopted), although it is ideal to impose carbon taxes globally in order to achieve sufficient reductions in global CO₂ emissions. However, given the political difficulties of introducing carbon taxes in countries such as the US, the prospects for the harmonization of carbon taxes at the OECD level seem remote, let alone across wider group of countries. Moreover, the initial difference in energy prices further complicates the harmonization of carbon tax (Zhang, 1997; Eizenstat, 1998). As a consequence of existing distortions in price regulations, taxation, national monopolies, barriers to trade and so on, there are initially great differences in energy prices, both between fuels and across countries (cf. Hoeller and Coppel, 1992). If CO₂ emissions are then to be reduced by similar amounts in two countries, *ceteris paribus*, lower taxes are required for the country with low prices before the tax imposition than for the country with the higher pre-tax prices. Thus, an eventual cost-efficient regime of international carbon tax would presumably need to remove existing distortions in international energy markets. Otherwise, countries with lower pre-tax prices would enjoy free rider benefits, whereas countries with higher pre-tax prices would attempt to offset the impact of international carbon tax through other changes in tax and subsidy policies. In the latter case, distinguishing permissible from prohibited policies would be extraordinarily difficult and could bring unacceptable international scrutiny to domestic tax decisions (Eizenstat, 1998). In conclusion, the harmonization of energy/carbon taxes at the OECD and global levels is the theoretically ideal solution, but is hardly a practical solution to mitigating competitiveness effects.

7. Conclusions

The Kyoto Protocol marks an important first step towards internalising the climate change externality and will potentially represent the most commendable effort by the international community to put the concept of sustainable development into practice. Measures taken by Annex 1 countries to meet greenhouse gas emissions targets will certainly have a bearing on world trade. They will affect the costs of production of traded products and therefore their competitive positions in the world market. Such an

interface between trade policy and climate policy calls for policy co-ordination in a sufficiently serious way.

Given the complex policy solutions required to tackle the global climate change problem and that the amendment procedure in the WTO is cumbersome, it would seem much preferable to strengthen the Climate Change Convention through the Kyoto Protocol and any follow-up legal instruments rather than to propose amendments to WTO rules to achieve the goals of the Climate Change Convention. Closely related to this, there might be the need to revisit and eventually strengthen languages in Article 3.5 of the Climate Change Convention and Article 2.3 of the Kyoto Protocol with a view to enhancing coherence between trade, climate change and development policies.

In dealing with transboundary and global environmental problems, it is more likely that measures adopted through multilateral negotiations may be WTO-consistent, although the question remains about how the WTO would deal with an MEA with trade measures in relation to a WTO member that is not a party to this specific MEA but is affected by these measures. Indeed, the GATT and WTO panels have repeatedly made reference to multilateral solutions to environmental problems, and the WTO Committee on Trade and Environment, in the Singapore Report, “endorses and supports multilateral solutions based on international co-operation and consensus as the best and most effective way for governments to tackle environmental problems of a transboundary or global nature” (WTO, 1996).

Experience with existing MEAs²⁹ shows that trade measures agreed to within the MEAs themselves may not necessarily lead to a dispute between parties. On the contrary, there is a great chance that disputes may arise from national measures undertaken to fulfil those obligations under the MEAs. The CITES, for example, explicitly allows its Parties to take stricter national measures than the trade measures multilaterally agreed to, although the Parties to the CITES have not formally complained to the Conference of the Parties concerning stricter measures. This possibility of conflict may well arise in implementing the Kyoto Protocol. As discussed in the paper, policy responses to meet the Kyoto emissions targets will require a fundamental change in the way that energy is produced and the way it is used, and thus will essentially centre on the greenhouse gas emitted by energy-using PPMs. This raises concern about trade implications of the whole PPMs controversy. Moreover, it is highly likely that Annex 1 governments with differentiated legal and political systems might pursue these policies in such a way as to unfairly favour domestic producers over foreign ones. Consequently, these domestic climate policies might have the potential to bring countries into conflict with their WTO obligations. In many cases, however, such conflicts are not so intractable as to threaten the integrity of either the Kyoto Protocol or the WTO. Provided that WTO rules are carefully scrutinised at the time Annex 1 governments take measures to achieve the required reductions in emissions, these conflicts can be avoided or at least minimized.

One strategy of avoiding the potential for conflict between the climate regime and the WTO rules is to pursue multilaterally agreed, WTO-consistent measures. Given that the TBT Agreement gives a regulation

adopted pursuant to international standards a “presumption of consistency” with its disciplines, it seems logical to conclude that measures taken pursuant to recommendations or mandates of the Climate Change Convention would certainly be more acceptable than measures taken unilaterally. This can be translated into a strong plea for multilateralism, a fundamental principle in the world trade regime. In this regard, although the prospects for the harmonization of performance standards among Annex 1 countries seem remote, there is a much stronger case for attempting to harmonize procedural standards and procedures of establishing eco-labels. This would lower the costs of information on, and adjustments to, different requirements involved in exporting to different markets, thus promoting international trade.

The establishment of a joint WTO/UNFCCC working group -- specifically focussing on greater coherence between trade, climate change and development policy -- could be an important step to help maximise synergies, while minimising the potential for conflict.³⁰ Unlike the Uruguay Round group with a mandate to examine the functioning of the GATT system, this joint working group could focus on discussions on the technical aspects and trade implications of specific measures and flexibility mechanisms envisioned in the implementation phase of the Kyoto Protocol. This would bring the consideration of specific climate policies and their resulting trade effects to a multilateral level and, at the same time, ensure their close consistency with the WTO rules, thus maximizing the WTO’s contributions to sustainable development.

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²⁹ Such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, and the Montreal Protocol on Substances that Deplete the Ozone Layer.

³⁰ In this regard, it is worth noting that similar sorts of successful joint working groups have been established in the past, for example, between the UNFCCC and the Intergovernmental Panel on Climate Change (IPCC). Such working groups have clear mandate within a given time framework.

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