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What Can Be Done to Blunt Potential Conflict Between
Climate Change and Trade Policies?

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Abstract

The December 2015 COP 21 meeting aspires to establish a post-Kyoto Protocol agreement for addressing climate change. The shift in emphasis towards self-determined emission targets in the COP21 approach to mitigation may raise the risk of disputes over the use of border measures as part of nationally determined climate strategies. This paper discusses the tax policies at the border and subsidy elements of climate change-motivated measures and the policy reactions that may follow in cases where prior agreement has not been secured in relation to the permissible use of these instruments.

Keywords

Climate change; WTO; trade policy; subsidies

I. Introduction*

A growing literature considers how climate change policy and the multilateral trade regime will interact as policy-imposed carbon constraints begin to bite in a more significant manner than has been the case so far.¹ This literature is not matched, however, by comparable engagement on the issue among governments. Under the United Nations Framework Convention on Climate Change (UNFCCC) in Durban in December 2011, the relationship between trade policy and climate change was only addressed in side events. Moreover, it would appear that one strand of the discussions upon which agreement proved elusive was not so much what should be done, but where -- whether under UNFCCC auspices or in the WTO. That suggests constructive engagement has some way to go.

In subsequent annual meetings of the UNFCCC's Conference of the Parties (COP), held in Doha in 2012, Warsaw in 2013, and Lima in 2014 made no progress in shaping agreed rules for managing the interface between climate change policy and trade measures. The COP 21 meeting to be held in Paris in December 2015 aspires to establish a post-Kyoto Protocol agreement for addressing climate change. The shift in emphasis towards self-determined emission targets in the COP21 approach to mitigation may raise the risk of disputes over the use of trade restrictions or taxes as part of nationally determined strategies. Yet it is precisely the move towards "best-endeavours", unilaterally determined targets that could lessen enthusiasm for constructing explicit understandings on permissible trade policy actions to support mitigation.

In short, the greater the degree of reliance on nationally determined actions on climate change, the greater the scope for a clash of regimes. A classic scenario is where the costs imposed on a particular industry through carbon constraint measures in one jurisdiction lead to the migration of that industry to a carbon-constraint-free jurisdiction elsewhere (carbon leakage). The affected industry then complains that its competitiveness has been undermined in the name of a climate change policy that will do nothing to reduce global warming. An obvious reaction of a carbon-constraining government to prevent this outcome is to deploy trade (or trade-related) policy to neutralize the negative competitiveness effects. Notwithstanding research (Mattoo et al., suggesting that minimal carbon leakage will result from unilateral emission cuts at the national level, there is a risk that the WTO could become a flash point of policy clashes in the absence of pre-commitment internationally on climate policies. In the absence of adequate accommodation, both climate change policy and trade policy will be adversely affected.

In a more optimistic frame of mind, Patrick Messerlin provides an interesting perspective on the risk of regime clash (Messerlin, 2012). He argues that the climate and trade communities share a common interest in dealing with an international public good. The climate community has no interest in seeing protectionist trade policies used to slow down climate change mitigation efforts. The trade policy community has no interest either in seeing protectionist policies reduce opportunities for attaining socially desirable gains from trade opening. The two communities could make common cause against governments that accommodate protectionist interests. While this coalition could well develop as climate change policies bite more than they do at present, the fact remains that governments are going to have to negotiate some aspects of trade policy behavior as well as climate change policy.

* The author wishes to thank participants at the Yale meeting in December 2011 and Michele Ruta for comments on his presentation. The Yale meeting was an occasion to celebrate Patrick Messerlin's contributions over the years to thinking on trade policy issues. His contributions to the literature are highly diverse and unfailingly original. This is also true of the subject of the present paper. We owe him a debt of gratitude.

¹ In spite of the development of carbon constraint policies across many nations in recent years, both at the national and sub-national levels, most of the action still constitutes promises about future action. Existing arrangements such as the European Trading Scheme have yet to achieve significant emission reductions.

The areas in which trade policy may interact with climate change policy are several (Low et al., 2011). They include tax policies, subsidies, anti-dumping and countervailing duties, regulations (standards and labeling), trade-related investment measures (TRIMS), and trade-related intellectual property rights (TRIPS). This is not an exhaustive list.

This paper focuses on the first two – tax policies at the border and subsidies. Within these two areas, other aspects of trade policy may still be relevant. Instead of adjusting taxes at the border, for example, a standard or regulation may apply to imported products. The standard could be cost-augmenting and expressed in terms of a tax-equivalent, but it would likely be WTO-consistent if the same standard applied and was administered in a way that imparted no competitive advantage on like domestic products. In the case of subsidies, where these are not ruled out as illegal *ex ante*, they may attract a countervailing or an anti-dumping duty. A TRIPS angle could also enter the picture if something were done to accommodate subsidy practices associated with research and development expenditures. Despite the interconnectedness among these various policy areas, however, the approach taken here is to focus primarily on the tax and subsidy elements of the interface between climate change and trade policies.

The next section of the paper will deal with the tax aspects. Section III will then take up subsidy issues and the policy reactions that follow in cases where prior agreement has not been secured in relation to the permissible use of subsidies. Section IV concludes.

II. International tax policy in the shadow of national climate change policy

The main focus here is that element of tax policy concerned with addressing carbon leakage and the loss of competitiveness. Potential difficulties arise from differing degrees of effort to mitigate climate change at the national level, combined with the absence of an international agreement on the appropriate distribution of responsibility for tackling global warming. The extent to which the tension arises depends in part on the policy chosen.

A carbon tax

If a uniform carbon tax were to be agreed internationally, the issue could be relatively straightforward. The simplicity would be compromised, however, if carbon taxes were to be treated analogously with the treatment of value-added tax in international trade. Since a carbon tax is an indirect tax falling on products and not a direct tax levied on the factors of production, it would be assumed that it is shifted forward and is therefore a 'destination principle' tax subject to a border tax adjustment. In other words, a carbon tax would not be paid on exports but levied instead by the importing country at rates equal to those charged domestically. The shifting assumptions behind this treatment are somewhat arbitrary because the incidence of any tax will depend on the competitive conditions in the market. Seemingly, the shifting assumptions behind direct and indirect taxes originate in the fact that historically direct taxes were property taxes that could not be readily shifted to consumers, whereas indirect taxes were the 'sin' taxes on alcohol and tobacco that were generally paid by consumers (Hufbauer, 1996).

A carbon tax would not be as straightforward as a value-added tax to adjust at the border because there would likely be many different effective rates, depending on the carbon intensity of production, even if the tax itself were uniform. It would not only be a matter of distinguishing between clean and dirty industries or products, and setting a carbon tax accordingly. Differences in tax incidence would also exist within product categories. Value-added taxes, by contrast, tend to apply at a standard rate on the value of products. Moreover, they are paid on final goods and not on inputs, as is the case with a carbon tax.

In light of these complications, one might consider a departure from the standard practice in trade policy of adjusting indirect taxes at the border. If a carbon tax were uniform across countries, why not

simply treat it as if it were a direct tax and rule out any border tax adjustments? This would serve the incentive effect of inducing firms to improve production techniques or technologies in order to pay less tax and be more competitive. The absence of border tax adjustments might add a further stimulus to that incentive by removing any possibility of manipulating border adjustments to afford protection to a domestic industry.

Provided an agreement could be reached on a global carbon tax, and border adjustments were disallowed, much of the debate on the interface between trade and climate change could be rendered moot, at least as far as this aspect of the interface is concerned. If the carbon tax were indeed global, however, an equity issues could arise. In the spirit of the principle of "common but differentiated responsibilities" enshrined in the Kyoto Protocol (1997), transfers of one sort or another may be appropriate if all countries were to adopt a uniform carbon tax. Alternatively, a threshold might be established below which carbon emissions of a country were sufficiently minor to justify an exemption from the carbon tax. Carbon taxes would become payable once the threshold have been reached.

Forging an international agreement on carbon taxes would be a significant challenge, in part because of the way taxes are regarded in political discourse. Nordhaus (2008) has pointed out that opposition to taxes may in part be because "goods" rather than "bads" are typically taxed -- that is, the reason for taxing incomes is because they provide a convenient tax base, not because income is a negative externality. By contrast, opposition to taxing negative externalities such as carbon emissions should logically not encounter the same degree of opposition.

A shift of the tax burden away from "goods" and onto "bads" should not be sector-specific. In other words, those paying the carbon taxes should not be exempted from income or profits taxes, since this would reduce the incentive effects of a carbon tax in terms of efforts to reduce carbon emissions. Selective tax breaks may also fall foul of WTO rules if they were regarded as specific subsidies.

Another concern relating to carbon taxes has been pointed out by McKibbin and Wilcoxon (2002). It is that business would be reluctant to brook the size of transfers implied by such a tax. This problem arises where firms may be required to pay more taxes than they would spend on emissions. In contrast to a permit system that sets an upper limit on emissions and renders emissions below that threshold free, a tax would apply to all emissions. The degree to which this is a problem depends on how severe the emission constraint is and how high the tax. McKibbin and Wilcoxon (2002) argue that this consideration explains why Pigouvian taxes such as a carbon tax have rarely been used as an environmental policy. They go on to devise a hybrid scheme involving the best elements of both policies, and avoiding large fiscal transfers.

A further criticism of taxes as opposed to permits is that taxes do not provide a 'quantitative steer', since it is impossible to tell with accuracy beforehand what the effects of a given tax rate will be on emission levels. Permits, on the other hand, set absolute limits on the amount of permitted pollution. As Nordhaus (2008) points out, however, so much uncertainty exists about the optimal level of abatement that this particular advantage of quantitative limitations is attenuated. Moreover, as Stern (2006) observes, in a world of uncertainty there is no valid *prima facie* assumption about the superiority of permits or taxes in welfare terms. If policy changes are required to fix policy where prior uncertainty has led to an inappropriate level of taxes or permits, it turns out that taxes are welfare-superior in the short-term and permits in the long-term. This is because of the relative slopes of the cost and benefit curves associated with mitigation actions change through time.²

² In the short-term the abatement cost curve is steeper than the benefit curve, and the relationship is reversed in the longer-term. This makes the difference in terms of welfare costs measured along the price and quantity axes.

Cap-and-Trade

Despite the economic arguments in favor of taxes over permits that have been strongly advocated by Nordhaus (2008), Cooper (1998) and others, permits are a prominent feature of climate mitigation efforts in a growing number of jurisdictions. Permits are generally rendered tradable, thus combining administrative decisions with the market mechanism into a cap-and-trade scheme. The European Union leads the field with its Emissions Trading System (ETS). The Kyoto Protocol has embraced cap-and-trade by setting quantitative limits on the emissions of Annex B countries and allowing the permits to be traded. According to Chichilnisky and Sheeran (2009), cap-and-trade was a compromise between those that favored regulation and those that believed the market held the secret to efficient climate change mitigation.

Another selling point for cap-and trade was that in an efficient market the initial distribution of permits did not matter, so this was an instrument that could be deployed for international financial transfers. Low emitters would be given permits they could not use and they would then be able to sell them in the market to those that did need them. The environmental consequences of such an arrangement would depend crucially upon what the revenue from unused permits would be used for.

The ETS is the best place to look for experience of how cap-and-trade has functioned. Early results have been modest, perhaps intentionally so because it was felt experimentation with the mechanism was necessary and its public acceptance would be easier if it did not lead immediately to significant carbon constraints. Problems with the ETS have included tax fraud (the VAT carousel), the theft of Certification of Emission Reduction certificates, the failure to retire permits from circulation that had already been used, and the practice of some utilities of raising prices under the guise of having to meet carbon constraint costs that were not actually incurred. These are generally problems that can be fixed through regulatory improvements.

Structural features of the market may be harder to manage, such as the fact that supply is relatively fixed, through government fiat, while demand fluctuates, creating considerable price volatility from time to time. Another consideration is whether, if the market is internationalized, sovereign wealth funds will have the market muscle to manipulate prices.

The fact that permits have been given away and not auctioned under the ETS has kept production costs down and reduced innovation incentives, affecting the pace of adoption of cleaner technologies. Some have also argued that the Clean Development Mechanism may inhibit innovation, since it provides a means for relaxing the costs of reducing emissions. Constrained sectors have tended to be those in which less trade takes place and there is less susceptibility to international competition. In general, experience so far with the carbon market has highlighted areas where improvements might be made.

Border tax adjustments

The discussion above suggests that the choice between carbon taxes and cap-and-trade arrangements does not depend primarily on any advantage with respect managing border tax adjustments. It does not really matter in this context whether charges on carbon constraints take the form of taxes or quotas. In either case, border tax adjustments will be complicated and contentious. The advantage of the tax is that it could be made uniform across countries and sectors,³ thereby taking away the logic for making such adjustments. Cap-and-trade arrangements, on the other hand, tend to be sectoral and therefore impinge more directly on competitiveness issues. If it were politically feasible to negotiate a uniform carbon tax, the avoidance of the border tax adjustment question would add another consideration in favor of carbon taxes rather than tradable permits.

³ As discussed above, an exemption could be made for countries with emission levels below a certain threshold. This should not for the most part raise major competitiveness issues.

The already copious literature on border tax adjustments has been framed largely in terms of cap-and-trade, if for no other reason than that this is the predominant mode for emission reduction policies. Some have argued that border tax adjustments on emissions would infringe WTO rules and others have argued the contrary. The issue turns primarily on the definition of likeness and on whether charges or restraints on inputs into the production process that are not physically incorporated in the product can be adjusted at the border. A further potential complication relates to the difficulties of calculating the carbon content of imports and the attendant risk of WTO-inconsistent over-adjustment. A further issue is whether, if a justification cannot be found for border adjustments through regular WTO rules, it might be possible to invoke the public policy exception of GATT Article XX for environmental reasons.

These issues are not explored further here.⁴ Suffice it to say that a uniform carbon tax would obviate the need for border tax adjustments on competitiveness grounds. The only way a cap-and-trade scheme would be comparable in this sense is if some way were found to issue emission permits uniformly across all emitters -- hardly a realistic prospect. If governments start to rely on border tax adjustments it is difficult to see how legal and political complications will be avoided, particularly if there has been no prior negotiation on the issue. One only has to look at the commotion caused by the unilateral decision taken by the EU to include air transport in the ETS a year or two ago to see why difficulties are likely to arrive. Finally, an important point to note about border tax adjustments motivated by competitiveness concerns is that they only partially do the job for the simple reason that they cannot address competitiveness issues arising in third markets.

A possible alternative

If uniform carbon taxes cannot be instituted internationally, even among the major carbon source countries, an alternative approach to avoiding border tax adjustments may warrant consideration.⁵ This approach would involve a trade-off that would effectively separate environmental objectives from competitiveness considerations, while ensuring that carbon leakage is no longer an issue. Twenty countries (counting the EU as one) account for around 80 per cent of global greenhouse gas (GHG) emissions. Suppose these 20 countries were to agree to binding, internationally justiciable emission reduction commitments at the national level. This negotiation would be undertaken against the background of the principle of common but differentiated responsibility enunciated in the Kyoto Protocol.

Once the emission ceilings were agreed, it would be for governments to decide in which sectors they wished to reduce emissions. If, as a consequence of a particular sectoral choice an industry decided to migrate to an unconstrained jurisdiction -- potentially resulting in industry-level carbon leakage -- it would be for that jurisdiction to make compensating adjustments elsewhere in order to meet its emission reduction obligations.

If governments eschew an across-the-board approach to constraining carbon, opting instead for a variant of industrial policy, they would have to accept that their choice of where to intervene would effectively become part of the calculus of comparative advantage. They could no longer behave as if their choices needed to be mirrored by their trading partners. If governments succeeded in negotiating their emission reductions, and accepted that in exchange for the adoption by all major emitters of binding emission ceilings, there would be no recourse to border tax adjustments, one potential problem would still remain. Firms or industries within sectors subject to carbon constraints may try to claw back some of their competitiveness, at least in the domestic market, by filing anti-dumping or

⁴ For a full discussion see, for instance, Pauwelyn (2007), UNEP and WTO (2009), Condon (2009) and Low et al (2011).

⁵ This approach was also mooted in Low et al. (2011)

countervailing duty action, or they may ask for safeguards.⁶ Avoidance of such an outcome would either require buy-in from industry, or governments would have to find ways of forestalling such a reaction. This would not be easy, which brings back the argument that a uniform carbon tax would still be the superior approach, assuming it could ever be agreed.

III. What To Do About Subsidies

Subsidize with care

Only the most committed free marketeer would claim that subsidies had no place in public policy. For most commentators the challenge is to distinguish between good and bad subsidies. A textbook approach to this is straightforward, since it only requires that subsidies may be deployed when market imperfections, such as the existence of externalities, increasing returns to scale or information asymmetries, drive a wedge between public and private welfare. But that is where simplicity ends because the existence of these market imperfections is difficult to pin down with precision. Even if there is agreement that an externality or some other market failure is present, it is another matter to agree on its magnitude and therefore on the appropriate degree of intervention to address it. Moreover, subsidies may also be deployed for non-economic reasons, such as to address a socially unacceptable distribution of income.⁷

Subsidies that purport to be in the public interest can have severely distorting consequences, let alone those that serve narrow interests at the expense of national welfare. Examples abound of bad subsidies, including ones that are touted as solutions for the shortcomings of markets. In order to avoid a lengthy discussion, the focus here is upon only one kind of subsidy -- support to research and development (R&D) expenditures in the name of developing technologies that will assist in combating climate change.

One of two assumptions is necessary to respond to the assertion that this kind of subsidy is unnecessary where private capital, supported by a system of intellectual property rights, is sufficient to the task of supplying climate-friendly technologies. The first is that the urgency of the need for such technologies, and the risks associated with R&D investments in this field, are too great for private capital to respond adequately. The second is that subsidies are needed, if not at the R&D stage, then at least when it comes to hastening the diffusion and lowering the costs of such technologies. These arguments might make the case for subsidies, but they do not address the reality that many climate change-related subsidies can be shown to be inefficient, distorting and excessive.⁸

Let us assume that all the health warnings against the abuse of subsidies are heeded and the case can still be made for R&D subsidies to climate-related innovation. The question then is whether the trade rules would allow such subsidies to be deployed, or would they result in trade frictions that ultimately undermine the use of subsidies designed to hasten technological solutions to climate change?

Subsidies can take many forms if they are broadly enough defined. They can constitute taxes that confer an advantage within a market if some products or producers in that market are exempted from paying the tax. The same applies to regulatory interventions if they are designed in a particular fashion. Even the absence of regulation might in some circumstances be argued to amount to a subsidy (Trachtman, 1993). Subsidies also operate through the financial system via preferential interest rates

⁶ I am indebted to Patrick Messerlin for this point.

⁷ For a more thorough but nevertheless brief discussion of these issues, see Low (2001).

⁸ See, for example, the work of the International Institute for Sustainable Development (IISD, 2008; IISD, 2010)

or loans. Subsidies to R&D can be more or less direct, and therefore more or less transparent and more or less distorting. They could operate in factor markets or product markets.⁹

The WTO rules on subsidies: legal uncertainty

The multiplicity of ways in which subsidies can be designed and the elasticity of the definition of what constitutes a subsidy pose a challenge for international rule-making. The WTO has opted for a relatively narrow definition, but this still creates a situation in which socially desirable subsidies may be successfully challenged on competitiveness grounds. Indeed, Green (2006) suggests that many of the policies used today to foster the green economy could be challenged under the Agreement on Subsidies and Countervailing Measures (SCM). To the extent this is so, climate change policies operate under a degree of uncertainty that could frustrate socially sound approaches to the climate externality and presage regime clash.

A growing literature demonstrates the extent of that uncertainty, which unsurprisingly goes beyond the specifics of subsidies relating to climate change policies.¹⁰ The discussion that follows only seeks to illustrate how interpretive differences remain unresolved, and how the economic logic of possible legal interpretations demonstrates that economics and law are not always well aligned in this area.

The SCM Agreement distinguishes between actionable and prohibited subsidies. The latter are defined as subsidies contingent upon exports, and the requirement to use domestic rather than foreign inputs in production. A recent disagreement between China and the United States over Chinese measures affecting the production of wind turbines illustrates how climate change policies and industrial policies can become intertwined. The United States alleged that China was subsidizing the use of domestic inputs rather than imported ones -- a prohibited subsidy under the SCM Agreement. China responded that its support for the wind turbine industry was to foster investment in wind power technology (ICTSD, 2011).

Since the expiry of Articles 8 and 9 of the SCM Agreement (see below), this difference in the interpretation of a measure is less decisive in terms of whether Chinese support for its wind turbine sector was WTO-consistent. On the other hand, recent jurisprudence from the Appellate Body suggests that the public policy provisions of Article XX could perhaps be interpreted to justify environment-related subsidies (Howse, 2010; Low et al., 2011). Regardless of the direction in which the legal analysis goes, these two representations of Chinese measure on wind turbines illustrate the tension between climate change policy and competitiveness concerns. In the event, China announced the discontinuation of the program and so no formal action from the US side went forward.

Other key elements in the SCM Agreement relate to the definition of a subsidy. A subsidy is deemed to exist if it entails a financial contribution and confers a benefit. The subsidy must also be specific and cause adverse effects in order to be actionable. Each of these elements is potentially subject to competing legal interpretation and can be the source of policy uncertainty and conflict.

On the issue of the existence of a financial contribution, for example, Eliason and Howse (2009) argue that emission permits might be considered a subsidy on the grounds that it constitutes government-granted access to an exhaustible natural resource. A benefit would be conferred if permits were grandfathered (given away free). Stiglitz (2008) has argued that the failure of the United States to ratify the Kyoto Protocol constitutes a subsidy to US industry. These sorts of arguments do not find favor among all commentators.

⁹ For a useful taxonomy of subsidy policies and review of what governments are actually doing in the name of reducing carbon emissions, see Australian Government Productivity Commission (2011).

¹⁰ See, for example, Sykes (2003), and Trebilcock and Howse (2005).

When it comes to benefits, Sykes (2003) has pointed out that a true economic analysis of a benefit that might result from a subsidy requires clarification of the basis upon which the assessment is made. Other government policies may have affected the conditions of competition in the market such that the subsidy in question may not confer a benefit. Rather, it may serve to rectify a situation in which the recipient was previously disadvantaged. The characterization of the market in which a subsidy is granted is therefore crucial in the determination of whether a benefit has been conferred.

Specificity is also a concept that carries complications. Writing in 1982, the present author argued that the specificity criterion was a good rule of thumb from an economic perspective (Low, 1982). The rationale for the argument was that the more specific the subsidy is, the sharper will be its distorting effect on relative prices. More recent literature is less sanguine on this point, arguing that there is no reason to assume from a welfare perspective that a subsidy aimed at a particular industry rather than of more general application will be less applicable in the face of a market failure (Sykes, 2003). The situation is made more complicated by the fact that the SCM Agreement covers both *de jure* and *de facto* specificity.

Reducing uncertainty?

Howse (2010) has summarized four approaches through which the specifics of climate change policy might be exempted from the current situation of legal uncertainty with respect to the use of subsidies. The first involves the use of Article XX of GATT, which contain the public policy exceptions to GATT rules that would otherwise prohibit certain actions. This is an approach favored by Green (2006) and arguably the *Brazil-Tyres* points in the direction of allowing a broad interpretation of the permissibility of applying trade policies in pursuit of environmental objectives. On the other hand, as governments become increasingly concerned by the growing use of subsidies for putatively environmental ends, such an interpretation of Article XX could become more contentious. This may lead to an use of unilateral contingency protection measures such as countervailing duties, which would do little to reduce uncertainty.

Secondly, a proposal that has attracted fairly widespread support, at least among commentators concerned about climate change, is to resurrect Articles 8 and 9 of the SCM Agreement. In the Uruguay Round SCM text, Article 8 and Article 9 dealt with non-actionable subsidies. Under carefully specified conditions (SCM, Article 8), designed in some measure to lessen the competitiveness consequences of non-actionability, for R&D subsidies and to offset some of the costs arising for firms of environmental regulation. The provisions were agreed for a trial period of five years and the default on the decision was that Members would have to agree explicitly to the continuation of these exemptions from anti-subsidy action. In the event, no decision was taken to extend the provisions. Reviving them could certainly contribute to softening the tension between environmental policy and competitiveness.

Howse's third proposal is for a negotiation-based approach. This refers to the Doha mandate to negotiate down obstacles to trade in environmentally-friendly goods and services. The mandate refers to both tariffs and non-tariff barriers (NTBs), but the negotiators have focused only on tariffs. They have encountered difficulty on the definition of environmentally-friendly products, which does not auger well for an expansion of the discussion to include NTBs. On the other hand, as Howse points out, if that were to be done, we would have a forum for discussing fossil fuel subsidies and subsidies to biofuels that some have argued do little or nothing for the environment. But whether the WTO would be the best forum for such a negotiation is a moot point.

Finally, the fourth suggestion is for the climate change community to come to closure on how to handle environmental subsidies and for the WTO to agree a waiver that would protect subsidies permitted in the context of UNFCCC negotiations from legal action under WTO provisions. This requires agreement among members as to forum choice -- something that was certainly elusive in Durban.

Emerging tension between climate change policy and contingency protection actions

We are beginning to witness a number of actions against alleged subsidies that are at least putatively designed to foster R&D aimed at developing more climate-friendly technologies. Reference has already been made above to the issue of wind turbine subsidies arising between the United States and China.

China has announced that it is investigating energy subsidies in the United States and will report on them by May 2012. This action is reported as being partly in response to US anti-dumping and countervailing duty investigation against Chinese solar panels (Shanghai Daily, 2011). An alliance of Chinese solar firms is also considering filing an anti-dumping petition against US companies accused of dumping polysilicon -- a raw material used in manufacturing solar cells (Shanghai Daily, 2011).

The United States has also asked China for consultations on the alleged failure of China to notify some 200 subsidy programs which the United States claims violate WTO rules (New York Times, 2011).

Japan has initiated a WTO dispute against Canada for allegedly fixing high long-term prices to producers of energy from renewable resources such as wind and solar power. A key element of the complaint is that the beneficiaries of this arrangement are required to source a certain percentage of inputs into a qualifying energy project from domestic sources. Domestic content requirements are likely to fall foul of WTO rules (Reuters, 2010).

In both the panels in the Airbus and Boeing cases, elements of R&D subsidization were found to be inconsistent with WTO rules. In the case of Boeing, for example, NASA had developed a lighter-weight alloy for spacecraft. In airplanes alloys weighing less mean that less fuel will be burned in flight, an obvious environmental benefit. NASA gave the technology to Boeing.

Another potential complaint from the United States is against the alleged domestic content requirements India imposes on its solar energy sector (Business Standard, 2011). The frequency with which "green" economy policies are seemingly associated with domestic content requirements is striking. This was also an issue in the initial case between China and the United States on Chinese R&D support for wind turbines. A larger issue here is how far the green economy is supported by subsidies of one sort or another, and how many of these subsidies can be classified as good or bad from an economic perspective. Then there is the question whether these policies, be they economically harmful or beneficial, are consistent with WTO rules. At the very least, they can be subjected to contingency protection measures.

A added wrinkle in this context is that if a subsidy associated with R&D is successfully deployed and lowers the price of a traded good, it may face not only a countervailing duty, but could also be challenged through an anti-dumping petition. This is because the definition of dumping is broad, and only requires evidence of a lower price in international trade than the "normal" domestic price. Since such price differentiation between segmented markets is commonplace (and can be explained by a variety of factors), finding a dumping margin can be quite straightforward. This leaves the injury test in anti-dumping investigations as the major filter through which an anti-dumping petition could be rejected.

Are there ways of separating the environmental and competitiveness aspects of subsidies?

In the Howse paper mentioned above (Howse, 2010), four proposals were made. These were to interpret GATT Article XX public policy exceptions as encompassing environmental subsidies, to resurrect Articles 8 and 9 of the SCM Agreement thereby making certain R&D subsidies non-actionable, to seek negotiated outcomes in the WTO, and for the WTO to yield via a waiver to whatever the UNFCCC decided was appropriate in terms of subsidy policy in the name of climate change mitigation. The third of these referred primarily to negotiations aimed at eliminating

environmentally unfriendly barriers to trade. The other three carry the implication that subsidies aimed at addressing climate change trump competitiveness concerns.

One way of softening the clash between environment and competitiveness might be to find ways of "exhausting" the subsidy in the marketplace without undermining the R&D effort. Suppose two situations: one in which the subsidy goes to a university department and the other goes to a firm. If a patentable technology advance emerges from a laboratory in a university, the government might claim ownership of the discovery and make it free. The R&D would then have been rewarded without affecting competition in the market

This might not be the case if the university researchers were permitted to claim any patentable invention they were responsible for. If the scientists decided to use the patent and establish their own business, the R&D subsidy would not be exhausted. If, on the other hand, the scientists sold the patent to an investor who then went into business, the subsidy would be eliminated.

If R&D subsidies were paid directly to firms, the government would have to step in and claim the patent once a successful invention had been discovered in order to exhaust the subsidy in the marketplace. This would presumably act as a disincentive to firms considering whether to accept government subsidies for undertaking research. It could also have an adverse incentive on declaring inventions if this meant that subsidies ceased upon the development of a new technology. Exhaustion may therefore require that the firm discovering the invention is paid at least something for surrendering a patent to government so that an invention is made available for general use.

It is important to note that in effect a subsidy will never be exhausted even if the discovery is sold at the market value. This is because the marketplace cannot be insulated from the fact that without the subsidy the invention would simply not exist, regardless of who paid what for it (Grossman and Mavroides, 2003, 2005). Notwithstanding this observation, the near-exhaustion of a patent through some purchasing or regulatory arrangement would surely blunt the tension between environmental policy and competitiveness.

IV. Conclusions

This paper has examined the actual and potential interaction between climate change policy and trade policy, stressing two areas in particular where regime conflict could occur in the absence of pre-commitment among governments. It is unclear how tensions between the climate change regime and the WTO are going to be avoided unless governments negotiate on the areas vulnerable to such a clash.

The paper has noted several areas in which these difficulties could occur, but has focused on two -- border adjustment measures and subsidies. There is little doubt that a uniform carbon tax set at a level that internalizes the social costs of GHG emissions would on the whole be the most economically efficient approach to address potential regime conflict arising from tensions between climate change policy and competitiveness.

The paper discusses the arguments for and against this approach, and notes that apart from its other efficiency properties and potential flexibility in designing tax incidence at the national level, a uniform carbon tax would embody all the desired incentives for reducing carbon emissions without running into the political economy challenges of a cap-and-trade system. On the other hand, political resistance to carbon taxes is strong.

If cap-and-trade is to continue being the dominant mode for climate change policy, and carbon constraint obligations are going to be set in quantitative terms, the paper argues that internationally binding emission limitation commitments combined with the freedom for governments to choose where to apply carbon constraints would remove any need for border adjustment measures. This

arrangement would probably need to be backed up with constraints on the use of contingency protection measures.

On the subsidies front, the challenge of distinguishing between good and bad subsidies is formidable in practical terms. WTO rules are not able to do this, and even if they were, this may not ensure that socially desirable subsidies would be immune from contingency protection measures. Several options have been put forward for softening the potential for conflict in this area. Solutions are most likely to emerge through an approach that effectively ring fences genuine R&D subsidies from neutralization through retaliatory policies of one kind or another. But none of these solution stand much chance of working in the absence of negotiations. This brings us back to Patrick Messerlin's argument (Messerlin, 2012) that the best way to engage governments in such a negotiation is for the climate change and the trade communities to articulate and make common cause around their shared interest in avoiding damage to the climate or damage to trade.

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