

Climate Change, Competitiveness and Trade

Aaron Cosbey and Richard Tarasofsky

A Chatham House Report

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ABOUT THE AUTHORS

Aaron Cosbey is a development economist with 15 years of experience in the area of trade and sustainable development, and an abiding interest in the intersection of the trade and climate change regimes. He is Associate and Senior Advisor with the International Institute for Sustainable Development (Winnipeg, Canada), where he works in the Trade & Investment and Climate Change & Energy programmes. He has advised numerous governments and intergovernmental organizations, and published widely on both trade and climate change topics.

Richard Tarasofsky heads the Energy, Environment and Development Programme at Chatham House. He trained as an international lawyer and for the past 16 years has worked with international organizations, governments and NGOs on sustainable development issues. He has published extensively on the interface between trade and environment since 1993.

EXECUTIVE SUMMARY

This report considers the implications of the Kyoto Protocol on competitiveness and addresses the WTO-compatibility of measures to offset competitive losses.

From the outset the Kyoto Protocol and the United Nations Framework Convention on Climate Change have had to contend with perceived tension between effective action to slow climate change and maintenance of competitiveness. This report explores the nature of the concerns over competitiveness, trying to dissect them in a meaningful way and assess the need for concern. It employs a definition of competitiveness that applies as between firms, as opposed to any general notion of the competitiveness of nations.

Two types of competitiveness concerns are identified and addressed. The first – the ‘non-Party problem’ – is that implementation may create an uneven playing field, with firms and sectors from non-Parties enjoying an unfair advantage because they are not subject to carbon constraints. The second – the ‘implementation problem’ – is that Parties may create unfair competitive advantages for domestic industry by the manner in which they implement their Kyoto commitments.

Surveying the literature for insight on the non-Party problem, the report finds a rich body of work on the influence of environmental regulatory policy on investment and production decisions. The overall picture painted by that work is that there are competitiveness impacts associated with environmental regulation, but that in most (though not all) cases they are moderate. Sectoral characteristics matter; for example, it matters how energy-intensive the sector is, what the state of technology is, and to what extent firms are able to pass along cost increases to customers. The form of regulation also matters.

The EU’s Emissions Trading Scheme is used as an obvious case study for the implementation problem. The report finds that there may be potential for significant impact in the longer term, under more ambitious targets, and in those sectors where higher electricity prices can be passed on from utilities (steel being a possible example). But even then the unevenness of the playing field among EU countries is likely to be relatively low, and along the lines of existing differentials driven by the traditional constituent ingredients of comparative advantage. At least in the medium term, the implementation problem seems constitute a lesser cause for concern than the non-Party problem.

The section on competitiveness concludes with a brief look at those factors that might render a firm more or less vulnerable to negative competitiveness impacts. The question is posed at three levels: firm, sector and nation. At the firm level, ability to innovate is key. At the sectoral level, energy intensity, opportunities for abatement and ability to pass along cost increases are highlighted. At the national level – where there may be the greatest potential for government policy to address impacts – the scope and distribution of burdens are important, as is the final form of the regulation. A number of complementary policies are also considered, including those aimed at competitiveness more broadly. In the final analysis, the most effective action at the national level may be contribution to the conclusion of a multilaterally agreed framework for long-term action.

The second main section of the report considers the relationship between the Kyoto Protocol and the WTO. Their present provisions do not contain any specific trade measures, but some of

the measures taken to implement the Protocol could overlap with WTO rules. The temptation to use more overt trade measures to offset competitiveness losses will grow as Parties consider more stringent targets under future commitment periods or successors to the Protocol.

This section begins by looking at the wider debate about the WTO/MEA interface. This interface has been considered by the WTO and scholars since 1995, and although the debate has become more refined, a definitive or political accommodation has yet to be agreed. The most important aspects that relate to the relationship between the Kyoto Protocol and the WTO are:

- (a) trade measures aimed at non-Parties to the Protocol;
- (b) trade measures taken by Parties to the Protocol to achieve its aims, but which are not specified in the text; and
- (c) which dispute settlement body should prevail – the WTO's or the Protocol's.

There are a number of specific points of interface between the Kyoto Protocol and the WTO.

- The use of tariff or other trade restrictions to induce compliance with the Protocol. Such moves would be difficult to justify under present WTO law, but could be strengthened by more explicit provision for this possibility in future versions of the Protocol.
- The WTO negotiations on 'environmental goods and services', which are meant to lead to greater market access, may have implications for meeting Kyoto objectives. In principle, these could include low- carbon goods and services, but these negotiations are currently bogged down over definitional issues.
- The use of subsidies to achieve Kyoto Protocol objectives may be permitted under the WTO Subsidies Agreement, but there are a few areas where policy-makers need to be careful. A particularly complex set of WTO rules may be triggered for subsidies over biofuels, which brings in the WTO Agreement on Agriculture.
- Border tax adjustments to offset competitiveness losses from carbon taxes may be attractive to some countries. At present, it is difficult to draw firm conclusions from the relevant agreements or WTO case law as to whether such adjustments are consistent with WTO rules.
- Energy standards can be useful instruments in meeting the terms of the Kyoto Protocol; the WTO Agreement on Technical Barriers to Trade (TBT) presumes that if such standards are adopted multilaterally, they will be compatible. Even if they are adopted unilaterally, however, the TBT Agreement will have an impact on their design and procedure of adoption, though not on their ultimate effectiveness.
- Energy-related ecolabelling can be an important market instrument for promoting goods and services that contribute to fulfilling the Protocol. The TBT Agreement will be relevant to governments and non-governmental bodies seeking to establish such schemes. Some controversy exists as to how far the WTO permits such labels to contain rules relating to how the product is made, as opposed to the physical characteristics of the product itself.
- Government procurement is another important tool that governments can use to influence the market for goods and services that help achieve the Protocol's objectives. The WTO Agreement on Government Procurement contains some disciplines, but in the main most procurement programmes relating to the Protocol ought to be in compliance.
- Emissions trading, which is a central instrument in the EU and is being considered in other parts of the world, is one of the Protocol's 'flexible mechanisms'. There may be WTO-compatibility issues arising from the way such permits are allocated.
- The Clean Development Mechanism, another 'flexible mechanism', should not run afoul of the WTO agreements on investment and services. So long as the conditions attached to

such investments relate only to whether the project is granted CDM status under the Protocol, and not whether the investment is to be allowed or not, then there should be no contradiction with WTO rules.

- Tariff preferences for developing countries in pursuit of the Protocol's ends can have an impact and, subject to certain conditions, ought to meet the WTO's requirements.

Ultimately, most of the issues around the interface between the Protocol and the WTO relate more to the design of the measures, rather than signifying that a measure is *ab initio* in conflict with the WTO. This suggests that policy-makers should take care in selecting measures to implement the Protocol, while keeping the relevant WTO rules in mind. The report concludes with suggestions on how Parties to the Protocol and WTO members, acting collectively, can make the relationship between the two more stable.

ACRONYMS AND ABBREVIATIONS

AGP	Agreement on Public Procurement
APEC	Asia-Pacific Economic Cooperation
BTAs	Border Tax Adjustments
CDM	Clean Development Mechanism
CDM	Clean Development Mechanism
CTE	Committee on Trade and Environment
ETS	Emissions Trading System
ETS	Emissions Trading Scheme
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GSP	Generalized System of Tariff Preferences (EU)
IISD	International Institute for Sustainable Development
MDGs	Millennium Development Goals
MEAs	Multilateral Environmental Agreements
MFN	Most Favoured Nation (status)
NAPs	National Allocation Plans
OECD	Organisation for Economic Cooperation and Development
PPMs	Processes and Production Methods
R&D	Research and Development
SMEs	Small and Medium-sized Enterprises
TBT	(Agreement on) Technical Barriers to Trade
TRIMs	Trade Related Investment Measures
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization

1 INTRODUCTION

Since the middle of 2006, climate change has soared to the top of the political agenda around the world. There are a number of factors for this, but one of the most significant was the release of the Stern Review on the economics of climate change. That Review made the persuasive argument that the costs of addressing climate change grow significantly, the longer one waits to act. While this argument provides sustenance to those politicians who are willing to assume a leadership role – acting now to avert problems that will manifest themselves far beyond their political horizons – it also confirms that there is no getting away from the reality that such action will entail some costs.

This report seeks to provide a basis for thinking about how to minimize these costs. It is often claimed that the economic costs of taking action on climate change will disrupt a country's economic competitiveness, especially since major economic powers, such as the United States and China, have not subjected themselves to mandatory emissions reduction targets. In other words, in an uneven playing field, there is a great disincentive to assuming the leadership role described above. This concern is one that plays out daily in domestic politics and which has stubbornly dogged international negotiations.

For example, the Confederation of British Industries has stated:

Competitive distortions will arise if companies from one country face different climate burdens to their competitors in other countries. This could lead to relocation of industries or production from countries facing environmental constraints to those with lower or no constraints, resulting in significant 'carbon leakage'. Constraints and restrictions applied on a specific region of the world can affect its competitiveness in the global market, resulting in a loss of jobs and GDP, while failing to achieve significant climate change benefit.¹

But how real are such concerns and what can be done about them? This study seeks to identify ways in which decision-makers can frame these issues in a constructive manner. The task is far from straightforward. Can a workable definition of 'competitiveness' be identified for this context? And how can the competitiveness impacts – adverse or positive – of measures such as taxes, tradable permits or subsidies be determined? Since these questions are very much the subject of debate it follows, then, that the measures taken by governments to mitigate, or offset, negative impacts are also controversial. Competitiveness concerns have often led to suggestions that trade measures be used to help offset a country's competitive imbalances with respect to free riders. For example, France has stated that countries not signing up the Kyoto Protocol should be subject to special import taxes.² But can trade measures be designed to address climate change concerns?

In addition to the free-rider problem, concerns about competitiveness also arise in the context of implementation, from the manner in which governments choose to meet their Kyoto commitments. Choices about what measures to deploy can have profound impacts on a country's domestic firms. Much of the debate about the allocation of permits under the European Union's emissions trading scheme has been about this. Negative consequences for competitiveness might be reduced through flanking measures, which again brings us back to trade policy. Can such measures also have the effect of favouring or protecting domestic producers that pursue these ends? More broadly, what kinds of trade-related positive incentives are available? International trade law has a number of rules that are relevant to whether such actions are permissible, but it does not answer all the possible questions.

Indeed, the trade and investment agenda that emerges from the Kyoto Protocol is so broad that the interface with the World Trade Organization (WTO) regime is still not fully clear in respect of some critical issues, such as the use of energy standards, subsidies and which treaty prevails in the event of conflict. Some issues, such as those relating to accelerated market access for certain products, are mainly within the realm of political decisions. Others problems, such as the role of border tax adjustments, seem to be mainly technical or legal in nature. Given this complexity, what are the options available to governments to act, collectively and individually, to minimize clashes between their Kyoto and WTO obligations? To what extent ought this action to occur within the framework of these treaties?

In 2005, Chatham House and the International Institute for Sustainable Development (IISD) teamed up to examine all of these issues. An initial study was enriched by two expert workshops – one was held in London, at Chatham House, and the other in Montreal, at COP-11. The paper that follows is the result of those efforts. The authors are grateful to all participants for the constructive comments made at these events, although responsibility for any errors remains with the authors alone. Gratitude is also expressed to the Canadian Department of Foreign Affairs and the United Kingdom's Department for Trade and Industry for their financial support.

2 COMPETITIVENESS AND CLIMATE CHANGE: A SURVEY OF THE ISSUES

From the outset the Kyoto Protocol and the UNFCCC have had to contend with perceived tension between effective action to slow climate change, and maintenance of competitiveness. Competitiveness concerns were the explicit prime motivation for the withdrawal of the US from the Kyoto process. Competitiveness concerns have since plagued Canada, the largest trading partner of the United States and the bearer of relatively difficult emissions targets. They have also figured large in the climate-related policy debates in the EU where, for example, they effectively scuttled the EC's 1992 proposed Directive on Carbon Tax, and have continued to dog the elaboration and implementation of the EU's Emissions Trading Scheme (ETS).

This chapter explores the nature of the concerns over competitiveness, trying to dissect them in a meaningful way and assess the need for concern. It begins by defining the problem, and then surveys the literature for relevant insights, going beyond the climate change research to the rich body of work on environmental regulations and industrial location. It concludes with lessons that should inform the elaboration of any future international regime to address climate change.

Defining the problem

As a first-order task, we should define what we mean by competitiveness. Too often the term is applied to nation-states as if they were in some sort of grand contest one against the other. A recent literature survey on competitiveness and regulation, using fairly standard language, defines international competitiveness at the country level as 'the success with which a country ... competes against overseas counterparts' (SQW Ltd, 2006). Krugman (1994) and others, however, have argued convincingly that competitiveness at the level of the nation-state has little meaning, as distinct from simple productivity.

Krugman argues this case by showing that over the last half-century standards of living in major economies have been almost entirely determined by domestic productivity, as opposed to terms of trade (the relative prices of imports and exports for an economy – an indicator of how productive a country's firms are *relative to those of other countries*). He explains this by noting that the overwhelming majority of production in those economies is for domestic consumption, and not for international markets. More fundamentally, he notes that the economic success of one country does not necessarily come at the expense of others; there is no zero-sum contest between nations, played out in trade flows and investment. Productivity growth in China, for example, means cheaper inputs for OECD manufacturers, cheaper consumer goods, and stronger Chinese demand for OECD exports.

A more useful and legitimate use of the concept of competitiveness is to consider it at the firm or sectoral level. Here it can be simply defined as capture of market share – a state that is maintained in a dynamic contest among firms. The question to be explored in this report is, then: *how will the implementation of the Kyoto Protocol affect the competitiveness of the Parties' firms or sectors?* Three scenarios are possible as manifestations of this type of concern:

- Regulated firms will simply migrate to jurisdictions where the regulations are less stringent (the pollution haven hypothesis);

- New (greenfield) investment, either domestic or foreign, will tend to flow to those jurisdictions that are less stringently regulated;
- Firms that do not migrate away from stringently regulated jurisdictions will suffer a loss of market share (either domestic or international) to their less-regulated competitors.

In the climate change context these concerns are commonly characterized as concerns over potential *leakage* – the chain of events whereby greenhouse gas-producing activity simply shifts from a regulated jurisdiction to an unregulated one.

To argue that competitiveness needs to be considered at the firm or sectoral level is not to deny that it can be significantly affected by the actions of home states. Governments have an important role to play in fostering an environment in which domestic firms can successfully compete against their foreign counterparts, both in the proper elaboration of climate change-related policies and more broadly in achieving such basic prerequisites as macroeconomic stability, and conducive legal and bureaucratic regimes. As such, though we will view competitiveness through a sectoral- or firm-level lens, any findings on competitiveness so defined are clearly relevant to government policy-making at the national level, and may have international-level implications as well.

Given such a framework for analysis, this report does not consider a number of costs and benefits that manifest at the national level, rather than at the sectoral or firm level. Most important, this analysis will not consider the side benefits that may accrue from measures designed to constrain carbon emissions, such as associated air quality effects. These sorts of benefits are significant; the recent Stern Review (2006) makes the case that such benefits – including energy security, health benefits from improved air quality, reduced consumer spending on energy, increased efficiency of production, increased innovation and reduced deforestation – will often outweigh the cost of mitigation actions.³ As such, policy-makers clearly need to consider such benefits when crafting climate change policies and policies in other related areas. But they are not a part of the competitiveness debates *per se*. Calculating competitiveness impacts should thus be understood as only one part of a larger exercise of considering the social welfare costs and benefits of action on climate change.

Two types of competitiveness concerns are often expressed in the climate change context, and both will be explored below. The first, hereinafter referred to as the ‘non-Party problem’, is that implementation will create an uneven playing field, with firms and sectors from non-Parties enjoying an unfair advantage because they are not subject to carbon constraints. This argument is expressed most pointedly with respect to non-implementation of the Kyoto Protocol commitments by the US, and to the lack of quantitative commitments by large developing countries under Kyoto. In both cases the issue is the potential loss of competitiveness that might be suffered by implementing country firms and sectors.

The second problem, hereinafter the ‘implementation problem’, is that Parties may create unfair competitive advantages for domestic industry by the manner in which they implement their Kyoto commitments. This argument has been considered most prominently in the context of the EU, where a highly integrated market spans countries that have the flexibility to elaborate very different national plans for allocating their emissions reductions.

A third type of competitiveness problem is not dealt with in this report. Even under similar targets for action on climate change, and even given a harmonized approach to implementation, the firms of some countries will suffer more than those of other countries. A

country that has in the past pursued aggressive targets for energy efficiency, or that has a preponderance of energy generated from clean sources, will have a much tougher time meeting a given target for emissions reduction than will a country with a large amount of 'low-hanging fruit' – that is, low-cost energy-efficiency or conservation opportunities. Other country-specific determinants of this sort might include the state of existing infrastructure, the functioning of financial markets, resource abundance, and so on. While many of these determinants are at least in part policy-dependent, this report does not consider what they are, or what sorts of policies might be employed to address the competitiveness problems to which they might give rise. As negotiations intensify on a post-2012 regime for addressing climate change, research on this aspect of competitiveness will be increasingly important.

The non-Party problem

The first type of competitiveness concern discussed above is highly intuitive. Since Annex B Parties are subject to Kyoto commitments, and their industrial and energy sectors have to make expensive adjustments, it seems likely that they will suffer a competitive disadvantage relative to the sectors of the non-Parties.

There has been considerable concern of this type in Canada, which seems a good case study given the fact that some 85% of Canada's trade is with the United States, which has indicated it will not ratify the Kyoto Protocol. This dynamic is amplified by the fact that Canada has a relatively difficult target (Cooper et al., 1999; Bernstein and Gore, 2001). Canadian Manufacturers and Exporters, an industry association, typifies the non-Party competitiveness concern in its arguments:

Kyoto compliance would result in higher operating and capital costs for Canadian manufacturers in relation to those incurred by their competitors operating in the United States, or in other countries like Mexico, Brazil, Indonesia, South Korea, China, and India ... If costs are passed on to customers, Canadian industry risks losing market share in the United States (the destination for approximately 63% of Canada's total manufacturing output), within Canada, as well as in other countries. (Canadian Manufacturers and Exporters, 2003: 15)

The paper goes on to cite a number of sectors in which there would be such problems, including electricity, petroleum refining, steel, chemicals, automotive production and other manufacturing.

The studies on which these forecasts are based, however, pre-date the US pull-out from the Kyoto accord (and most of them assume as one scenario no international trading of permits – an assumption that yields strikingly high costs⁴). As such, there are two important effects they fail to capture. First, because they assume US participation in Kyoto they fail to actually consider the non-Party competitiveness issues, at least with respect to Canada's biggest trading partner. Second, they fail to account for the impacts of the US pull-out on the trading price of carbon, which according to some studies is as much as quartered the expected prices (Nordhaus, 2001).

A wealth of subsequent research in the Canadian context searches for the economic impacts of Kyoto implementation.⁵ But almost all of it looks for national-level effects such as GDP impacts, whereas our focus is on competitiveness, which we have defined at the sectoral and firm level. And most of it shares the problems noted above: it pre-dates the US renunciation of Kyoto, and assumes emissions reductions through domestic measures only. As such, we have a paucity of analysis on which to draw in the Canadian context.

There have been several recent sectoral studies from the EU, assuming non-US ratification, that show minimal non-Party competitiveness impacts. Reinaud (2005) looked at the competitiveness effects of the EU's emissions trading scheme (ETS) on four vulnerable sectors: steel, pulp and paper, cement and aluminium.⁶ The study found little concern for leakage, except perhaps in the aluminium sector, which deals in a highly global market and faces high energy input costs.⁷ The overall result depends critically on the behaviour of the electricity markets in passing through costs to consumers. But the EU case is less acute than the Canadian case, given the generally higher transportation costs between the EU and non-EU countries, and the fact that the market between the EU and others is less integrated than in the North American case.⁸ As such, the lack of Canadian research represents a clear gap.

There is, however, a rich parallel body of work on which we can draw in seeking lessons with respect to the non-Party problem: the 'pollution haven' literature. This line of analysis focuses on a problematic number of often ill-defined hypotheses, but three of the questions commonly posed are of relevance to the present analysis:

1. Does stringent environmental regulation affect output? That is, do sectoral competitiveness impacts from environmental regulations reduce international market share?
2. Does stringent environmental regulation affect greenfield plant location or investment decisions?
3. Does stringent environmental regulation foster migration of regulated firms to countries that have less strict environmental standards (the classic pollution haven hypothesis)?⁹

A number of studies in the 1990s addressing all these questions seemed to dispel the fear that environmental regulations indeed had such effects.¹⁰ The studies typically found that environmental compliance costs were low (averaging only 2–3%, even though they ranged to much higher values in specific sectors), and were only one of many important considerations for firms considering relocating, or for greenfield investment decisions. Other determining factors include proximity to markets, natural resource input availability, labour costs, quality of human resources, political risks, macroeconomic stability, adequate legal regimes (including intellectual property rights, contract law, investment law, an independent judiciary), infrastructure (communications, energy, transportation) and other considerations. The verdict seemed to be that environmental costs were simply too small relative to these other factors to have much competitiveness impact.

More recent studies, however, have criticized the early work on fundamental methodological grounds. Several exhaustive surveys of the research¹¹ detail the various problems with that body of work, including the following:

- Because most studies used cross-sectional data rather than panel data, they were unable to control for characteristics specific to particular sectors and countries – differences that might have explanatory power for the different investment and locational decisions (problem of unobserved heterogeneity). Such characteristics might include, for example, a link between dirty industries and natural resource use (meaning a reluctance to move away from those resources),¹² or a sector's high transport costs (meaning manufacturing cannot move too far away from markets),¹³ and would result in underestimated pollution haven effects for those sectors.
- A related problem is that many studies aggregated industry figures to calculate overall responsiveness to environmental policies. To the extent this is done, it masks the presence of strong pollution haven effects in particular sectors, assuming a large number of other sectors with weak effects.

- Most studies assumed that environmental policy was exogenously determined. But if there is some way in which abatement costs are linked to environmental policy (e.g., policy-makers set tougher standards for big polluters and more lenient standards for insignificant ones), then any pollution haven effect will be offset to some extent by these linkages, and will be underestimated (problem of endogeneity).

A rich body of work in the last ten years or so has corrected for these problems in various ways, and has consistently found a statistically significant pollution haven effect.¹⁴

On the first question – does environmental stringency affect terms of trade? – the few good studies to date (those correcting for the problems surveyed above) find that increases in compliance costs do affect trade patterns, with one analysis finding a rather improbable 30% increase in import penetration for every 1% increase in pollution abatement costs.¹⁵ SQW Ltd (2006) summarizes two studies that seem to show that trade effects will depend in part on the regulating country's factor endowments and on how intensively the industry uses that factor. For firms that intensively use a scarce factor of production (e.g. timber), even marginal tightening of environmental regulations will have an impact on market share. Firms that use that factor intensively in countries that have abundant stocks will not be so significantly affected by regulation.

On the second question – does environmental stringency affect greenfield plant location decisions? – the recent studies using panel data are in agreement that it can and does, particularly for heavily polluting firms.¹⁶ One study found that in the first 15 years after rules were introduced to more heavily regulate highly polluting US counties, those counties (relative to others) lost approximately 590,000 jobs, \$37 billion in capital stock and \$75 billion (1987\$) of output in pollution-intensive industries. All of these studies are based on US state- and county-level variations in regulatory stringency, and subject to data availability.

On the third question – is the pollution haven effect strong enough to induce industrial migration? – most of the studies that have addressed this question have failed to account for other explanatory factors.¹⁷ A few recent studies that try to control for previous errors, however, seem to find little evidence of regulation-driven migration of industry (SQW Ltd, 2006). These studies seem to show that, at current levels, pollution abatement costs inherent in stringent regulations are not as significant as a host of other determining factors: access to markets (the primary driver in most studies), labour costs, access to resources and other such variables. This is not to say that regulatory costs are not influential at the margin, however.

The key lesson to be drawn from this body of work is that there are competitiveness impacts associated with environmental regulation, that in most cases they are moderate, but not in all cases. Several of the surveys cited above found that unobserved heterogeneity was a problem, as was aggregation of sectors. The key here is that sectoral characteristics matter when we consider the competitiveness impacts of environmental regulations. Along these same lines, a recent Carbon Trust analysis (2004) outlines three variables that together serve as a useful screen for assessing the competitiveness impacts of climate policy in any given sector:¹⁸

- (1) **Energy intensity:** The more energy a sector uses in its production process, the more it will be vulnerable to price increases. Under any implementation scenario, energy prices will increase. In a sector such as aluminium, for example, where on average energy comprises about a third of the cost of production, the potential exposure is obvious.

- (2) The ability to pass cost increases along to consumers as increased price of the sector's final product:** This ability depends fundamentally on the availability of substitutes, either in the form of other goods that satisfy the same needs, or in the form of production from foreign firms in the same sector. So transport costs are important, as is the global nature of the product's market. At the firm level, as opposed to the sectoral level, the degree of domestic competition is also important; other things being equal, the more monopoly power, the better able a firm is to pass along cost increases in the form of increased prices. The nature of the good in question also matters; is it a luxury good of which consumers will buy more when prices decrease, or is it a staple that will be bought in relatively steady volumes regardless of price?
- (3) Opportunities for abatement:** Firms or sectors in which there are ample unexploited low-cost opportunities for abatement obviously have an advantage over those where there is no 'low-hanging fruit' (either because it has already been harvested, or because the state of technology is not well advanced). Porter and von der Linde (1995), elaborating what has become known as the 'Porter hypothesis', argue that, at least in some sectors and some firms, these opportunities are potent enough for the net effect of tighter regulations to be actually positive in terms of competitiveness.

The Carbon Trust study looked at five sectors in the EU context to test for vulnerability according to this framework. They found minimal competitiveness impacts for the electricity sector, which could pass on cost increases, and only marginal impacts for cement, paper and steel. Aluminium, however, seemed particularly vulnerable, being a highly internationally traded sector with limited ability to pass along cost increases, and not being part of the ETS. Smale et al. (2006) looked at the same sectors and found profits in most, with small negative impacts in cement and steel and, again, high impacts for aluminium.

Similarly, Frontier Ltd (2006) surveyed the existing studies and concluded that the vulnerability to competitiveness impact as a result of the EU's ETS was determined by the extent to which a firm or sector was carbon- or electricity-intensive, and by the degree of international competition it faced (this latter determined the ability to pass along increased costs to consumers). It found aluminium to be vulnerable, with lesser vulnerability for iron and steel, and found mixed predictions for the cement sector.

Another potential influencing factor, highlighted by SQW Ltd (2006), is the form of regulation. Most studies concentrate on the stringency of environmental regulation, measured by such indicators as compliance costs. But there is a lack of studies that try to discern the impacts of regulatory form, which we would predict should heavily influence those costs. Theory tells us, for example, that generally the more flexibility a firm has in achieving an environmental goal, the more cost-effectively it can do so. This highlights an important argument, which is explored in greater detail below: policy matters. Competitiveness impacts are not simply a function of firm cost curves and the stringency of standards. They are determined in no small part by government policies, whether they be regulatory policies or broader environmental or economic policies.

In summary, the literature on pollution havens is instructive in demonstrating that competitiveness concerns are an issue in the non-Party context: that the cost of environmental regulations can matter for some firms and sectors, but not usually enough to induce leakage. For most firms and sectors the impacts are moderate, but for some – dictated by characteristics specific to the sector – impacts can be high enough to warrant concern.

The policy implications of these findings are taken up below. First we turn to an analysis of a second type of competitiveness concern.

The implementation problem

Countries are generally at liberty to decide how to achieve their emissions reductions commitments, and it is feared that some might distribute the domestic-level obligations in a way that benefits particular sectors. If so, this might create shifts in competitive advantage among Annex B Party sectors.¹⁹

This concern has been expressed most clearly in the context of the EU, which is a tightly integrated economic community with relatively low costs of intra-union transportation. As such, in considering this aspect of competitiveness we use the EU and, in particular, the European ETS as a case study. There are, of course, many other forms of domestic implementation that may give rise to competitiveness concerns, including subsidies, taxes, standard-setting and government procurement. These are examined in greater depth in Chapter 3, with a view to clarifying how international trade law treats the various options.

Clearly while this type of competitiveness concern is distinct from the non-Party problem examined above, the empirical and theoretical research summarized there is relevant here as well. That is, from the results of that research we might expect to find that while overall impacts are real, they are moderate for most firms and sectors. We might also expect to find certain firms and sectors will potentially be exposed to significant competitiveness pressures – primarily those with high levels of international competition, high energy/carbon intensity and few low-cost opportunities for abatement.

A recent study (Gilbert et al., 2004) details the areas in which the various EU member country National Allocation Plans (NAPs) differ in their implementation. These include basic definitions of covered installations, handling of new entrant reserves (specifically, the issue of free allocation to new entrants), the equity with which caps are allocated among sectors and other aspects that would affect operating costs differently across jurisdictions.

Carbon Trust (2004) looks at implementation in five sectors: electricity, cement, newsprint, steel and aluminium, paying attention to the implementation of differing NAPs, and looking in particular at the UK case. It notes that the national-level plans are being differently elaborated, showing that for most countries proposed allowances exceed current needs, even in sectors where carbon emissions are on a downward trend.

The study concludes that there exists potential for shifts in intra-EU competitiveness based on how the NAPs are elaborated. It notes that certain sectors, such as steel, are particularly sensitive to differing elaborations.²⁰ First-order impacts are unlikely to be significant (in some sectors because long-term contracts with energy suppliers will cushion the shocks). But in the longer-term scenario there may be impacts, particularly if the electricity sector is successful in passing through a substantial portion of its cost increases as price increases.

This concern is certainly echoed in industry responses to the NAPs and the ETS, a process that has from the outset been fraught with tough negotiation and political pressures. The UK's chemical producers, for example, in commenting on the UK first phase draft allocation plan, which sought to achieve results even beyond those required, warned that 'industry's competitiveness compared with other EU member states could be compromised if they do not adopt such a stringent approach' (Chemical Industries Association, UK, 2004a). They further

argued that the sector 'faces the prospect of a double blow, in terms of both emissions caps and energy prices, compared with its competitors elsewhere in Europe' (Chemical Industries Association, UK, 2004b). Similar concerns have been expressed by a number of different sector representatives in Member States.

Grubb and Neuhoff (2006), however, put the competitive pressures into perspective, estimating that in the UK context, assuming a value for carbon of €15/tCO₂ and free allocation of permits, a 5% differential in allocation for most sectors results in marginal changes in value added; for example, in the iron and steel, or refining and fuels, sectors the change would be just 0.25%. Only in the cement and electricity sectors might the change even approach 1%. And they note that 'this is also small compared with existing price differentials between different parts of Europe, because of transport costs, and tie-line constraints and losses, respectively' (p. 18).

The final constraint of established national targets will reduce the potential for strategic allocations of emissions rights in the national implementation of Kyoto responsibilities; any gain given to a particular sector will necessarily mean pain for others. And the potential for addressing implementation issues as they arise is likely to be greater in settings such as the EU where there is strong existing economic and policy integration – precisely in those contexts where the implementation competitiveness concerns are greatest.

In the end, the implementation problem seems to have potential for significant impact, particularly in the longer term, under more ambitious targets, and in those sectors where higher electricity prices can be passed on from utilities (steel being a possible example). But even then the unevenness of the playing field among EU countries is likely to be relatively low, and along the lines of existing differentials driven by the traditional constituent ingredients of comparative advantage. At least in the medium term, the implementation problem seems to constitute a lesser cause for concern than the non-Party problem.

That said, there is certainly scope for useful harmonization of approaches in some areas. For example, there should probably be a common definition of a combustion installation, as well as a common approach to handling the new entrants' reserve. Such fine-tuning is likely in the works for the next allocation period, and will probably help to defuse some of the concerns that have been expressed over implementation and competitiveness.

Conclusions

The non-Party problem – and to a much lesser extent, the implementation problem – seems to be a legitimate concern, with potential to influence competitiveness of firms and sectors. As such, even aside from the economic implications for particular sectors, they are potential obstacles to the political acceptability of strong national action on climate change, and deserve significant attention from policy-makers. They may also give rise to demands to resort to various forms of trade measures, the implications of which are examined in Chapter 3.

That said, there seems to be reason to believe that the final impacts will not be large in most sectors, while a few sectors and firms will experience real problems. The non-Party problem also seems to create more cause for concern than does the implementation problem. From a policy perspective, it is useful to consider what factors might render a firm more or less vulnerable to negative competitiveness impacts. There are at least three levels at which this question might be posed: at the level of the firm, the sector and the nation. All are examined below.

Firm-level factors:

Ability of firms to innovate. The ability of any firm to innovate in response to regulatory demands will be key in determining the final competitiveness impact it experiences. Those firms that are best placed in this context are probably good candidates for a strong Porter effect: *increased* competitiveness through regulatory stringency. Ability to innovate in turn is determined by such factors as the company culture (is it a learning firm?), management systems (are they aimed at continuous improvement?), R&D spending and employee incentives.

There is an entire body of literature devoted to understanding what allows some firms to innovate more successfully than others, and it is beyond the scope of this paper to pursue the question. But it is worth noting that there may be a role for national governments to assist firms, particularly small and medium-sized enterprises (SMEs), to better respond to regulatory pressure through innovation.

Sector-level factors:²¹

These influences are discussed in greater detail above. Three factors are key here:

Energy intensity. Assuming that energy prices will increase under any realistic scenario for climate change action, this factor is obvious.

The ability to pass along cost increases to consumers. If demand for the goods is elastic (meaning perhaps that there are close substitutes, or there are many foreign competitors to which consumers could turn), then the impacts are likely to be more significant, since firms will be unable to pass along cost increases to customers, fearing loss of market share.

Opportunities for abatement. Firms or sectors in which there are ample unexploited low-cost opportunities for abatement obviously have an advantage over those where there is no low-hanging fruit (either because it has already been harvested, or because the state of technology is not well advanced).

National-level factors:

There are a number of factors determined at the national level that will shape the competitiveness impacts at the firm/sector level of any regulatory regime to address climate change:

The scope and distribution of burdens. Any national-level target will be implemented by a plan to demand a certain amount of reductions from various sectors of industry, government and the public. The impacts in any given sector are obviously influenced by the extent to which it is expected to contribute to the effort under a national regime of action.

The analysis in this paper has indicated that there may be particularly vulnerable sectors that need special consideration at the national level. The first challenge is of course to do the requisite analysis to identify those sectors, and the root causes of their vulnerability. One policy option is then to lessen the burden on those sectors, or even exempt them from the scope of the regime altogether. Or policy-makers may decide to allow for restructuring, cognizant that the burden lifted from any exempted sector is then placed on those remaining within the scheme.

Form of regulation. The regulatory manner in which any given target is achieved will also affect competitiveness impacts. Adequate lead time on any new regulations, and certainty of investment conditions, will reduce compliance costs. Flexibility in achieving abatement is also vitally important; results, rather than particular technological means, should be the specified goals, with firms devising for themselves the most cost-effective ways to meet them. Market-based mechanisms in general are desirable on the criterion of cost-effectiveness, though they are not a panacea.

Complementary policies. There are a host of policies in areas related to climate change that will have positive or negative effects on the strength of competitiveness impacts that firms will feel under any given national target. Going back to the question of scope and distribution, any policies that effectively reduce the overall burden will lower competitiveness impacts felt by firms. For example, demand-side management policies that encourage consumer conservation will, to the extent that they are successful, lower the share of the burden to be shouldered by firms. The same sort of effect will prevail for policies aimed at promoting the use of renewable energy, policies for increasing availability of public transportation, public education policies, policies aimed at development and dissemination of new emission-lowering technologies, and so on.

In a broader vein, effective policies aimed at fostering competitiveness in general – outside the realm of energy policies – will also have positive impacts. There is a wealth of such policy tools: business development banks, export credit guarantees, training and education programmes, support for upgrading management systems, specialized support for SMEs, support for research and development, and so on.

Another option that has been repeatedly considered to address non-Party competitiveness concerns is the use of trade measures. Specifically, it has several times been proposed that a border tax adjustment be used to levy a charge on imports from countries that do not take serious action on climate change.²² A rebate to domestic producers on exports would complement this measure, aimed at levelling the playing field for domestic producers. This type of measure, and the broader gamut of trade law as it relates to climate change efforts, are considered in Chapter 3.

In the final analysis, one of the best ways to address competitiveness concerns is to achieve international agreement on an approach to combating climate change, ensuring broad participation in any international regime, and helping ensure that different modes of national implementation do not unfairly tilt the playing field in anyone's favour. This, of course, is more easily said than done, and efforts to get broad participation are dogged by a version of the old chicken-and-egg problem: broad participation would help ease competitiveness concerns, but it is difficult to achieve precisely because of those concerns. As such, any steps at the national and international level that might be taken to address competitiveness concerns will certainly contribute to building a stronger multilateral regime for addressing climate change.

3 THE KYOTO PROTOCOL AND THE WTO: IMPLICATIONS FOR POLICY-MAKERS

The interface between the Kyoto Protocol and the World Trade Organization is extremely complex. For example, it is arguable that the very objective of the WTO, to expand the 'production of and trade in goods and services',²³ could result in increased pressure on the climate system. The relationship is also difficult to define because important aspects of the law emanating from the WTO and the Protocol are not yet fully clarified. Unlike some other environmental treaties – e.g. the Montreal Protocol on Substances that Deplete the Ozone Layer – the Kyoto Protocol does not contain explicit trade measures, with the exception of the emissions-trading system. However, a small but growing body of literature has been exploring the linkages between the two regimes; the general conclusion appears to be that Parties to the Protocol need to be aware of potential WTO problems in devising the implementation measures.²⁴ At the same time, those Kyoto Parties that are also WTO Members have an important stake in ensuring that the negotiations in the WTO do not result in a limitation on the ability of Kyoto Parties to fully implement the Protocol.

The relationship between the two treaties also has a wider political context. It is the existence of the WTO which helped bring the Kyoto Protocol into force. It has been widely reported that one of the demands that Russia made to the EU, in return for ratifying the Protocol, was for the EU to support its bid to accede to the WTO.²⁵ Another, more subtle aspect is that a growing number of OPEC countries in the process of joining the WTO may have an impact on how the WTO deals with energy-related issues.²⁶

From the outset of the UNFCCC, negotiators were aware of the potential impact of the treaty on the global project to liberalize trade. Although there is no explicit provision relating to WTO rules, as exists in some other treaties, such as the Cartagena Protocol on Biosafety, Article 3.4 of the Convention states:

The Parties should cooperate to promote a supportive and open international economic system that would lead to sustainable economic growth and development in all Parties, particularly developing country Parties, thus enabling them to better address the problems of climate change. 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.

Although the Convention did not contain any meaningful targets that could be the basis of trade measures, it did introduce at least one notion that does not sit entirely well with WTO norms: the precautionary principle. The precautionary principle is controversial because it increases the space available to countries to introduce unilateral trade restrictions in the absence of international consensus on their scientific justification. Discussions on the precautionary principle in the WTO have been very contentious because it could be used to justify trade restrictions that are not universally accepted (Shaw and Schwartz, 2005: 7). Another potentially problematic principle is that of 'common but differentiated responsibilities', embedded in the UNFCCC, which might possibly justify creating trade distinctions between developed and developing countries (Shaw and Schwartz, 2005: 10). However, this scenario has not yet occurred.

The Kyoto Protocol also seeks to avoid trade restraints. Article 2.3 states:

The Parties included in Annex I shall strive to implement policies and measures under this Article in such a way as to minimise adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties and in particular those identified in Article 4, paragraphs 8 and 9, of the Convention, taking into account Article 3 of the Convention. The Conference of the Parties serving as the meeting of the Parties to this Protocol may take further action, as appropriate, to promote the implementation of the provisions of this paragraph.

No trade restrictions are specifically provided for in the first commitment period. However, given that the intention is for subsequent commitment periods to be more robust, the Kyoto Parties may wish to include trade measures aimed at offsetting the competitiveness impacts of more ambitious targets.²⁷

This chapter seeks to scope out the linkages between the two regimes. As there has never been a dispute involving a collision between the two, the aim of the chapter is to highlight potential issues in the context of existing law, recognizing that the state of the law is not static. It will locate these issues within the wider debates in the WTO and then drill down to specific instruments that relate to implementing the Kyoto regime, before ending with some questions and observations about the future.

The wider debate about the WTO/MEA interface

General considerations

The relationship between WTO rules and Multilateral Environmental Agreements (MEAs) has been contentious since the beginning of the trade and environment policy debate in the early 1990s (Brack and Gray, 2003; Stilwell and Tarasofsky, 2001). The political process for discussing these issues within the WTO Committee on Trade and Environment, and certain specific negotiating tracks under the Doha Development Agenda, has been limited and is currently bogged down.

More guidance has come from the WTO Dispute Settlement Mechanism, which has heard several cases involving environmental measures. Although none of these cases have directly involved an MEA measure, many of the legal principles appear to be applicable to MEA measures. In addition, MEAs have been used to assist in the interpretation of some WTO provisions relating to the environment. As a result, there is now greater understanding of the principle of 'national treatment' and the concept of 'likeness' in GATT Article III, as well as the scope of the General Exceptions provided for in Article XX. However, despite these important rulings, there is no doctrine of *stare decisis* (i.e. precedent) in the WTO, which means that the Appellate Body may adopt different approaches in the future.

The concept of 'likeness' in Article III has been very challenging for both the GATT and the WTO. After a series of disputes, the *EC-Asbestos*²⁸ case confirmed that risks associated with the physical characteristics of a product are sufficient to distinguish two otherwise similar products. So too are consumer tastes and habits. This can be important to the extent that consumers are willing to distinguish between similar products on the basis of how 'climate friendly' they are.

Even more significantly, the *US-Shrimp I*²⁹ and *US-Shrimp II*³⁰ cases have applied GATT Article XX in a manner that does allow states considerable policy space to develop trade measures for environmental reasons, within limits, to prevent abusive trade protectionism. These measures may be unilateral, and while states need to try to get multilateral consensus, there is no WTO requirement that these efforts succeed, so long as they are made in good faith. According to the *Korea Beef*³¹ and *EC-Asbestos* cases, Article XX(b) permits decision-makers to consider the public interest in determining whether a measure is 'necessary' to protect human, animal and plant life or health. This too increases the policy space available to states to take trade measures for environmental purposes. Furthermore, in the *US-Shrimp I* case, MEAs and other bodies of law were used to interpret relevant WTO provisions. Therefore, it would appear that WTO jurisprudence would permit trade-related measures aimed at climate stabilization, under certain conditions.

Trade measures aimed at non-Parties of MEAs

At present, the Kyoto Protocol contains no specific provisions aimed at non-Parties. However, given that the United States – the world's largest emitter of greenhouse gases – is not a Party to the Protocol, an important future consideration is the extent to which the WTO allows Kyoto Protocol Parties to take trade measures aimed at non-Parties. This technique is applied in other MEAs, to prevent free-riding and create an incentive for non-Parties to join the regime.³² Some WTO Members have expressed concern about this,³³ but this aspect of the debate is not under negotiation in the Doha Round.

From a legal point of view, this is a challenging problem because by not participating in an MEA with trade measures, the MEA non-Party has not consented to altering its WTO obligations to conform with the MEA. This is not to say that the flexibilities just noted above would not apply to trade measures affecting MEA non-Parties – they would – but there may also be a higher legal hurdle than in the case of a dispute over trade measures between MEA Parties.

Specific/non-specific measures

Another crucial distinction arising out of the Doha Agenda is between 'specific' and 'non-specific' measures. The present Doha negotiation mandate only covers 'specific' trade measures. 'Non-specific' measures are taken individually by Parties in order to achieve the objectives of the MEA. They can occur in cases where the MEA in question contains obligations of result – e.g. Kyoto Protocol – which allow Parties the discretion to select the precise policies and measures they take to fulfil those obligations. A further scenario is where a Party takes unilateral trade measures to enforce the substance of a treaty against other Parties or non-Parties. So far, no Kyoto Party has developed trade measures to implement the treaty.

At present, the negotiations on this issue in the WTO are stalled on fundamental definitional issues. Switzerland has used examples from the Kyoto Protocol to argue in the WTO for a broad interpretation of 'specific trade obligations':

One example is the Kyoto Protocol which has as its objective to reduce emissions of greenhouse gases. The measures to be taken to that end may relate to a number of spheres – taxation, rules and standards, and so forth (Article 2.1 of the Protocol). Let us take Member A, which is listed in Annex I to the Protocol along with the other countries that have undertaken greenhouse gas reduction commitments. If Member A prohibits

the importation and use of emission filters for industry on the grounds that they do not meet national standards in terms of retention of substances that adversely affect the concentration of greenhouse gases, such a measure should be regarded as a specific trade obligation covered by the solution negotiated among WTO Members under paragraph 31(i). Indeed, it contributes to the implementation and achievement of the object of the Protocol, which provides for an 'obligation de résultat' (obligation to achieve results). This second category thus encompasses MEAs which specify:

- *an obligation to achieve results, and*
- *the spheres in which a measure may be taken. Measures that may be adopted in order to fulfil the obligation to achieve results are thus not explicitly named but implicitly derive from the sphere in which they should be taken (e.g. the fiscal sphere implies fiscal measures).³⁴*

Other countries, such as Canada, have rejected the breadth of this interpretation, whereby the Kyoto Protocol provisions would not be considered as containing specific trade obligations.³⁵

Dispute settlement

Another issue in the WTO/MEA interface is what happens when a dispute settlement body in an MEA rules in a manner that diverges from the WTO. So far this has not happened. The closest case was when Chile and the EU lodged parallel complaints in the WTO and the Tribunal of the UN Convention on the Law of the Sea over Chilean landing requirements for swordfish.³⁶ However, that case was settled before a ruling in either body occurred.

International law is unclear on whether there would be primacy by the WTO or an MEA. The rules governing conflicts between treaties in the Vienna Convention on the Law of Treaties are unhelpful in this context, because they do not fully anticipate the complexities in the relationships between the WTO and MEAs (Tarasofsky, 1997). However, the WTO Committee on Trade and Environment has made a non-binding recommendation regarding competing dispute settlement systems, urging Parties to MEAs to settle their dispute in the MEA framework prior to taking them to the WTO.³⁷ The WTO has not yet been able to find consensus on how to handle trade disputes between a party and a non-Party to an MEA.

The CTE recognizes that WTO Members have not resorted to WTO dispute settlement with a view to undermining the obligations they accepted by becoming Parties to an MEA, and the CTE considers that this will remain the case. While WTO Members have the right to bring disputes to the WTO dispute settlement mechanism, if a dispute arises between WTO Members, Parties to an MEA, over the use of trade measures they are applying between themselves pursuant to the MEA, they should consider trying to resolve it through the dispute settlement mechanisms available under the MEA. Improved compliance mechanisms and dispute settlement mechanisms available in MEAs would encourage resolution of any such disputes within the MEA.³⁸

The dispute settlement mechanism of the Kyoto Protocol and the UNFCCC has not yet been used, so it has not been possible to apply the CTE's policy. It may also be permissible for UNEP, or another UN body, to seek a non-binding advisory opinion from the International Court of Justice about the compatibility of the Kyoto Protocol with the WTO.³⁹

Specific issues in the WTO–Kyoto Protocol Relationship

Tariffs and trade restrictions

A lot of recent discussion has taken place around the question of whether countries can unilaterally raise their import tariffs for goods with a high carbon content. For example, in the WTO negotiations on MEAs, the issue came up in the context of who would bear the burden of proof in challenging such a move:

The representative of Australia wondered whether Switzerland would consider the following scenario as involving only a procedural change: Australia obtains from Japan a tariff binding on coal in exchange for certain concessions which Australia makes, but following the entry into force of the Kyoto Protocol, Japan decides to raise that tariff. Australia asked, if according to the Swiss proposal, it would be up to Australia to convince a Panel that the measure was inconsistent with WTO rules, and if such a change on current practice could simply be called 'procedural.' Such a change in rights and obligations could not be accepted.⁴⁰

Raising tariffs and other trade restrictions are increasingly raised as an option in Europe as a means of inducing compliance by non-Parties to the Protocol.⁴¹ However, the WTO jurisprudence has frowned on explicit efforts to influence the environmental policies of other countries. For example, the first two environment related trade disputes in the WTO, the **Venezuela Gasoline** case⁴² and **US-Shrimp I** case, have ruled that Article XX cannot be used to exempt provisions that contravene other parts of the GATT, if their purpose is to influence the policies of other WTO members. However, it could be argued that this logic is counter to the reasoning of trade measures in MEAs, which are often part of a package of carrots and sticks aimed at inducing countries to join the regime (Stilwell and Tarasofsky, 2001).

Could the 'precautionary principle', referred to in the UNFCCC, be a defence for such trade measures? For example, could a Kyoto Party adopt policies and measures to restrict the availability of certain goods in the market-place on the basis of a precautionary approach to stabilizing the climate, and then restrict imports of such goods? WTO law is unclear on this. It is arguable that the results in the **EC-Asbestos** case provide states with the ability to determine their own level of health protection. Indeed, in that case, the Appellate Body referred to its decision in **Hormones**⁴³ in interpreting Article XX to assert that governments may act in good faith, even if the scientific opinion diverges from the majority, so long as that opinion comes from qualified and respected sources.⁴⁴ The **Korea Beef** case suggests that precaution may play a role in determining whether a measure is 'necessary', under Article XX, insofar as it is encompassed by 'common interests or values'.⁴⁵ If the dispute involved two parties to the Kyoto Protocol, and if the precautionary principle were to be considered as part of customary international law, then under the Vienna Convention on the Law of Treaties, WTO rules would need to be interpreted in a manner that considered 'other rules of international law applicable between the parties'.⁴⁶

So far, the Kyoto Protocol does not provide any explicit multilateral basis for taking any economic action against non-Parties. However, were it to do so in the future, it would strengthen the argument of those countries unilaterally implementing such measures as being *bona fide* in the context of Article XX of the GATT. Even if those measures were ultimately deemed incompatible with WTO rules, there is always the possibility for WTO Members to grant a waiver to cover those measures, similar to the one granted in 2003 for the Kimberley Process controlling trade in conflict diamonds. This requires a two-thirds majority vote.

Environmental goods and services

One of the possible 'win-wins' for trade liberalization and environment was the mandate in Paragraph 31(3) of the Doha Agenda to negotiate 'the reduction or, as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services'. The European Union's Commissioner for Trade has suggested that certain goods specifically linked to reducing climate change, such as clean power generation and renewable energy, ought to be subject to a 0% tariff deal.⁴⁷ However, to date, WTO Members have been bogged down over definitional issues, as there is little consensus as to what is encompassed by the term 'environmental goods and services'. There is agreement on goods and services whose end use is for an environmentally beneficial purpose. However, processes and production methods (PPMs) and 'environmentally preferable products' are particularly difficult, especially as regards 'environmental goods'. There is some degree of agreement on the content of 'environmental services', since that has been under negotiation since the end of the Uruguay Round. Lists drawn up under the auspices of Asia-Pacific Economic Cooperation (APEC) and the OECD have been starting points for some proposals, but developing countries have resisted these because most of the items were developed-country exports. As a result, UNCTAD has developed an approach aimed at including items of export interest to developing countries.⁴⁸ Another approach has been to consider goods and services on the basis of whether they contribute to fulfilling international environmental and sustainable development priorities – e.g. as expressed by MEAs or the Millennium Development Goals (MDGs) – or which have a triple win: trade, environment and poverty relief. India has suggested an approach that is different from a list-based one, which is to identify environmental goods and services in the context of particular projects.⁴⁹ Argentina has responded with an approach that integrates lists and projects.⁵⁰

Some of the WTO discussions so far on this topic have focused on areas relevant to the Kyoto Protocol. The APEC and the OECD lists contained goods aimed at improving energy efficiency.⁵¹ Some members, such as Japan, have included energy-efficient products in their proposals.⁵² Some proposals, including those of the European Communities⁵³ and Brazil,⁵⁴ have included renewable energy, such as ethanol and bio-diesel. In addition, Qatar has proposed including 'efficient, lower-carbon and pollutant-emitting fuels and technologies' as environmental goods, which would include natural gas.⁵⁵ The project-based approach may also be applicable to CDM projects.

Some commentators have raised the possibility of biofuels being considered as environmental goods (International Food and Agricultural Trade Council, 2006). But the structural intricacies of the WTO negotiations make this difficult, because the products involved are clustered under the agricultural negotiations, not those on goods and services (Singh, 2005).

Subsidies

Subsidies of energy-efficient products might run afoul of the WTO Agreement on Subsidies only in a few instances. One is where the subsidy is contingent on export performance.⁵⁶ Another is where the subsidy requires the use of domestic goods over foreign ones.⁵⁷ A further instance is where a subsidy has the effect of being available only to certain enterprises and causing injury to a domestic industry of another Member or prejudging the interests of another Member.⁵⁸ The determination of both the specificity of the subsidy and the injury caused by it is complex and done through a case-by-case analysis – although some guidance and presumptions are provided in the Agreement.⁵⁹

The Subsidies Agreement did provide that assistance to existing facilities to promote adaptation to new environmental requirements may be non-actionable, provided that it:

- is a one-time non-recurring measure;
- is limited to 20% of the cost of adaptation;
- does not cover the cost of replacing and operating the assisted investment;
- is directly linked to and proportionate to a firm's planned reduction of nuisance and pollution, and does not cover any manufacturing cost savings that may be achieved; and
- is available to all firms, which can adopt the new equipment and/or production processes.⁶⁰

However, this provision was time-bound, and is no longer operational, as a consensus did not emerge among WTO Members to renew it. It has been asserted that were this provision to be reinstated, it might be useful to promote renewable energy, which often requires high levels of up-front investment (Sell et al., 2005).

Another complex area of interaction arises when countries subsidize the development and export of biofuels, which emit far fewer carbon emissions than fossil fuels. These are considered promising, especially since they can be used alone or mixed with other conventional fuels. Ethanol can be made from many farm crops, including maize, wheat, sugarcane, beet and tapioca, while biodiesel can be made from a variety of vegetable oils (Bullion, 2005). This provides important export potential for many developing countries; at present, the exporters include Brazil and several Central American countries. Some countries, such as the European Union, are committed to increasing the role of biofuels within their overall energy mix.⁶¹ But the trade and environmental policy issues are complex. First, the agricultural products involved are the subject of very intricate negotiations on agriculture. In certain cases, the domestic support rules of the WTO Agreement on Agriculture might become applicable, either currently or in the context of a revised 'Green Box'. In this context, the law is continuously being clarified through WTO cases, which have emerged since the expiry of the 'peace clause' that had previously prevented such cases. Secondly, concerns have been expressed about the environmental impact of planting biofuel crops, such as the conversion of forest land for these purposes, the impact of any genetically modified crops used, and the use of pesticides.

Border tax adjustments

Some Kyoto Parties, such as Japan and Switzerland, are creating fiscal instruments – i.e. carbon taxes – as incentives to mitigate carbon emissions. Depending on the severity of the charges, countries imposing carbon taxes may wish to offset some of the international competitiveness losses through border tax adjustments (BTAs). BTAs are taxes imposed on imports or tax-relief granted to exports, used to level the playing field between taxed domestic industries and untaxed foreign competitors. They are commonly used for goods that are subject to indirect taxes such as sales tax, value added tax and so on.

BTAs for these sorts of taxes are permitted under the GATT,⁶² but the extent to which they can apply to energy inputs is unclear. This raises fundamental debates, still not completely resolved, as to whether the WTO permits distinctions based on the method by which a good is produced, rather than just on the product as such (Chaytor and Cameron, 1995). The original draft of what is now Article III: 2 referred to taxes or charges 'applied on or in connection with like products', which would have bolstered the argument that BTAs for taxes on processes were permitted. But this draft was rejected because it was considered too difficult to translate into

French (Hoerner and Muller, 1996). The final draft, by contrast, refers to taxes or charges applied 'directly or indirectly, to like domestic products'. During the negotiations, some of the drafters, such as the US negotiator, asserted that the word 'indirectly' was intended to permit BTAs on processes.⁶³

However, the WTO website states that unlike product taxes, process taxes 'by and large cannot' be adjusted at the border, and that 'a tax on the energy consumed in producing a ton of steel (a tax on the production process) cannot be applied to imported steel, even if it is charged on domestically produced steel, which could make the imported steel cheaper (and presumably less environmentally friendly)'.⁶⁴ In addition, the GATT Working Party on BTAs in 1970 was unable to agree that adjustments on '*taxes occultes*', which include taxes on consumed energy, should be permitted:

*There was a divergence of views with regard to the eligibility for adjustment of ... (a) 'Taxes occultes' which the OECD defined as consumption taxes on capital equipment, auxiliary materials and services used in the transportation and production of other taxable goods. Taxes on advertising, energy, machinery and transport were among the more important taxes which might be involved.*⁶⁵

There is some WTO jurisprudence to consider, although none of it is conclusive. In the *Superfund*⁶⁶ case of 1987, the panel stated that the United States could legally tax imported goods based on chemicals used during production – that is, that a process-based BTA was legal, as long as it was non-discriminatory. But the panel did not determine whether countries could tax imports based on inputs unincorporated into the final product, leaving the implications for carbon taxes unclear (Biermann and Brohm, 2003). More recent cases under the GATT/WTO suggest that there is some flexibility in the international trade rules to allow such adjustments in this context. For example, in *United States – Taxes on Automobiles*⁶⁷ the GATT Panel found that tax differentiation on the basis of gasoline consumption, as well as differences in application of a luxury tax, were not inconsistent with GATT Article III, even though they applied differently to cars that were otherwise similar. Although that case is not a direct parallel to a BTA for a tax on process, since it involved physically discernible difference in the final product characteristics, it is nonetheless instructive that the Panel considered the environmental purposes of the tax as relevant, which is in contrast to the approach in the *Tuna-Dolphin* cases,⁶⁸ and earlier cases involving taxes.⁶⁹ Furthermore, if the BTA failed on the text of Article III, the new flexibility in Article XX might still save the measure, although this is contentious (Charnovitz, 2003).

The argument from the WTO, cited above, is perhaps a little too certain on an issue where certainty is impossible. In the end, while the GATT allows BTAs to adjust for direct taxes in the case of both imports and exports, it is unclear and has never been tested whether such adjustment is permissible for indirect taxes ('*taxes occultes*') on an input that is fully consumed during production. A carbon tax, based on the energy consumed in the production of a product, falls squarely into the latter category.

BTAs may have less flexibility under the General Agreement on Trade in Services (GATS), which applies if they are taxes on services, such as air travel. Difficulties may arise in cases where domestic service providers are treated differently for tax purposes than foreign providers – which may happen in the case of cross-border services. The General Exceptions provision of the GATS is narrower than in the GATT and, in any event, may not cover the object of compensating for loss of competitive advantage.

Energy standards

Many countries have developed energy standards that aim at reducing carbon emissions; several of these have been notified to the WTO. The key WTO instrument governing these standards is the Agreement on Technical Barriers to Trade. The preamble of the TBT Agreement states the following:

Recognizing that no country should be prevented from taking measures necessary to ensure the quality of its exports, or for the protection of human, animal or plant life or health, of the environment or for the prevention of deceptive practices, at the levels it considers appropriate, subject to the requirement that they are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail or a disguised restriction on international trade, and are otherwise in accordance with the provisions of this Agreement;

Thereby, the TBT Agreement seeks to establish a balance between the ability of countries to establish standards and the desire to eliminate barriers to trade.

The TBT Agreement applies to a 'document' that sets mandatory standards (referred to in the Agreement as 'technical regulations') or voluntary standards (referred to as 'standards') for products. The TBT Agreement covers not only the products themselves, but also the processes and production methods, as these are explicitly included in the definitions of standards and technical regulations. However, it remains in dispute precisely what PPMs are covered: those relating only to the product or also to non-product PPMs? An example of a product-related PPM is a requirement that recycled materials go into the product. A non-product PPM example is a policy which requires that the process for making a product be energy-efficient.

The Agreement fosters the harmonization of technical requirements by favouring the use of international standards. When a Member adopts or expects to adopt technical regulations for a product, it is required to participate, within the limits of its resources, in efforts to set international standards for that product. If 'relevant international standards' exist, then Members must use them as a basis for their technical regulations, unless these standards would be 'ineffective or inappropriate means for the fulfilment of the legitimate objectives pursued'. Article 2.2 explicitly recognizes the protection of human health or safety, animal, plant life or health, or the environment as legitimate objectives. A technical regulation for legitimate objectives that is based on international standards is 'rebuttably presumed not to create an unnecessary obstacle to international trade'.⁷⁰

Members may, however, choose not to follow international standards. In that event, the TBT Agreement imposes both procedural and substantive requirements. The former are aimed at fostering transparency. Members must provide prior notice and opportunity to comment on draft regulations and must publish promptly final technical regulations.⁷¹ They must also establish enquiry points to which other Members and interested parties may turn for information.⁷²

At the substantive level, technical regulations and conformity assessment procedures must obey the MFN and national treatment obligations.⁷³ In addition, such regulations 'shall not be more trade-restrictive than necessary to fulfil a legitimate objective, taking account of the risks non-fulfilment would create'.⁷⁴

The TBT Agreement applies only to central governments. A Code of Good Practice is annexed, to which non-governmental bodies establishing standards may adhere. Central governments are required to take reasonable measures to ensure that local government and non-governmental standardizing bodies comply with the Code of Good Practice. However, the extent to which the Code of Good Practice applies to voluntary eco-labelling programmes is still a matter of dispute.

All this suggests that using energy standards to implement the Kyoto Protocol may be a useful technique. The TBT Agreement should influence the design of these standards, but ultimately does not create rules that would have an impact on their effectiveness. The more these standards are harmonized, the more immune they will be from WTO challenge.

It should also be noted that energy standards have been the subject of negotiations in the WTO on non-agricultural market access. Several such non-tariff barriers have been officially notified, and include fuel efficiency standards for automobiles and energy efficiency measures (Friends of the Earth International, 2005). There is no consensus yet on these negotiations.

Energy-related labelling

One of the key market instruments aimed at enhancing environmentally positive behaviour is the use of labelling. This can be applied in pursuit of Kyoto objectives, particularly those aimed at energy efficiency. As labels can have a trade distorting effect, they have been the subjects of GATT/WTO disputes. The first *Tuna-Dolphin* case upheld the voluntary eco-labelling scheme for 'dolphin safe' tuna under GATT. However, considerable controversy exists over the WTO compatibility of such labels with the TBT Agreement, whether they issue from state programmes or from independent voluntary initiatives. A fundamental controversy is the extent to which the TBT Agreement actually covers voluntary independent labelling schemes. Assuming the TBT Agreement does apply, its Code of Good Practice calls on central governments to take reasonable measures to ensure that independent standard-setters comply with the TBT rules. However, so far it has not been determined what such measures might be. There have been no cases yet that decided the applicability of the TBT Agreement to eco-labelling schemes.

However, the decision in *Sardines*⁷⁵ is instructive in addressing how the TBT Agreement might be interpreted in relation to such schemes. First, the decision affirmed the obligation to base standards on established international standards, except where they would be ineffective or inappropriate to achieve a legitimate objective. Secondly, it appears that the Appellate Body will not shy away from interpreting the content of these standards. Finally, it should be noted that the *Sardines* case concerned a mandatory regulation; a label based on a voluntary standard might not be subject to such stringent scrutiny, since the requirements for standards are less stringent than for regulations.

Although the TBT Agreement expresses a preference for international standards, if none exist, or those that do are considered unsatisfactory, there is still scope for countries to develop national standards relating to eco-labelling. There is an ongoing debate in the WTO as to whether the TBT disciplines allow labelling for so-called 'non-product PPMs', which are PPMs that are not detectable in the end product (Appleton, 1999; Abdel, 1999). From the perspective of exporting countries there are legitimate worries about labelling standards and regulations based on non-product PPMs creating unreasonable competitive disadvantages for some products. This is particularly so if these standards and regulations were developed in a non-transparent manner, without the participation of exporters, especially from developing countries, or entail high costs of producers from developing countries.

Government procurement policies in support of the Kyoto Protocol

Kyoto Parties could, conceivably, use their public procurement policies to influence suppliers to act in a manner that conforms to the objectives of the Kyoto Protocol – e.g. are energy-efficient. The main WTO instrument governing public procurement is the Agreement on Public Procurement (AGP). By its very nature as a plurilateral agreement, the AGP does not cover all WTO Members,⁷⁶ but its substantive scope is limited to monetary thresholds and country-specific Annexes.

So far, in the literature, there has been a general discussion about whether sustainable development conditions could be added to public procurement tenders. It would appear that the AGP does allow considerable flexibility to procurement authorities. It allows national technical specifications to include ‘... marking or labelling requirement as applied to a product, service process or production method ...’.⁷⁷ Although the use of particular labels appears to be frowned on, unless there is no sufficiently precise or intelligible way of describing a procurement requirement, where there is a reference to a particular ‘trademark, etc.’ the words ‘or equivalent’ are to be included in the tender documentation. However, it is also worth noting that the definitions of technical specifications and standards provided for in the footnote of Article VI.2 are the same as in the TBT Agreement. There has been much discussion in the WTO TBT Committee about whether these provisions cover ‘non-product related PPMs’.

WTO procurement rules rest on principles of non-discrimination against products deriving from parties to the AGP. In theory this could give rise to a WTO challenge to procurement policies covering only some countries (e.g. Kyoto Parties). Another type of challenge may come from an AGP Party that is closely aligned with a certification scheme not favoured by a national procurement policy.

Finally, even if a procurement rule was found to have fallen foul of such a substantive provision, there is an exception for the protection of human, animal and plant life (Article XXIII). As suggested by the jurisprudence around GATT Article XX, this may cover measures aimed at tackling climate change – having multilateral cover, through the Kyoto Protocol, could contribute to the defence of the measure.

Emissions trading under the Kyoto Protocol

There seems to be general agreement among many, although not all, commentators that tradable emissions allowances are neither goods nor services, and therefore are not directly covered by the WTO.

However, there are some aspects of the emissions trading regime which may bring in WTO aspects. For example, it has been argued, but not universally accepted, that allocation of emissions permits that do not reflect their market value may be considered to be subsidies under the terms of the WTO Subsidies Agreement.⁷⁸ This view is supported by the ruling the *US Softwood Lumber* case, which indicated that subsidies include in-kind transfer of resources that can be valued.⁷⁹ Indeed, the EU approach explicitly seeks to ensure that the allocations do not violate the EU rules on state aid, suggesting that there may be concerns over subsidies in this connection.⁸⁰

Some commentators have also asserted that the financial services provisions of the GATS may be applicable.⁸¹ For example, emissions allowances will inevitably have a financial value, and thereby might be considered to be a negotiable instrument under GATS – although this view is not universally shared. Similarly, derivatives, such as contracts for future transactions, may also

come under GATS. Thus countries with liberalized financial services sectors would not be able to limit the imports of these instruments, although they would not need to accord them any validity. In principle, a domestic cap and trade emissions trading scheme would not encounter GATS issues, since there is no concept of 'importation', but the legal situation may become more complex when domestic emissions trading schemes link with schemes from some but not all other countries. At the very least, it is clear that the GATS will prevent any discrimination against foreign traders of such instruments, for example by refusing them the right of establishment.

The Clean Development Mechanism

Parties involved in CDM projects may face some issues relating to the GATS and the Agreement on Trade Related Investment Measures (TRIMS Agreement). Both involve the extent to which host countries can determine who participates in such projects, and under what conditions.

For example, the GATS could become relevant for CDM projects involving services coming from more than one country, were the host country to limit providers to those who are Parties to the Protocol. However, the more likely scenario is that projects involving non-Party investors may not have CDM status, which is limited to Kyoto Parties. This scenario ought not to conflict with GATS, since it would not be a limitation on whether the project can take place in such circumstances – it would only relate to the status of the project under the Kyoto Protocol.

In the case of TRIMS, host countries need to take care in attaching conditions relating to national development priorities, such as local content requirements. For example, in the WTO case on *Indonesia – Certain Measures Affecting the Automobile Industry*⁸² a tax credit aimed at encouraging local manufacturing was held to be inconsistent with Article 2.1 of the TRIMS Agreement. That provision requires the application of the GATT 'national treatment' principle, such that encouraging local industry is not permitted. What is particularly striking is that the measure at issue in that case did not even require any specific action, but was an incentive for voluntary pursuit of a national objective (Werksman et al., 2001). However, in practice, this does not yet appear to be an issue, since CDM recipient countries are not making establishment of the investment conditional upon such stipulations. As in the case of GATS, such criteria appear to be applicable only in the granting of CDM status to a project, which does not in itself raise TRIMS issues.

Incentives to implement Kyoto through use of the Generalized System of Tariff Preferences

For a number of years, the EU GSP programme has sought to create extra preferences for developing countries meeting certain environmental and social standards. An earlier version of the programme was successfully challenged by India in the WTO, but the Appellate Body ruling suggested that such schemes based on differentiation would be permissible provided they involved equal access and objective criteria.⁸³ Accordingly the EU refined its approach.

The new scheme was the subject of the 2004 trade policy review of the EC, where a link to the Kyoto Protocol was made:

Q34. The EC is poised to launch a new trade-preference scheme aimed at giving duty-free access for about 7,200 product lines originating in smaller countries with vulnerable and poorly diversified economies. The new scheme, which is to take effect from January

2006, is geared towards developing countries that implement the Kyoto protocol and other international treaties on human rights, labour standards and the environment. In this regard, we would be interested in receiving further information about the new trade-preference scheme, as well as the EC views as to how it will ensure the scheme's full compliance with WTO's rules and regulations.

A: As stated in question 1, the new regime Thailand is referring to is the so-called future 'GSP+'. It will provide a positive discrimination (better preferential treatment) to those of the beneficiaries facing 'special development needs'. The beneficiaries that are both the most vulnerable ones on one hand, and that accept to pave the way for a more sustainable development on the other, have to face special burdens/costs, that may hamper their economic development. Because of this situation, the EC considers that it is fully in line with the WTO's ruling, which allows for any special treatment as far as they are based on 'objective criteria' and are not discriminatory between countries being in the same conditions.⁸⁴

Conclusions

The discussion above raises several questions and points to several possible ways forward. Fundamentally, it suggests that the extent of the potential problems varies according to the specific kind of measures, and that in many cases, the potential problems relate more to the design of a Kyoto trade measure than to whether such a measure is incompatible *ab initio* with the WTO. In other words, there is little inherent legal conflict between the WTO and the UNFCCC, but care needs to be taken in both fora to ensure that particular measures conform to both regimes. This involves clarifying WTO law, and Kyoto Parties taking care to ensure that their policies and measures remain within those boundaries.

Specifically, the paper suggests certain useful strategies that Parties to both the Kyoto Protocol and the WTO might wish to preserve to ensure conformity with the WTO. For example, they could revive the expired exception in the Subsidies Agreement that allows for subsidization for environment purposes. More generally, they could also continue to pursue win-win solutions in the WTO, such as improved market access for environmental goods and services, GSP incentives, and the inclusion of climate-related considerations in their negotiations on tariff bindings.

There are a few areas where Kyoto Parties may wish to act. First, to enhance the information base, it would be useful for Parties to include trade impacts in their national reports. Second, they could decide to establish international standards on energy efficiency, although this would probably need to be done in another international standard-setting body and then perhaps referred to a decision of the Kyoto Meeting of Parties. Third, it would appear to be in the Parties' interest for the Kyoto Protocol dispute settlement mechanism to become operational as soon as possible, so as to be able to handle disputes that might otherwise end up at the WTO.

Parties to the Protocol that are also WTO Members can take steps to help ensure that the current negotiations on the WTO/MEA relationship do not undermine the Kyoto Protocol. They can either craft a formula for an expansive notion of 'specific measures' that might include fiscal measures, but that also include appropriate safeguards against economic protectionism. Or, they can complete the current negotiations in a rather narrow fashion and set the stage for a more meaningful negotiation, perhaps outside the confines of WTO negotiating bodies. Other important WTO negotiations include labelling and agriculture.

NOTES

¹ CBI, Stern Review on Climate Change – CBI Response, available at http://www.hm-treasury.gov.uk/media/FC6/5C/climatechange_cbi_1.pdf.

² See

<http://www.nytimes.com/2007/02/01/world/europe/01climate.html?ei=5090&en=718095d16a7c2e7f&ex=1327986000>.

³ See in particular Chapter 12.

⁴ Note, for example, the enormous cost differences between the domestic action case and the trading case expressed in Wagle (2001). This finding is widely replicated in the theoretical literature.

⁵ For a survey of the research ‘explosion’ spanning the years 1999–2001, see Environment Canada (2002).

⁶ This study assumed that implementation would be the same in all EU member states, so its conclusions centred on the non-Party problem, in isolation from the implementation problem considered below.

⁷ The study did, however, find potential concerns over costs in some cases, but notes that these are likely to be overstated for a number of reasons; the report is pitched at giving an outside boundary picture of costs.

⁸ Canada and the US are bound by the North American Free Trade Agreement (NAFTA), and a number of related initiatives to reduce non-tariff barriers to trade and investment.

⁹ A fourth question is whether environmental regulations become ‘stuck in the mud’ (Zarsky, 1997). The hypothesis is that regulators collectively fail to raise standards out of fear of competitiveness impacts. This hypothesis is not examined here, though the desire to avoid this dilemma is clearly what motivates the analysis in this paper. The difficulty of attributing causation to a failure to act has meant that there is a dearth of empirical studies in this area.

¹⁰ A comprehensive survey of the early literature is Jaffe et al., (1995). See also Low and Yeats (1992); Tobey (1990); McConnell and Schwab (1990); Lucas et al. (1992: 67–86); Birdsall and Wheeler (1993); Eskeland and Harrison (1997).

¹¹ See, in particular, Brunnermeier and Levinson (2004); Copeland and Taylor (2004); and Levinson and Taylor (2004).

¹² Such an effect is found in Ederington et al. (2003).

¹³ The cement sector is an obvious example.

¹⁴ For surveys of this body of work, see Brunnermeier and Levinson (2004); Copeland and Taylor (2004); Levinson and Taylor (2004); Taylor (2004); and SQW Ltd (2006).

¹⁵ See Ederington and Minier (2003); Ederington, Levinson and Minier (2003); Cole and Elliott (2003).

¹⁶ See Henderson (1996); Kahn (1997); Becker and Henderson (2000); List and Kunce (2000); Greenstone (2002); Keller and Levinson (2002); and List et al. (2003).

¹⁷ This is the clear conclusion of the seminal literature survey in Copeland and Taylor (2004).

¹⁸ Reinaud (2005) has similar findings, specifically with respect to the EU.

¹⁹ Annex B Parties are those Parties with quantitative emission reduction commitments under the Kyoto Protocol.

²⁰ Like Reinaud (2005), it singles out aluminium as vulnerable to non-Party competitiveness impacts, and predicts eventual leakage. A number of studies coming to similar conclusions are summarized in Frontier Economics Ltd (2006).

²¹ Based on Carbon Trust (2004).

²² See High-Level Group on Competitiveness, Energy and the Environment (2006: Para. 12); ‘France’s Chirac Says Wants EU Carbon Tax Post-2012’, Reuters, 1 January 2007; and ‘French Plan Would Tax Imports from Non-Signers of Kyoto Pact’, *New York Times*, 14 November 2006, p. 6.

²³ Preamble, Agreement Establishing the World Trade Organization.

²⁴ See, e.g. Swedish Board of Trade, Climate and Trade Rules – Harmony of Conflict, 2004, available at http://www.kommers.se/binaries/attachments/2501_Climate_and_Trade_Rules.pdf.

²⁵ See *Bridges Weekly Digest*, 2 June 2004, <http://www.ictsd.org/weekly/04-06-02/story5.htm>; and Korppoo et al., eds (2006).

²⁶ See, for example, Mitchell (2005).

²⁷ See ‘French PM wants to hit Canada with carbon tax’, reported in *The Globe and Mail*, 15 November 2006, available at <http://www.theglobeandmail.com/servlet/story/RTGAM.20061115.wnairobi15/BNStory>.

²⁸ *European Communities – Measures Affecting Asbestos and Asbestos-Containing Products*, Report of the Appellate Body adopted 5 April 2001, WT/DS135/AB/R (‘*EC-Asbestos*’).

²⁹ See, e.g. *United States—Import Prohibition of Certain Shrimp and Shrimp Products*, 12 October 1998, Report of the Appellate Body WT/DS58/AB/R (‘*US-Shrimp I*’), paras 130, 132, 168.

³⁰ *United States – Import Prohibition Of Certain Shrimp And Shrimp Products, Recourse To Article 21.5 of the DSU by Malaysia*, Report of the Appellate Body, 22 October 2001, WT/DS58/AB/RW (‘*US-Shrimp II*’).

³¹ *Korea – Measures Affecting Imports of Fresh, Chilled and Frozen Beef*, Report of the Appellate Body adopted on 10 January 2001, WT/DS161/AB/R; WT/DS169/AB/R, (‘*Korea-Beef*’).

³² A prominent example is Article 4.1 of the Montreal Protocol on Substances that Deplete the Ozone Layer.

³³ See, e.g., discussion of environmental issues on WTO website,

http://www.wto.org/english/tratop_e/envir_e/envir_backgrnd_e/c5s1_e.htm, last accessed on 22 December 2006.

³⁴ Meeting of the Special Session of the Committee on Trade and Environment, 12–13 February 2003, Contribution by Switzerland, Paragraph 31(i), WTO Doc. TN/TE/W/21, 10 February 2003.

³⁵ TN/TE/W/22, 10 February 2003, Committee on Trade and Environment Special Session, Discussion Paper on the Concept of Specific Trade Obligations (STOs), Submission by Canada, Paragraph 31(i).

³⁶ *Chile – Measures Affecting the Transit and Importation of Swordfish*, WTO Doc. WT/DS193, and International Tribunal for the Law of the Sea (ITLOS), *Case Concerning the Conservation and Sustainable Exploitation of Swordfish Stocks in the South-Eastern Pacific Ocean (Chile/European Community)*, Case No. 7, available at http://www.itlos.org/start2_en.html, accessed on 30 July 2006.

³⁷ Report of the Committee on Trade and Environment, 12 November 1996, WT/CTE/1.

³⁸ 1996 Report of CTE to Singapore Ministerial Conference, para 178.

³⁹ See Charter of the United Nations, Article 96.

⁴⁰ TN/TE/R/3, 31 October 2002, Committee on Trade and Environment Special Session, Summary Report on the third meeting of the committee on Trade and Environment Special Session, 10–11 October 2002.

⁴¹ See http://www.carolinelucasmep.org.uk/parliament/pdfs_and_word/KyotoWTO_220305.pdf, and http://www.carolinelucasmep.org.uk/parliament/pdfs_and_word/KyotoWTO_Ans_220305.pdf. But also see negative reaction of European Union Commissioner for Trade, Peter Mandelson, in 'Trade and climate change', speech given in Brussels on 18 December 2006.

⁴² *United States – Standards for Reformulated and Conventional Gasoline*, Report of the Appellate Body adopted 20 May 1996, WT/DS2/AB/R 1996 WL 227476 (W.T.O.) ('Venezuela **Gasoline**').

⁴³ *EC Measures Concerning Meat and Meat Products (Hormones)* Appellate Body Report, WT/DS26/AB/R, WT/DS48/AB/R, adopted 13 February 1998 ('**Hormones**').

⁴⁴ *EC-Asbestos*, paragraph 178.

⁴⁵ *Korea Beef*, paragraph 164.

⁴⁶ Article 31(3)(c).

⁴⁷ See Mandelson, 'Trade and climate change' speech, 18 December 2006.

⁴⁸ See Note by UNCTAD Secretariat, Environmental Goods and Services in Trade and Sustainable Development, TD/B/COM.1/EM.21/2, 5 May 2003.

⁴⁹ See TN/TE/W/51, TN/TE/W/54 and TN/TE/W/60.

⁵⁰ Integrated Proposal on Environmental Goods for Development, TN/TE/W/62 of 14 October 2005.

⁵¹ See, e.g., 'Opening Markets for Environmental Goods and Services', OECD Policy Brief, September 2005, available at <http://www.oecd.org/dataoecd/63/15/35415839.pdf>.

⁵² See TN/MA/W/15.

⁵³ EC Submission on Environmental Goods, TN/TE/W/56 of 5 July 2005.

⁵⁴ Environmental Goods for Development, TN/TE/W/59 of 8 July 2005.

⁵⁵ TN/TE/W/19, TN/MA/W/24, 28 January 2003, Committee on Trade and Environment Special Session, Negotiating Group on Market Access Negotiations on Environmental Goods: Efficient, Lower-Carbon and Pollutant-Emitting Fuels and Technologies, Submission by Qatar, Para 31 (iii).

⁵⁶ Article 3.1(a).

⁵⁷ Article 3.1(b).

⁵⁸ Part III.

⁵⁹ Article 15.

⁶⁰ Article 8 (2)(c).

⁶¹ Directive 2003/30/EC of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport.

⁶² Article III: 1 and III: 2.

⁶³ Quotations from EPCT/A/PV/9, pp. 18–19, cited in Hoerner and Muller (1996).

⁶⁴ World Trade Organization, 'CTE On: How Environmental Taxes and Other Requirements Fit In', http://www.wto.org/english/tratop_e/envir_e/cte03_e.htm.

⁶⁵ *Working Party Report on Border Tax Adjustment*, BISD 18S/97, p. 101, para 15 (1970).

⁶⁶ *United States – Taxes on Petroleum and Certain Imported Substances*, Report of the Panel adopted 17 June 1987, BISD 34S/136 ('**Superfund**').

⁶⁷ *United States – Taxes on Automobiles*, Report of the Panel, 29 September 1994 (not adopted) DS31/R

⁶⁸ *United States – Restrictions of Imports of Tuna*, Report of the Panel, GATT Docs dated 3 September 1991 (DS21/R) and 16 June 1994 (DS/29/R) (neither panel report adopted).

⁶⁹ **Superfund** case, note 66 above.

⁷⁰ Article 2.5.

⁷¹ Article 2.9.

⁷² Article 10.1.

⁷³ Article 2.1.

⁷⁴ Article 2.2.

⁷⁵ *European Communities – Trade Description of Sardines*, Report of the Panel 29 May 2002 (WT/DS231/R) and Report of the Appellate Body 26 September 2002 (WT/DS231/AB/R) ('*Sardines*').

⁷⁶ Current signatories are mainly OECD countries.

⁷⁷ Article VI(1).

⁷⁸ See Articles 1 and 2 of the Agreement on Subsidies and Countervailing Measures.

⁷⁹ *United States – Softwood Lumber III*, Report of the Panel adopted 1 November 2002, WT/DS236/R and *United States – Softwood Lumber IV*, Report of the Appellate Body adopted 17 February 2004, WT/DS257/AB/R. Cf. Petsonk (1999).

⁸⁰ See, for example, 'Emissions trading: Commission clears over 5,000 plants to enter emissions market next January', available at

<http://europa.eu.int/rapid/pressReleasesAction.do?reference=IP/04/862&format=HTML&aged=0&language=EN&guiLanguage=en>.

⁸¹ See, for example, Green (2005).

⁸² *Indonesia – Certain Measures Affecting The Automobile Industry*, Report of the Panel adopted 2 July 1998, WT/DS54/R, WT/DS55/R, WT/DS59/R, WT/DS64/R.

⁸³ *EC – Tariff Preferences*, WT/DS246/AB/R, Appellate Body report of 7 April 2004.

⁸⁴ Trade Policy Review – European Communities, WT/TPR/M/136/Add. 2, 24 January 2005, Trade Policy Review Body, 25 and 27 October 2004. The new EC scheme is found in Council Regulation (EC) No. 980/2005, 27 June 2005: applying a scheme of generalized tariff preferences.

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