

Multilateral Environmental Agreements and the Trade and Environment Nexus

Tim Taylor, Alistair Hunt, and Anil Markandya

Department of Economics, University of Bath, Bath, BA2 7AY, United Kingdom
and Metroeconomica Limited, 108 Bloomfield Road, Bath BA2 2AR, United Kingdom

ecstjt@bath.ac.uk, ecsasph@bath.ac.uk, hssam@bath.ac.uk

1 Introduction

The emergence of transboundary environmental problems, including climate change and the depletion of the ozone layer, has led to the establishment of a number of multilateral environmental agreements (MEAs). To date, over 200 such agreements have been made. These MEAs may have important impacts on trade, either directly through trade measures or indirectly through the changing of relative prices through mitigation measures. This chapter will investigate these impacts on trade of MEAs.

This chapter will review some of the main literature on the issue of trade impacts of MEAs to date, including the Montreal Protocol, CITES and the Basel Convention, before examining the potential trade impacts of the Kyoto Protocol or its successor. It then discusses issue linkage within a political economy framework and investigates key determinants of implementation for future MEAs.

The trade and environment nexus within MEAs and likely implications for future trade-environment issue-linkage within MEAs are then investigated.

2 Trade and Environment Nexus: Overview

The linkages between trade and environment are complex. Many studies have attempted to identify and analyse these linkages, either through analysing the impacts of trade liberalisation on the environment (e.g. CEC, 1999, Jha et al., 1999) or through investigating the impacts of environmental agreements on trade (e.g. Jha et al., 1999; Brack, 1996; Markandya and Milborrow, 1998). This section will give a brief introduction to the key issues within the trade and environment

debate, before looking further at the latter case of the impact of multilateral environmental agreements on trade.

2.1 Trade Liberalisation and the Environment

The liberalisation of trade is a key part of the modern world. With the development of free trade areas such as the European Union, NAFTA and others, the impact that such liberalisation will have on the environment is of increasing concern. Trade liberalisation, thus, forms the backdrop to future multilateral environmental agreements and hence, we investigate briefly the impact that such liberalisation may have had on the environment to date.

The impact that the North American Free Trade Agreement (NAFTA) may have on the environment was investigated by CEC (1999), amongst others. They identified four key areas in which trade liberalisation was linked to environmental change, notably:

- Changes in production, management and technology employed – which can affect the environment in that if cleaner production methods are used, as a result of increased access to the technology or environmental regulation contained within the trade agreement, then the level of environmental degradation could fall. There could also be negative impacts if trade liberalisation leads to increased output (the scale effect) and hence increased pollution.
- Changes in physical infrastructure, including transportation networks – it is suggested that NAFTA could lead to changes in environmental quality depending on the capacity of existing traffic networks, and hence the need for possible expansion, and through shifts to more environmentally-friendly transportation methods.
- Changes in social organisation – CEC suggested that “the NAFTA institutions may serve as the centre of a deepening North American community in which a sense of stewardship... grows.”
- Changes in government policy – government regulations may converge as a result of trade liberalisation. The implications of this on the environment are that the level of environmental quality in countries with lower environmental standards may be expected to rise as these standards converge with those of the other countries.

Studies on the effect that trade liberalisation may have on the environment have reached conflicting conclusions. Boyd et al. (1993) suggested that for the case of the Philippines tariff removal¹ would result in substantial increases in deforestation. Cruz and Repetto (1993) found similar results in another Philippine study. However, a study of 25 Latin American countries from 1960-88 found that open-

¹ Boyd et al. (1993) considered removal of tariffs existing in 1988.

ness of the economy was significant in explaining pollution intensity, with increased openness implying reduced intensity (Birdsall and Wheeler, 1992).

Markandya (1999) reviewed the impacts of changes in trade regimes on developing countries and economies in transition by examining case studies commissioned by UNCTAD and UNDP. For Brazil the situation was found to be one where some small moves towards trade liberalisation have been accompanied by an upward trend in the level of environmentally harmful exports. In the case of China a more mixed picture was found. The use of new, cleaner technologies was accompanied by a dramatic expansion, particularly in small-scale industries. This expansion created significant ecological problems in some areas, including loss of biodiversity and natural resource depletion. For Poland, market reforms and trade liberalisation were not distinguished in the study. However, the economy was seen to be moving from energy-intensive, heavy engineering activities to a more Western mix of output. Markandya concludes that, for the eleven countries examined, the “studies do not provide emphatic evidence that trade liberalisation has systematically hurt the environment”. In some cases the UNCTAD/UNDP studies identified cases in which environmental pressures had reduced and others where they had increased, though where the latter were the case policies were identified that would redress the situation with no negative impact on liberalisation.

To conclude, there is mixed evidence on the impact that trade liberalisation may have on the environment. With the potential enlargement of the European Union looming ever nearer, this forms the setting in which any potential future multilateral environmental agreement will have an impact on trade. Hence, studies of the trade impacts of future MEAs should consider the changing world environment. We now examine the impact that multilateral environmental agreements have on trade.

2.2 Multilateral Environmental Agreements and Trade

Trade and environment are not only linked in the case of trade liberalisation, but also when environmental protection measures may impact on trade. With growing awareness of transboundary environmental problems such as the depletion of the ozone layer and climate change the need for international agreement on ways in which to mitigate or adapt to environmental degradation has arisen. As a result, over 200 MEAs have been signed. These MEAs may have important implications for trade, either directly through trade restrictions² or indirectly through changing production costs and hence prices.

² Brack et al. (2000) point out that of the 200 MEAs in existence, around 20 incorporate trade measures. These include the Basel Convention on Hazardous Waste, CITES and the Montreal Protocol.

Brack et al. (2000) identify four main objectives for which direct trade restrictions have been applied in the design of MEAs:

- to restrict markets for environmentally hazardous products or goods produced unsustainably,
- to increase the coverage of the agreement's provisions by encouraging governments to join and/or comply with the MEA,
- to prevent free-riding by encouraging governments to join and/or comply with the MEA,
- to ensure the MEA's effectiveness by preventing leakage³.

However, the trade restrictions introduced as part of an MEA may fall foul of WTO regulations established to promote free trade. A number of issues are of importance in this discussion, including:

- the hierarchical relationship between the WTO and MEAs: developing countries have resisted efforts to give MEAs superiority in dispute resolution (Shahin, 1999);
- the debate over Article XX: Article XX of GATT allows for measures "necessary to protect human, animal or plant life or health" or "relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption". This Article is the subject of some debate as to whether it allows scope for trade restrictions under MEAs. Esty (1994) notes that the Article does not cover atmosphere, oceans, ozone layer and other elements of the global commons. The issue of the definition of "like products", which cannot be discriminated against under WTO rules, is also important. Article XX focuses on goods produced, not on the techniques used to produce them. Brack (1999) suggests that negotiations should be opened on a new WTO Agreement on MEAs with Trade Provisions.

Potential conflicts with the WTO must be taken into consideration in the design of trade measures in MEAs.

The implications of some of the major MEAs for trade are reviewed in the next section.

³ Brack et al. (2000) define leakage as "the situation where non-participants increase their emissions, or other unsustainable behaviour, as a result of the control measures taken by signatories".

3 Review of Past Experience with MEAs and Implications for Trade

This section presents a qualitative review of previous work on MEAs and the trade impacts associated with them. Three major MEAs have been the subject of much investigation, notably the Montreal Protocol on Substances that Deplete the Ozone Layer, CITES and the Basel Convention. These are reviewed below, along with some recent work on possible trade implications of the Kyoto Protocol.

3.1 Montreal Protocol

The Montreal Protocol on Substances that Deplete the Ozone Layer was established in 1987 as a result of growing international concern over the damage done to the ozone layer by ozone depleting substances, including chlorofluorocarbons (CFCs), halons and methyl bromide. The Montreal Protocol aimed to reduce consumption of Ozone Depleting Substances (ODS) and included a number of provisions which directly impacted on trade in ODS and products containing or made with ODS. The Protocol established a timetable for the phasing out of ODS, with industrialised countries aiming to phase out the main CFCs by the start of 1996 and industrialising countries by 2010 (Brack, 1996).

Trade provisions included restrictions on trade with non-signatories, which encouraged accession to the Protocol, and ensuring that no country gained a competitive advantage by not acceding to the Protocol. Brack (1996) concluded that the trade provisions contained in the Montreal Protocol were effective in reducing the extent of free riding and in preventing leakage, as there was no evidence of nations not signing in order to evade the controls. Markandya and Milborrow (1998) also concluded that trade restrictions, together with financial assistance to cover the costs of acceding to the Protocol, played a key role in the acceptance of the Protocol by all but 27 countries, a number of which are undergoing transition or have no stable government.

3.1.1 Trade Impacts of the Montreal Protocol

The trade impacts of the Montreal Protocol were examined in Markandya and Milborrow (1998). Markandya and Milborrow examined the impact of the Montreal Protocol through econometric analysis of the determinants of trade in ODSs for Belgium, the United Kingdom and the EU as a whole. The key results are presented in Table 1 below. As can be seen from the table, the Montreal Protocol

had significant impacts on trade⁴ between some of the areas considered in the study. In particular, ODS imports from developing countries rose by 25.6% in the UK, whilst European exports to the rest of the world fell dramatically.

Table 1: Impact of Montreal Protocol on Trade in ODSs (in %).

		Rest of World	Other EU	Other Developed	Developing Countries
Belgium	Imports	ns	ns	-14	ns
	Exports	ns	13,4	ns	ns
	Years of Impact		1989-94	1985-94	
UK	Imports	19,6	-10,9	ns	25,6
	Exports	ns	-15,6	33,4	6,7
	Years of Impact	1987-94	1989-93	1987-94	1987-94
Europe	Imports	-11,5	na	-10,4	-10
	Exports	-139	na	ns	ns
	Years of Impact	1989-93		1989-93	1989-93

ns=not statistically significant, na=not applicable.

Source: Based on Markandya and Milborrow (1998).

The Montreal Protocol also contained trade measures for goods containing ozone depleting substances. The trade impacts for a number of regions and countries on trade in several goods containing ODSs were evaluated by Markandya and Milborrow (1998). The impacts of the Protocol identified using regression analysis are shown in Table 2. This regression analysis included GDP as a determinant variable and for individual countries exchange rate variables were tried but found to be insignificant. The impact of the Montreal Protocol varied from region to region, with negative impacts on imports of non-domestic and domestic refrigeration. The most notable change was that of EC imports of air-conditioning machinery, which rose by 77% over the period 1989 to 1993.

The trade impacts for some developing countries of the Montreal Protocol were presented in Jha et al. (1999). The main findings were:

- For Brazil, ODS-related exports declined by 45% between 1989 and 1992, compared with a decline in exports of manufactured goods to the OECD of 7%. Exports of products containing CFCs to developing countries rose quickly in the early 1990s, though this was side-by-side with growth in manufacturing exports.

⁴ The impact of the Montreal Protocol was estimated by regressing imports/exports on real GDP, exchange rate lagged one period and various 1-0 dummy variables to pick up trends after 1985 to proxy a protocol impact.

- For China, the volume of refrigerators exported fell 58% between 1988 to 1991, with similar declines in other ODS-related goods. This led to an expansion of the phase-out programme.
- For Malaysia, close cooperation between government and industry in the phase-out strategy meant that ODS phase-out had little or no impact on trade and competitiveness.

Table 2: Impact of Montreal Protocol on Trade in Goods Containing ODSs (in %).

Sector	Imports		Exports	
	Protocol Impact (%)	Years	Protocol Impact (%)	Years
Non-Domestic Refrigeration				
EC	-30	1990-92	None	
OECD	-26	1990-92	None	
Asia	-24	1986-88	None	
Korea	None		None	
Air Conditioning Machinery				
EC	77	1989-93	-27	1986-88
OECD	37	1989-93	n.a.	
Asia	None		-28	1988-90
Singapore	-27	1989-91	n.a.	
Domestic Refrigeration				
EC	-28	1986-88	-35	1986-88
OECD	-28	1989-90	None	
Asia	None		-41	1988-90
Singapore	-28	1990-92	-37	1988-89
Malaysia	-54	1986-88	n.a.	
Turkey	n.a.	n.a.	None	
Korea	n.a.	n.a.	-53	1988-89

Source: Based on Markandya and Milborrow (1998).

3.1.2 Illegal Trade and the Montreal Protocol

Illegal trade is one potential problem for the credibility of the Montreal Protocol and other MEAs. Markandya and Milborrow recommended the following measures to counteract this:

- Demand-side measures to encourage industry to replace CFC-using equipment, for example fiscal exemptions or product endorsement for rapid conversions.
- Alternatively, controls could be established for CFC sales, holding stockpiles or imports of recycled materials.
- Closer monitoring of CFC production and trade.
- Greater cooperation between customs authorities and environmental agencies at national and international level, with a centralised intelligence unit being proposed.
- Credible penalties for breaking the Protocol are required.

3.1.3 'Pollution Havens' and the Montreal Protocol

The main findings in the literature on the Montreal Protocol and industrial location were:

- There was little evidence available to support the hypothesis that a shift in production location occurred as a result of the Montreal Protocol, in line with most other findings on industrial production.
- Cases of shifts of a number of CFC-using enterprises from Hong Kong (then a British protectorate) to China reported by Lu et al. (1993) may have been due to less stringent phase-out schedules in China. However, the shift may also have been caused by a desire to gain access to the Chinese market.
- In Thailand, one study found an increase in ODS consumption by subsidiaries of transnationals (UNCTAD, 1995).
- Evidence is not available of a shift in production by multinationals from established factories in developed to those in developing countries. Even if this were the case this should not be a matter of concern since ODSs will be needed in developing countries for some time. Targets established under the Montreal Protocol will still be met.
- Industrial migration is being restricted in some cases to prevent total consumption of ODSs rising above 0.3kg/head. Such is the case in Malaysia, where the government is reluctant to allow foreign companies that may raise the level of ODS to set up for fear of losing the benefits of being a non-Annex 5.1 member.
- Adaptation to the new market was shown to be advantageous in the Chinese case, where manufacturers of refrigerators had to adopt new non-ODS-using technologies in order to meet demands of international buyers.

Thus, it can be concluded that industrial migration or the creation of 'pollution havens' has not been a major issue as a result of the Montreal Protocol. This is possibly due to the fact that few countries have not become party to the Protocol, but also reflects wider evidence in the literature that other factors play a more important role in industrial location than environmental protection.

3.1.4 Conclusions

The Montreal Protocol has proven itself to be one of the most successful MEAs to date. A large part of this success can be attributed to the trade provisions laid down within the Protocol which encouraged accession and prevented free-riding. Statistical analysis shows that the Protocol was an important determinant in trade of ODS and ODS-containing goods. Important lessons can be drawn for other MEAs in terms of the time-lag between accession and impact and also in terms of measures that have been identified to prevent illegal trade in the substance under consideration. There is little or no evidence in the literature to date of a 'pollution haven' effect arising from the application of the Montreal Protocol, and where it does exist then there may be other factors, such as market access, which determine the enterprise decision to relocate.

3.2 Convention on International Trade in Endangered Species (CITES)

CITES came into force on July 1, 1975 and has a membership of 152 countries. (CITES, 2001). These countries have banned commercial international trade in an agreed list of endangered species and regulate and monitor trade in species that might become endangered.

CITES lists vulnerable species in one of three appendices:

- Appendix I – species “threatened with extinction and are or may be affected by trade”, for which trade is banned for primarily commercial purposes.
- Appendix II – species not yet threatened with extinction, but which may become so if trade is not strictly regulated, for which trade is banned if the authorities in the exporting country deems export to be detrimental for species survival.
- Appendix III – species listed by governments as subject to exploitation and needing regulation to restrict exploitation. The presentation of appropriate export documents at the time of importation is required for such species.

3.2.1 Trade Impacts of CITES

Trade impacts under CITES are restricted to impacts on the trade in protected species or goods made with such species. Trade measures under this Convention have been suggested to cause unnecessary economic losses where the species under consideration are sustainably managed. Jha et al. (1999) give the example of Zimbabwe where there have been significant losses in trade of ivory and crocodiles, leading to stockpiling of ivory valued at US\$12 million. Recent measures to alleviate this problem have included the downlisting of elephants to Appendix II,

allowing limited trade. In April 1999, the first trade in ivory for 10 years took place between Zimbabwe and Japan (AFP, 1999).

Trade in products covered by CITES may represent only a small proportion of total exports. As such, only very small impacts on trade may be experienced. Such is the case in Costa Rica, though orchid dealers have complained of the impacts of a 5% tax on imports of wildlife species, claiming these have reduced competitiveness (Markandya, 1999).

3.3 Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal entered into force on May 5, 1992, having received 20 ratifications. In December 1998 there were 122 Parties to the Convention, with the United States being the most important non-signatory (Krueger, 1999).

The trade provisions within the Basel Convention have been reviewed by Krueger (1999). They include the following:

- A ban on parties exporting wastes to countries that have prohibited their import;
- a ban on export of hazardous waste to “states that are neither parties to the Basel Convention nor to an agreement that is less environmentally sound than the Convention”;
- a ban on hazardous waste export to Antarctica.
- Prohibition of export if reason to believe environmentally sound management or disposal is not available at the destination.

Prohibition of trade with non-parties under Article 4.5 acts as a mechanism to encourage non-parties to join. The logic is similar to that of the trade provisions under the Montreal Protocol, in that non-parties must accede or lose trade with those that are party to the Convention. Krueger argues this measure has been undermined by Article 11, which allows for agreements with non-parties as long as they are not less environmentally sound. Moves to ensure conformity with the Convention were quashed by some industrialised countries due to fears over existing regional mechanisms not meeting the required standards.

3.3.1 Trade and Environment Impacts of the Basel Convention

The loopholes provided within the Basel Convention have been exploited to some extent, with such agreements being made between the US and Malaysia (1995), the US and Costa Rica (1997), Germany for exports to Kazakhstan and Namibia, amongst others. Krueger reports that by August 1997, 25 bilateral and nine regional or multilateral agreements were in existence. Hence, the trade impacts of

the Basel Convention have not been as large as they may have been, due to this flexibility.

Impacts identified in the literature are diverse:

- That trade restrictions on recyclable hazardous waste may restrict access to secondary raw materials for non-OECD countries. Secondary raw materials are important in developing countries, for example imported battery scrap in India and the Philippines accounted for 60 to 70% of lead consumption in the early 1990s (UNCTAD, 1998).
- Definitions of the nature of “hazardous waste” are important in determining the trade impact (Johnstone, 1999).
- For LDCs the impact may be positive in terms of the environment, as they are protected against fake recycling schemes as a pretext for export.
- For Brazil, the impact of trade restrictions on the import of scrap metal could adversely impact on competitiveness, as scrap is imported to compensate for fluctuations in supply (Jha et al., 1999).
- For Poland, trade restrictions have resulted in a large decline in the import of wastes. Some of these wastes, in particular scrap paper, were useful inputs into production. Exports of scrap metal have also fallen which may have some benefits. The loss of revenue from transport of waste may be important, particularly for the corridor between Ukraine and Russia (Jha et al., 1999).
- In Thailand, imports of hazardous waste rose dramatically, but under new regulations these imports were expected to fall.

3.3.2 ‘Pollution Havens’ and the Basel Convention

The Basel Convention has at its core the idea of preventing the dumping of hazardous waste in developing countries without the resources to manage such wastes. Insofar as this has resulted, such ‘pollution havens’ that existed due to differential regulations in these developing countries have been eradicated to a great extent. Illegal movements of waste are still of concern, however, and steps have been taken to prevent these.

In the intermediate years between accession to the Convention and the raising of environmental regulations, some impact on trade has been experienced. Jha et al. (1999) cite the case of Thailand, where the importation of toxic waste rose considerably, but were predicted to fall dramatically as regulations came into force. Such a pollution haven effect may be seen as a temporary phenomenon.

3.3.3 Conclusions

Trade restrictions form an important part of the Basel Convention. First, they encourage accession to the Convention, though the extent to which these measures are important has been blunted by the inclusion of Article 11 in the Convention. Second, they prevent the creation of pollution havens, though these have been seen in the short term in the immediate aftermath of the Convention.

Some significant trade impacts have been experienced as a result of the Convention, particularly in the trade of recyclable goods. These trade impacts may have important implications for competitiveness in developing countries which rely on these goods as inputs in the production process.

3.4 Kyoto Protocol

The potential for the application of trade measures within the framework of the Kyoto Protocol is discussed in Brack et al. (2000) in terms of feasibility, fairness and the interrelationship with the multilateral trading system. This section briefly reviews their main conclusions.

In terms of feasibility, four main criteria are identified for the successful application of trade restrictions. The products should be:

- limited in type and application;
- limited in origin;
- easily detectable; and
- easily substitutable.

Brack et al. conclude that for the Montreal Protocol these criteria were met by the main ozone depleting substance, CFCs. However, for the case of climate change trade restrictions would be more difficult to apply as green-house gases (GHGs) tend to be byproducts rather than traded products (though some GHGs, like Hydrofluorocarbonates (HFCs), are traded). For traded goods, Brack et al. suggest trade restrictions like those under the Montreal Protocol may be feasible. For byproducts the conclusions are that restrictions on GHG-related inputs or goods made with processes that produce GHGs would not meet any of the criteria for feasibility and if they were applied they would also result in a high welfare loss resulting from the severe restrictions on trade.

In terms of fairness, a climate change related treaty with trade provisions is argued to be relatively fair. This is due to the fact that the scientific evidence is becoming more credible and the FCCC contains scope for equity considerations, by differentiating between developed and developing nations.

The debate over the interaction between the WTO and multilateral environmental agreements continues, as mentioned earlier in the paper, and no firm conclusions are reached about the likely interactions between the Kyoto Protocol in particular and the WTO.

The current Climate Change and Global Trade project, of which this paper forms part, will examine the trade implications of the Kyoto Protocol, including focus on the flexibility mechanisms and impacts of EU enlargement. This will employ CGE modeling.

3.5 Effectiveness of Trade Measures Within MEAs

The assessment of the effectiveness of trade measures within MEAs is complex, as trade measures form only part of a wider set of measures to promote environmental improvement. The trade impacts identified above give some insight into the impacts of the MEAs on trade, but one question that remains is that of how influential are these trade measures on the successful implementation of the MEA under investigation. Clearly this will vary depending on the type of MEA. The issue of the impact of trade measures in defining accession to MEAs is discussed later in this chapter, but here we will discuss the broader issues of the impact on the success or failure of an MEA to meet its objectives.

OECD (1999) presents a review of the impacts that trade measures have had on the implementation of the Montreal Protocol, the Basel Convention and CITES. For the Montreal Protocol the identification of the impact that trade based measures have had on the success of the Protocol is made complex by multilateral funding, however trade based measures were clearly important in encouraging accession.

CITES is a slightly different MEA from the Montreal Protocol, as it is made up of trade measures. However the success of CITES is not solely due to the banning or restriction of trade, CITES listing raises awareness of the risk of the extinction of species and can lead to actions by NGOs and others (OECD, 1999).

The Basel Convention is, like CITES, based on trade measures to promote environmental improvement. Inadequate data restricts the extent to which the effectiveness of the trade measures can be assessed – data on the physical quantities of transboundary waste transport is not precise and the valuation of total economic costs and benefits complex. The identification of the specific impact of the Basel Convention is also made more complex by the introduction of other control systems, including those enforced by the OECD and the European Union.

Hence, it is difficult to precisely assess the effectiveness of trade measures within MEAs. However, trade measures may lead to other positive impacts on environmental quality promoted by the MEA.

3.6 Conclusions

Trade measures have been used to some effect in multilateral environmental agreements. Such restrictions have been useful in encouraging countries to sign MEAs, particularly in the case of the Montreal Protocol and, to a lesser extent, the Basel Convention.

The impacts that some of the major MEAs have had on trade have been reviewed above. The main findings of this review are as follows:

Montreal Protocol

- Trade measures incorporated within the Montreal Protocol were important in encouraging countries to sign up to the Protocol.
- The trade impacts of the Montreal Protocol were significant, with large changes in the direction of trade of a number of goods, particularly refrigerators and air conditioning.
- The impact on developing countries varied from country to country, depending on the degree of government cooperation with industry, amongst other factors.
- Measures are needed to prevent against illegal traffic in prohibited substances.
- Industrial migration as a result of the Montreal Protocol has not been a major issue. This is possibly due to the number of parties, but also reflects wider evidence of the location of industry.

CITES

- Under CITES the trade impacts have not been large, in part due to the small proportion of total trade that trade in endangered species and related products represents.
- Some economic losses may have been experienced as a result of the listing of species as a whole rather than species in selected areas which are at risk of extinction. The Zimbabwean elephant case is one possible example, though steps have been taken to allow limited trade in ivory from Zimbabwe.

Basel Convention

- Trade provisions within the Basel Convention to encourage countries to become party to the convention have been weakened by allowances for waste to be traded with non-parties as long as agreements are not less environmentally sound (Article 11).
- For developing countries, impacts on the import of waste used as secondary sources of raw materials may be important for industrial competitiveness.

- There is some evidence of temporary increases in the import of toxic wastes to Thailand. However, as new legislation is passed this is predicted to fall dramatically.

It is difficult to assess the precise implications of trade measures for the implementation of MEAs. However, in the case of the Montreal Protocol it is clear that trade measures were instrumental in encouraging accession. In addition, under CITES, trade measures not only restricted trade in species and their byproducts but also raised awareness of the potential for species extinction.

4 Stakeholder Analysis

The preceding review of MEAs has shown that the adoption of trade sanctions within these Agreements has not noticeably reduced support for participation and seems likely to have acted as an incentive towards compliance with the Agreements. This is particularly the case for the Montreal Protocol, though there remains the possibility that the success to date for this policy is more dependent on the general recognition that ozone depletion is a real and serious threat to human health than of the threat of sanctions. The positive role of trade sanctions within future MEAs is, however, always likely to be contingent on the acceptability of the measure within society. Analysis of historical experience is therefore limited to the extent that interest groups are likely to have different influence in each new context. This section briefly indicates how stakeholder analysis can be used to add a layer of contextual realism to the overall analysis of whether trade sanctions are likely to be adopted within an MEA, using the climate change policy context as an example for illustrative purposes.

The aim of a stakeholder analysis is to identify those whose interests will be, or are being, affected by the suggested policy option, and to assess the potential influence they may have on the decision problem. The techniques used to identify the stakeholders can range from the formal (e.g. interviews) to the informal (e.g. press reviews). Option formulators and implementers should be expected to be aware of who the cast of stakeholders are likely to be, though this can be supplemented by the use of group consultations, etc.

Once a cast of stakeholders has been identified it is helpful to have systems of categorisation. One such system, shown in DFID (1995), categorises stakeholders as:

- **Primary:** those ultimately affected by the option, positively or negatively.
- **Secondary:** those involved in the delivering of the option, including those involved in the decision-making and those excluded.

- **Key:** those who may be indirectly affected by the option, but who may exercise a large degree of influence that can affect the intervention.

When considering whether to introduce trade sanctions to help enforce an MEA – such as those that may arise from the Kyoto Protocol or its successor – the primary stakeholder group may include households that have to pay higher prices for domestically produced goods and the industries in the signatory country that are affected by a shift in demand towards their products or by higher input costs. Within the non-signatory countries, energy intensive exporting industries and subsequently impacted households are also primary stakeholders. The secondary stakeholders might include the national governments of the signatory countries and perhaps the UNFCCC, as well as non-signatory country governments. The key stakeholders might include environmental NGOs and energy producers.

Having identified and categorised stakeholders the next step is to assess their interest in, and potential impact on, the option. Once again, a range of formal and informal research techniques may be used to gather information on the ways in which different stakeholders have an interest in the option and the ways in which they might influence an option. The importance of the different stakeholders in the policy objectives of the decision-maker, and the amount of influence that different stakeholders can bring to bear on an option, are therefore assessed. A matrix can then be constructed to locate stakeholders. The stakeholders identified in the climate change context are plotted in the matrix shown as Figure 1 below. Importance on the vertical axis means the extent to which the needs and interests of a particular group of stakeholders are regarded as a priority by the decision-maker. The horizontal axis ranks the amount of influence they may bring to bear. Clearly, the analytical framework is common to the consideration of decisions relating to accession to any MEA.

The matrix is used as an impressionistic tool to rank the importance and influence of stakeholders in relation to each other. An analysis of the relationships between the stakeholders views and the intervention objective – in this case, the imposition of trade sanctions – is the key output of a stakeholder analysis. In particular, it is necessary to assess the risks posed by the stakeholder views to the possibility of the option achieving its objective. Where stakeholders are identified as having considerable potential influence on the option, then they represent a considerable risk to its implementation. This then leads to consideration of how such risks should be managed.

	Low Influence	High Influence
High Importance	1, 2, 3, 4	5, 6, 10
Low Importance		7, 8, 9

Notes:

Primary stakeholders:

- 1 = households (signatory country)
- 2 = households (non-signatory country)
- 3 = import substitution industries (signatory country)
- 4 = energy intensive industries (non-signatory country)

Secondary stakeholders:

- 5 = signatory country governments
- 6 = non-signatory country governments
- 7 = UNFCCC
- 8 = WTO

Key stakeholders:

- 9 = environmental NGOs
- 10 = energy producers

Figure 1: Climate Change MEA Stakeholder Matrix when Considering Imposition of Trade Sanctions.

In the climate change enforcement context, formal negotiation between UNFCCC participants has not begun on the possible use of trade sanctions as an enforcement tool. It is therefore not possible to ascertain all stakeholder views. Nevertheless, it is clear that the key relationship is likely to be between the signatory and non-signatory governments (both having high importance and high influence), now that the US is planning to reverse its signature. Specifically, since the US is a major export market for the EU it is foreseeable that the EU will not press for trade sanctions against non-signatory countries for fear of retaliatory action from the US. This is compounded by the uncertainty over the use of environmental trade barriers under the WTO rules, highlighted earlier.

The second dimension of the analysis is to identify what assumptions need to be made about how stakeholders should act for an option to achieve its objective. If the assumption is too ambitious, then it may be that it should be regarded as what is sometimes known as a ‘killer-assumption’ and the option specification should be revisited. In the climate change enforcement context, a principal assumption is that the trade sanction does not trigger a trade war, particularly between the EU and US. Whether this is the ‘killer assumption’ is not known since the EU has made no formal statement as to its intention regarding policy towards non-signatory countries.

To conclude, the views of different stakeholders are likely to have significant impacts on the implementation of any trade measures in climate-related MEAs. This section has identified some potential stakeholders that may be of importance and indicated some of the key issues that may dictate their actions in creating or responding to the threat of trade restrictions. A more rigorous analysis – soon to be conducted by the authors of this paper – will put more emphasis on the informal research approach by conducting in-depth interviews/surveys of stakeholder groups. This will hopefully allow a greater degree of understanding of the flexibility of the positions that the actors take and therefore allow a more realistic appraisal of the possibilities of the MEA-trade linkage to be made.

5 Political Economy of Accession to a Multilateral Environmental Agreement

Governments must weigh the cost of accession, including intertemporal considerations, with the benefits in terms of improved environment. The net benefits of accession to an environmental agreement may be expressed as:

$$NB=f(E_{(t-t+\infty)}, C, T, G, D, X) \quad (1)$$

Where E represents the (discounted) environmental benefit over period t to the infinite future, C the net direct costs of meeting the requirements of the treaty (including no-regrets options), T the trade impacts, G the level of environmental awareness and participation, D the distributional implications of the MEA and X all other factors.

The net environmental benefit will depend on a number of factors, including the nature of the environmental problem in question. The impact may vary according to location of the country, the level above sea-level, the population size and many other factors. In the case of a global pollutant, such as climate change, the impact may be felt globally though the distribution of the benefits of mitigation strategies and reduced damages may be felt differently from country to country. The benefits of reducing the level of local pollutants, such as hazardous waste covered under the Basel Convention, may only be felt in the country in question.

In weighing the decision of whether or not to accede to an MEA, it is obvious that the time horizon and discount rate applied may be crucial. Where the environmental benefit is felt a long time in the future, as is the case with climate change, then discounting the benefits has a large impact on the environmental benefits derived from such a policy measure. For a discussion on intertemporal equity and climate change see Portney (2000). However, where the impact is felt in the nearer term, as is the case with a reduction in the depletion of the ozone layer, then this implies that the environmental benefit will be larger in the minds of decision-makers.

The net environmental benefit will depend not only on the timeframe of the environmental benefit but also on the environmental benefits that are taken into consideration by the government. This is particularly important in the climate change debate, with the contentious issue of ancillary benefits of climate change mitigation. Ancillary benefits⁵ (or costs) are those benefits that arise as a consequence of a mitigation policy but are not the focus of the policy, for example health benefits. The inclusion or exclusion of such benefits (costs) may be of great importance in the decision of whether or not to accede to a climate change related MEA such as the Kyoto Protocol. Estimates of the ancillary benefits of GHG mitigation range from a small percentage of mitigation costs (defined as C above) to largely offsetting these costs (Krupnick et al., 2000). A framework for the estimation of these benefits (costs) is provided in Krupnick et al. (2000).

The costs of meeting environmental standards depend critically on the costs of installing new technologies and the efficiency with which these new technologies work. This component of the net benefit function should decline with time, thus delaying agreement may lower costs, although production may expand in the meantime, meaning that costs of adaptation would increase.

⁵ For a review of issues relating to ancillary benefits see IPCC (forthcoming) and OECD (2000).

The trade impacts would depend, as shown above in the review of trade and multilateral environmental agreements, on the nature of the commodity in question, the structure of the trade in that good and the extent to which trade sanctions may play a part in the MEA. This component may be crucial to signing a treaty, as was shown in the case of the Montreal Protocol. If the trade sanctions which may follow from non-signature of an MEA are large enough, these may affect the size and potentially the sign of the net benefits.

The level of environmental awareness and participation may affect the extent to which the environmental benefits of an agreement are valued. However, they also may cause changes in voting patterns towards more environmentally-friendly candidates. The extent to which this is important to accession may vary from country to country and across the electoral cycle.

The distribution of impacts resulting from the implementation of an MEA may have important implications in terms of political feasibility. Where the impact focuses on a politically active group, or an important interest group in society, then the implementation of such a policy may be stalled and render the policy infeasible. Thus, even if signing an MEA has a negative economic cost and has a low financial cost, if there are negative impacts on a key interest group this may affect the desirability of implementation in the eyes of the policy-maker. This problem was highlighted by Dixit (1996) who shows that, even in the case where compensation of the affected group is possible, credibility issues may render the policy impossible to implement. Thus, the distributional impacts on certain key interest groups in society may have important implications for the potential success of MEAs. As such stakeholder analysis, described above, will prove crucial to the design of the MEA to protect against barriers to implementation or accession.

The distribution of impacts may also be important in terms of political feasibility if poorer sectors of the community are impacted. The degree of inequality in a country has a number of potential impacts, including increased social unrest and slower economic growth. The impact on the environment may also be negative⁶.

The extent to which the different determinants are important in bringing about accession will vary across countries, governments and time. The nature of each variable will also vary according to the multilateral environmental agreement under consideration. First, we will examine the factors affecting the weights placed on each component of the payoff function. We will then examine the components within the frameworks of different MEAs.

The weights attributed to different components of the net benefit payoff function will vary for a number of reasons. As noted above, the electoral cycle may be of

⁶ For a recent review of the impact of increased poverty on the environment see Markandya (2001).

importance in determining these weights. The weight given to environmental participation in elections may increase as time to the next election falls if the 'green' vote is important. The discount rate applied to far-off benefits may also change. Likelihood of remaining in office may affect a government's willingness to commit to an environmental agreement. Where a government is unlikely to remain in office this may reduce the weight placed on the cost element, as it will fall on the incoming government.

Political ideology may be important in determining the weight placed on various components of the net benefit payoff function. First, 'green' parties may place a higher weight (or lower discount rate in the case of climate change) on the net environmental benefit from acceding to an MEA. Second, the weight placed on distribution may vary according to the political ideology of the government in terms of the impacts on the richer and poorer sections of society, as well as on different industries. Governments may be less concerned about negative impacts on groups that do not form a major part of their support base. Political funding may also play a role where impacts on major industries fund political activities. A government for which industrial funding forms a major part of party income may place a higher weight on impacts on the relevant industries.

The nature of government may also play a role in determining the weights. A democracy would probably be more likely to place weight on 'green' participation than a dictatorship.

The weight applied to trade impacts may vary according to the overall importance of trade in the economy. They may also be correlated with the distributional implications of trade impacts, following the industrial funding of political activities as described above. The expected likelihood of application of sanctions may also determine the value of the trade impacts, which may be defined in expected value terms.

The relationship between the components of the payoff function and the likelihood of accession (or put otherwise the net benefits) need not be linear. It may be the case that small losses are valued more highly than small gains by voters, for example.

5.1 Application of Framework to MEAs

The above framework can be applied to existing MEAs and the Kyoto Protocol. In Table 3 below, estimates of the size of the impact on different countries are given for the Montreal Protocol and the Kyoto Protocol, based on a review of the literature on these two MEAs. The size of impact and weights applied are open to some debate, though we believe the sizes given are defensible.

In the existing literature on the Montreal Protocol, the impacts of the trade regime have been identified as being particularly important in obtaining signatories to the

Protocol. However, as shown in the table below, other factors may also have been of importance, notably the level of 'green' participation. The costs of adaptation to non-ODS also fell, with the development of new technologies. Expectations of this may have played an important role in accession. The literature also suggests that a lengthier phase-out period and financial supports may have played an important role in reducing costs to developing countries.

For the case of the Kyoto Protocol, a major factor may be seen to be the expected environmental impact. Some scientific uncertainty as to the impacts has been identified, and some have argued that this uncertainty restricts the extent to which environmental benefits can be measured. Potential implications on industry also may be of importance to the Bush administration as a result of contributions by these stakeholders to campaign financing. These two factors may mean that the US government's payoff function is quite different from that of the EU. Hence, negotiations have been made to reduce the cost element (and likely negative impacts on industry) by expanding the scope of the Kyoto flexibility mechanisms. The EU, however, seems to be accepting the IPCC evidence that climate change is due in part to human-made pollutants, and thus values the net environmental benefits more highly than the US.

In different EU states the strength of industry and other stakeholders varies, as such the extent to which distributional concerns are important in the EU will vary from country to country.

The above is an illustrative view of the possible decision-making process undertaken by governments in the US, EU and developing countries. It represents a first step towards understanding the factors that may be of importance in determining accession to the Kyoto Protocol. Trade sanctions may play a role, however their scope may be limited by the extent to which they conflict with WTO rules. Also, the threat of retaliation may be significant enough to prevent parties from placing trade restrictions on countries which are non-parties.

6 Conclusions and Implications for Future Multilateral Environmental Agreements

This paper has examined the linkages between trade and environment in terms of multilateral environmental agreements. Firstly, we suggest that the trade impacts of MEAs must be considered in the context of increasing trade liberalisation, including the expansion of the European Union. Secondly, the impact of potential conflicts with the WTO and the MEA have to be considered.

Direct trade restrictions form part of a number of important multilateral environmental agreements, notably the Montreal Protocol, CITES and the Basel Conven-

tion. The trade impacts of these agreements vary, depending on the commodities concerned and the countries under consideration. Trade restrictions contained within MEAs have played an important part in expanding the coverage of the MEAs and thus should be considered important to the overall implementation of the agreement.

There is little evidence of pollution havens resulting from those multilateral environmental agreements reviewed. Some cases do exist, however, these can be explained through other factors such as attempts by industry to gain access to new markets through relocation. This is broadly in line with evidence in the literature on the location of industry.

The actions of stakeholders in response to a multilateral environmental agreement may be central to the success or failure of the MEA in question. The positive role of trade sanctions within future MEAs is always likely to be contingent on the acceptability of the measure within society. As such, a review of stakeholder opinions is important, as is the determination of the importance of the stakeholder to the decision maker and the amount of influence the stakeholder may bring to bear on the decision-making process. We present a framework for the evaluation of stakeholder opinions within the context of a climate change related MEA, which will be employed in a future study.

Factors other than trade may be important in determining a policy maker's attitude to accession to a multilateral environmental agreement. We develop a net benefit payoff function for governments deciding about whether or not to accede to an MEA, including discussion of the determinants of weights placed on the different factors by policy makers. This is then applied for the cases of the Montreal Protocol and the Kyoto Protocol.

Table 3: Political Economy and MEAs⁷.

MEA	Size of Impact (Weight)				
	E	C	G	T	D
Montreal Protocol					
OECD	Dependent on location (high)	Fairly low and reduced with R&D of ODS alternatives (fairly low)	High (variable)	High (high)	Low (variable)
Developing Country	Depends on location	Higher than OECD, but reduced with technology transfer, financial supports and lengthier phase-out period	Low (probably low)	Potentially High (variable)	Low (variable)
Kyoto Protocol					
US	Questionable - scientific uncertainty	Moderate (high) reducing with flexibility mechanisms and new technology	High (low)	Uncertain probably high (high)	High (high)
EU	High (high)	Moderate (high) reducing with flexibility mechanisms and new technology	High (high)	Uncertain probably high (high)	High (variable)
Developing Country	High (high)	Low - CDM and JI will reduce costs	Low (probably low)	Probably low but positive (low)	Low (low)

⁷ The rankings in this table are based on what we believe may be the case, based on a review of the literature and of the media. For environmental impact, the Montreal Protocol is shown to be dependent on location, due to the nature of the problems presented by the hole in the ozone layer. For climate change, the same is true, however, overall the impact is expected to be quite large. The level of weight attributed to this in the EU and DCs reflects the high media interest and importance of the issue in these areas. The costs of mitigation in the US and EU are shown to be moderate. This is because they reflect only a relatively small percentage of GDP (see IPCC, 2001). Flexibility mechanisms provide potential opportunities for reducing these costs. Some also argue that there are 'no-regret' options available. The extent of the "green" vote varies by country, and the importance attributed may also do the same. In the case of the US, the weight attributed to this may be low as industrial perspectives may be given more weight due to political funding, employment and trade concerns. The trade impacts of the Kyoto Protocol are at present uncertain, though developed countries may be expected to bear the brunt of these impacts. The weight attributed in the US is high as the impact on competitiveness is a stated reason for non-ratification. The distributional implications may be seen to be high as the impacts on key stakeholders, particularly industry, may be high in developed countries. Impacts on the poorer groups in DCs may be considered under the environmental cost component.

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