

# Trade, development and the environment



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# Trade, development and the environment<sup>1</sup>

## Summary

Debates over the merits of trade liberalisation have been going on for some time, but over the last ten years the debate has intensified as environmentalists and the trade policy community squared off over the environmental consequences of liberalised trade. This note asks and then answers three basic questions regarding the trade and environment relationship from a developing country perspective. These are: (1) what are the links between trade, the environment and development? (2), why are trade and the environment issues especially important to developing countries? and (3), what role can donor agencies play in assisting developing countries in the area of trade, development and the environment? It argues that while the existing empirical evidence is incomplete there is little evidence that dirty industries migrate to low regulation developing countries, but rather economic development and capital accumulation are the most likely cause of the rising shares of pollution intensive goods in the GDP and exports of many developing countries. Developed

countries, which are still the primary producers of pollution intensive goods, are however losing their competitive position in these same heavy industries. A rising environmental awareness in the developed world coupled with the shrinking of heavy industry in these countries is likely to produce an ongoing demand for protection from developing country exports on environmental grounds. Developing countries must integrate into the world economy to foster their development. To ensure continued access to developed country markets, this note suggests that developing countries should measure and record environmental quality, develop environmental assessments for major projects and policies, and develop the capacity needed to maintain and defend their interests in WTO negotiations.

## Introduction

The purpose of this note is to summarise the key issues facing developing countries in the area of international trade and the environment. Debates over the merits of trade liberalisation have been

<sup>1</sup> This note was written by Scott Taylor, University of Wisconsin, Madison and Research Associate at the National Bureau of Economic Research (NBER), Cambridge, M.A, December 2003.

going on for some time, but over the last ten years the debate has intensified as environmentalists and the trade policy community squared off over the environmental consequences of liberalised trade. This debate was fuelled by negotiations over the North American Free Trade Agreement and the Uruguay round of GATT negotiations, both of which occurred at a time when concerns over global warming, species extinction and industrial pollution were rising. The continuing interest in trade and environment issues is reflected in the Doha Declaration.

Included in the Doha round of negotiating objectives is clarifying the relationship between WTO rules and specific trade obligations set out in MEAs; establishing procedures for regular information exchange between MEA secretariats and the relevant WTO Committees, and reducing or eliminating tariff and non-tariff barriers to environmental goods and services. In addition, discussions are ongoing over the role fishery subsidies play in natural resource depletion, the benefits of accelerated liberalisation in forest product trade, the usefulness of eco-labeling, and the role, if any, for the precautionary principle to play in determining allowable imports.

Despite the many issues at play and the large stakes involved, our understanding of trade and environment links is actually quite limited. In this note I ask and then answer three basic questions regarding the trade and environment relationship from a developing country perspective. These are: (1) what are the links between trade, the environment and development? (2), why are trade and the environment issues especially

important to developing countries? and (3), what role can donor agencies play in assisting developing countries in the area of trade, development and the environment?

### **1.1 Linkages: trade, development and the environment**

The relationship between trade, development and the environment is complex and not well understood. Currently, we have limited understanding of the role international trade plays in fostering economic growth and only a limited understanding of how international trade and growth affect the environment. As a consequence the task of advising developing countries in regard to trade and environment policy is especially difficult. To understand the links between growth, trade and the environment it is useful to start with some definitions to help clarify the ways that growth or trade affects the environment.

The environmental impact of economic development or liberalised trade can be thought of as arising from three conceptually distinct sources that we refer to as scale, composition and techniques effects.<sup>2</sup> For example, consider the impact of a trade liberalisation on the environment. A trade liberalisation may spur economic growth and thereby alter the scale of national output as measured by real GDP. Holding the composition of national output constant (i.e., the mix of industries the country produces) and the pollution intensity of its production techniques, this increase in the *scale* of economic activity must raise pollution. Therefore, the scale effect of this trade liberalisation

<sup>2</sup> For a detailed treatment see Copeland and Taylor (2003).

necessarily lowers environmental quality. Trade liberalisation has other impacts as well that may offset the scale effect. For example, trade liberalisation almost always affects the composition of industrial output leading countries to specialise in those industries where their relative costs are lowest.

If trade leads a country to specialise in the production of pollution intensive goods, then all else equal, this *composition* effect raises pollution and also creates a worsened environment. Alternatively, if trade leads a country to specialise in the production of relatively clean goods, then all else equal, this composition effect lowers pollution and tends to improve its environment. Finally, trade liberalisation can raise incomes per capita.

If these income gains either create demands for better environmental protection or provide funds for investments in environmental protection, then changes in the *techniques* of production may be forthcoming. Therefore rising incomes brought about by trade may lead to lower pollution intensities and lower pollution via a technique effect.

The challenge of sustainable development is to provide a balanced program fostering growth in real incomes (which create a scale effect) while maintaining or improving environmental quality (via composition or technique effects). International trade may play a positive role in this effort, but to assess its implications we need to measure trade liberalisation's impact on the environment (or on resource use). Grossman and Krueger's (1993) study of NAFTA introduced the terms scale, composition and technique effects and then put forward an argument

suggesting that NAFTA would improve Mexico's environment. Subsequent theoretical work (Copeland and Taylor (1994)) and follow up empirical work (Antweiler et al. 2001) refined our understanding of the magnitudes of the scale, composition and technique effects created by a trade liberalisation, but much uncertainty remains.

Uncertainty about the links between trade and the environment has meant that many of the debates over the impact of trade have been left unresolved. For example, one possibility is that with trade liberalisation firms in pollution intensive industries will move from their current location in the developed world to new low cost locations in the developing world. As a consequence, environmental quality may be lowered in developing countries, overall pollution in the world may rise, and governments in the developed world may respond to this migration of industry by refusing to adopt tighter regulations. These predictions follow from what is commonly referred to as the pollution haven hypothesis. The hypothesis follows from an assumption that differences in pollution regulation across countries are a significant determinant of trade patterns, and firms in pollution intensive industries respond to these differences by relocating in lax regulation locations. Free trade then offers firms the same access to markets they had before, but with the now lower costs attainable in the lax regulation country.

The pollution haven hypothesis is the intellectual foundation for many of the arguments for trade barriers against developing country exports. It supports calls for the

restriction of imports produced by methods that are less environmentally friendly than those in the developed world, because this competition is unfair and raises world pollution. It suggests that non-signatories to Multilateral Environmental Agreements must be penalised via reduced market access to developed country markets because they are obtaining large (and unfair) cost advantages by not adopting tighter environmental standards. And it suggests that in the absence of coordination across countries in environmental policy, overall world environmental quality will fall with trade. Even if many of the trade barriers put forward are not WTO consistent and will not withstand challenge, the view that free trade leads to unfair competition and a worsened environment is a strong motivation for many so-called environmentally friendly policies that restrict trade (such as eco-labeling products according to their production method). Many, if not all of these potential policies are a threat to the economic well being of developing countries.

It is not clear however that the pollution haven hypothesis is a adequate or even useful description of world trade in dirty goods. An alternative hypothesis, which is held by many in the trade policy community, is that international trade in pollution intensive goods primarily reflects cross-country differences in the conventional determinants of relative costs such as differences in human and physical capital and differences in technology. Under this “factor endowments view” of world trade,

international trade is unlikely to lead pollution intensive production to move to less developed countries because regulatory costs are only a small part of total costs, and many of these conventional determinants of relative costs favour production in the developed world.<sup>3</sup> If this view is correct, then international trade would lead to the relocation of pollution intensive production from the human and physical capital scarce and relatively poor developing countries, towards the rich and capital abundant developed economies. Pollution levels should fall in developing countries but may rise in the developed world. Therefore, this factor endowments view of world trade in dirty goods predicts a very different environmental impact of trade liberalisation. It is also noteworthy that most of the policy prescriptions suggested by the pollution haven hypothesis are now no longer supported. World pollution may fall with trade, industries do not migrate to countries with lax regulation, and the environments in less developed countries may improve with greater access to international markets.

At present the empirical evidence for and against these hypotheses is limited. There is a growing body of evidence that finds a significant link between the stringency of pollution regulations and the location of foreign direct investment and the size of net trade flows in U.S. manufacturing industries.<sup>4</sup> These results suggest there is a fairly strong response by firms to differences in environmental regulation, but there is little

<sup>3</sup> Pollution abatement costs as a fraction of value-added are very small for most industries. For example, in the average cost of pollution abatement in U.S. manufacturing over the 1974–1986 period is only 3.7 percent for the top 25 hardest hit industries. Overall, the share of pollution abatement costs in value-added is only 1.5 percent. See Levinson et al. (2003).

<sup>4</sup> See List et al. (2000), Keller et al. (2001), and Ederington et al. (2003).

evidence that regulatory differences are the most significant determinant of trade flows – which is what the pollution haven hypothesis predicts. Much of the empirical evidence for pollution havens comes from relatively simple statistical exercises constructing and then evaluating trends in “dirty good” production, consumption, or trade. Typical results from this literature are that the share of production and exports coming from pollution intensive products is growing in the developing world and falling in the developed world. These trends, while consistent with the pollution haven view of industry location and trade, are also consistent with many other alternatives.<sup>5</sup>

The most direct explanation for these findings is that rapid capital accumulation and growth in the developing world is eroding the developed world’s comparative advantage in heavy industry. In fact, the largest producers of dirty pollution intensive goods remain the rich, OECD countries although their shares in these industries have been falling over time. This quite strongly suggests that industry location is determined by more than just weak regulation. In addition, the relative price of dirty pollution intensive goods has fallen over the 1965–2000 period. This trend in prices is hard to square with the view that tightening environmental standards in the developed world are pushing dirty industries to less suitable locations in developing countries.<sup>6</sup> Finally, several of the empirical studies arguing in support of pollution havens also report that while

developing countries as a group are altering the mix of their production towards pollution intensive goods, more open developing countries have on average a cleaner mix of industries than those that are relatively closed to international trade. This finding suggests while economic growth is altering the composition of national output towards pollution intensive heavy industries in many developing countries, this trend is weakest in open economies. Surprisingly, this suggests that the competition from developed country exports of pollution intensive goods is reducing the extent to which developing countries specialise in pollution intensive goods.

Other evidence on the impact of trade liberalisation comes from studies linking national income gains to changes in pollution levels. There is a large empirical literature showing that income gains can have a beneficial impact on pollution levels.<sup>7</sup> The mechanism by which income gains improve environmental quality is unclear, but this literature is at least suggestive of a strong technique effect arising from the income gains created by trade or economic growth. Estimates of this technique effect are however difficult to come by. In one study, Antweiler, et al. (2001) estimate the scale, composition and technique effects created by trade liberalisation. The study have three key findings. The first is a very strong technique effect: a 1 percent increase in national income per capita lowers pollution concentrations by over 1 percent. The

<sup>5</sup> For example see Low and Yeats (1992), Ratnayake (1998), Lucas et al. (1992), Birdsall et al. (1992) and Mani et al. (1997).

A detailed critique is contained in Copeland and Taylor (2004).

<sup>6</sup> Evidence on prices is presented in Copeland and Taylor (2004).

<sup>7</sup> See Grossman and Krueger (1993) and (1995).

second is that factor endowment motivations for dirty good trade appear to be more important than pollution haven motives. This implies that the developed world's cost advantages created by its abundant human and physical capital and superior technology at present more than outweigh the developing world's advantage of less stringent regulation. The third is that economic growth fuelled by capital accumulation is likely to raise pollution levels while growth fuelled by technological progress will lower it.

Putting these results together leads to a very different view of the link between trade, growth and environmental outcomes. The evidence suggests that growth in heavy industry may be worsening environmental outcomes in developing countries while eroding the natural comparative advantage of the developed world in these same, relatively dirty, industries. Trade liberalisation tends to lessen the focus on heavy industry in developing economies, and the income gains created by trade liberalisation can produce large reductions in pollution.

The impact of international trade on natural resource industries can differ from that of conventional manufacturing for several reasons that deserve mention. Many developing countries are of course heavily reliant on the exports of natural resource products, but establishing and maintaining property rights to natural resources is both difficult and costly, and in many countries regulatory regimes are very weak. In this situation, access to international markets may exacerbate the

already difficult job developing countries have in controlling the harvest or extraction of key natural resources.<sup>8</sup> Part of the difficulty arises because many poor countries are also natural resource abundant and hence these countries have both weak regulation and a natural cost advantage in these industries. In manufacturing industries, developing countries had only a regulatory cost advantage but ostensibly faced higher costs for other inputs. It was these offsetting forces that tended to make the composition effect of trade liberalisation in manufacturing industries relatively small. But no comparable offsetting force is at work in natural resource industries, and hence the composition effect of trade liberalisation may be especially large and potentially damaging in these industries.

The enforcement of property rights is however likely to change with economic conditions just as environmental regulation responds to changes brought about by trade. If access to international markets raises the value of natural resources, then efforts to control and regulate these resources may rise creating a beneficial technique effect as in the case of polluting goods. Moreover, productivity in many natural resource industries depends on the quality of resource management; as such, a heavily regulated resource can also be a relatively low cost one since excessive depletion makes resource products more, and not less, expensive. This suggests that tighter regulation in developing countries is not inconsistent with their long run best interests.<sup>9</sup>

<sup>8</sup> See Bee (1987) for case study evidence; Chichilnisky, (1994) and Brander et al. (1997a) for theory.

<sup>9</sup> See Brander and Taylor (1997b) for productivity effects, and Copeland and Taylor (2004) for an analysis of property rights transitions created by trade liberalization.

## 1.2 Why are trade and the environment issues important to developing countries?

Trade and environment issues are important to developing countries because secure and reliable market access to developed country markets is critical to their growth prospects. Access to developed country markets can bring new technology, knowledge and capital via foreign direct investment; it can foster a more competitive domestic manufacturing base, raise the returns to education, and offer a ready market for many of the natural resource based exports of developing countries. But at the same time access to international markets may also bring some risks to their environment. If international trade alters the composition and scale of output in favour of relatively pollution or resource intensive industries, then one risk is greater environmental degradation.

Other risks arise not from the environmental impact of trade *per se*, but from limits to market access brought about by developed country trade restrictions or by consumer boycotts of certain products. Unfortunately, many of the industries that are key sectors in developing countries are also highly protected. For example, while the U.S and European Union have on average quite low tariffs (1.9 and 2.7 percent respectively), non-tariff barriers are extremely important in many sectors important to developing countries such as textiles, agriculture, forestry and fish, and in food, beverages and tobacco.<sup>10</sup> Moreover, since many of the exports of developing countries are natural resource based, their exports may be vulnerable to import restrictions

on environmental grounds. For example, the European Union is on record as desiring the ability to restrict trade in agriculture, in order to protect agriculture's role as a protector of the environment, and a guarantor of animal welfare, food safety and food security. The U.S. and other member governments have argued against such a link, but the EU's position makes clear its interests in employing environmental grounds for import protection.

In the past, concern with the environment in the developing world has for example led to calls for a ban on tropical timber imports, for restrictions on the technologies used in capture fisheries, and for the use of green countervail to level the playing field across countries, etc. Ongoing discussions in the WTO over trade liberalisation in forest products have already met with opposition by some countries arguing that it ignores the conditions and management of forests in each country. While it is unlikely that WTO rules will allow green countervail measures or allow dumping duties to be applied to account for under-priced environmental assets, consumer groups and NGOs in the developed world have been quite successful in pressuring industry to adopt more environmentally friendly production methods in all of their production locations. While these developments are in many cases welcome, given the already large array of trade barriers facing developing country products any new hurdle, however well intentioned, must be unwelcome.

In addition to these risks, developing countries have now

<sup>10</sup> See Tables 2 and 4 of Anderson, J. and E. van Wincoop, "Trade Costs", forthcoming in the *Journal of Economic Literature*, September 2003.

been asked to play a role in conserving global public goods by entering into Multilateral Environmental Agreements.<sup>11</sup> While the Kyoto protocol contains no firm obligations for developing countries in reducing carbon emissions, it was of course the absence of these commitments that led the U.S. to withdraw from the treaty. Similar concerns arise with discussions over conserving the world's biodiversity. Much of this diversity exists in tropical rainforests located in developing countries. The value of this resource in situ is great from a global perspective, but low from the perspective of the developing economy owning the resource. Economic theory tells us that a globally efficient level of conservation or a globally efficient program of carbon reductions can be obtained but it most surely requires large monetary transfers from those in the developed world with the highest valuation for these global public goods to those in the developing world that are in the best position to either ensure conservation or lower carbon emissions cheaply. Large cross-country transfers are however difficult to implement, and this means countries will seek other solutions that are necessarily less efficient and perhaps more costly to developing countries.

In total, developing countries face a significant threat from environmental concerns – both from the potential for liberalised trade to worsen environmental outcomes at home, but also from rising environmental awareness in the rest of the world that may translate into reduced or more costly access to rich developed

country markets. With these facts as a background, it is worrying then that the Doha round includes the discussion of the relationship between MEAs and the WTO. Many of the over 2000 MEAs in force contain provisions for members to apply trade restrictions on countries both within the agreement and without. As well, some of the MEAs adopt a strong form of the precautionary principle and allow countries to limit imports under far weaker conditions than do WTO rules. It is therefore a concern to developing countries that these discussions are ongoing. If the discussions lead to negotiations that provide for the precedence of MEA rules over WTO rules, the scope for protection against developed country imports will increase dramatically.

### **1.3 What role can donor agencies play in assisting developing countries?**

There are three main areas where technical and capacity building assistance may help developing countries. The first form of assistance is in building and maintaining systems of environmental monitoring. In many countries monitoring of air, water and soil quality is at best rudimentary and in many cases non-existent. In addition, monitoring of the state of national forests and fisheries is difficult if not impossible for some of the poorest nations. Assistance in this regard would be important in several ways. Information concerning environmental quality is a necessary input into any evaluation of the impact of trade liberalisation in particular, and economic development more

<sup>11</sup> Examples of prominent MEAs are the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); the Basel Convention; the Montreal Protocol; the Convention on Biological Diversity; the UN Framework Convention on Climate Change; and UNEP Chemicals (PIC and POPs Conventions).

generally. Moreover, the existence of data on environmental outcomes may provide some insurance against claims made that developing countries are excessively depleting their natural resources or producing ruinous conditions of air quality. Data on environmental quality could also play an important role in establishing adequate environmental policy, while directing the developing countries scarce resources to those areas where regulatory failures are most acute. In some cases, NGOs have joined with developing country governments in an effort to help with environmental monitoring but far more assistance is necessary if we are to accurately measure environmental quality in developing countries.

A second form of assistance is in the capacity building area. Developing countries should start a process of environmental review of major policy changes and major industrial projects. Such reviews are commonplace in developed countries. To start, these reviews could be ex post analyses of the environmental costs and market benefits from past policy changes or major industrial projects. With time and experience, these reviews could play an important role in assessing the likely environmental impacts of prospective policy changes. The United Nations Environment Programme has already commissioned a group of studies with a view to creating the

required expertise in developing countries. These studies examine the environmental consequences of trade policy and trade related projects and established guidelines for environmental reviews. Further funding along these lines is necessary if developing countries are to build the human capital needed to undertake these studies and generate the data needed to make this type of work useful for policy analysis.<sup>12</sup>

Finally, developing countries need to strengthen their capacity to engage in trade negotiations at the WTO. It is well known that the burden of administering existing trade agreements is already very large in relation to the regulatory capacity of many developing countries. Apart from the capacity to maintain and administer their current trade obligations, developing countries must develop a capacity to defend their own interests in the trade and environment area. Part of this defense could come from their better monitoring of environmental quality, and the proposed environmental assessments of major projects and policy changes. But even with this information at hand, trade negotiators in developing countries are likely to face ongoing calls from the developed world to restrict market access on environmental grounds. This may be the single largest threat to the successful integration of developing countries into the world economy.

<sup>12</sup> See for example the studies at [http://www.unep.ch/etu/publications/Ctry\\_studies\\_2.htm](http://www.unep.ch/etu/publications/Ctry_studies_2.htm)

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