

ENVIRONMENTAL REGULATION, INTERNATIONAL TRADE, AND TRANSBOUNDARY POLLUTION

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Summary

It has often been argued that opening up the economy to increased international trade can transform a less developed economy into a developed economy. There is growing concern, however, about the environmental consequences of increased international trade. Typically, different countries have different environmental regulations and it is argued that the developed countries have more stringent environmental laws than do less developed (or developing) countries. It is argued that, aided by the free flow of goods and capital across borders, firms will therefore take advantage of lax environmental regulations in developing countries by migrating to those countries and turning them into “pollution havens.” Moreover, nations typically enact environmental laws unilaterally. Different levels of development, different kinds of technologies, and different environmental regulations all imply that pollution levels vary significantly across countries. As a result, pollution that is emitted in one country often ends up causing harm in other (neighboring) countries. This is known as “transboundary pollution.” Full cooperation between countries is difficult to achieve because in this situation countries share pollution abatement costs unequally and there is always an incentive to free-ride. One needs to examine possible alternative mechanisms.

1. Introduction

It has often been argued that opening up the economy to increased international trade is one way to transform a less developed economy into a developed one. Proponents of this view argue that free international trade, unhindered by taxes and other kinds of government regulations, will provide lower prices for consumer goods because of

increased competition from foreign producers and also provide increased opportunities for domestic producers to exploit foreign markets.

There is growing concern, however, about the environmental consequences of increased international trade. Typically, different countries have different environmental regulations and it is argued that the developed countries have more stringent environmental laws than do less developed (or developing) countries. Compliance with environmental regulations is costly (for example, firms might have to install new and cleaner technology, or they might have to find ways of waste disposal that are more costly) and the more stringent the environmental regulations, the higher the costs of compliance. Firms subject to stricter environmental policies are therefore less competitive internationally than firms in countries that are not subject to such strict environmental policies. It is argued that, aided by the free flow of goods and capital across borders, firms will therefore take advantage of lax environmental regulations in developing countries by migrating to those countries and turning them into “pollution havens.” This has several adverse effects. First, it causes significant job losses in the developed countries. Second, it causes greater environmental degradation in the developing countries. Finally, there is every reason to believe that it will increase world pollution, a worse outcome for everyone.

There is, however, an opposing view that has been articulated by M.E. Porter and is therefore known as the Porter hypothesis. Its advocates argue that while in the short run more stringent environmental regulations will certainly result in high environmental compliance costs, the long-run gains will more than compensate for the short-run losses. Strict environmental regulations force firms to innovate and innovative firms are more competitive. Further, strict environmental policies are more likely to increase investment in research and development programs for new technologies that will reduce environmental compliance costs. Investment in such technologies is likely to place firms in a more marketable position as forerunners in the installation of green technologies and production of goods that are “cleaner.”

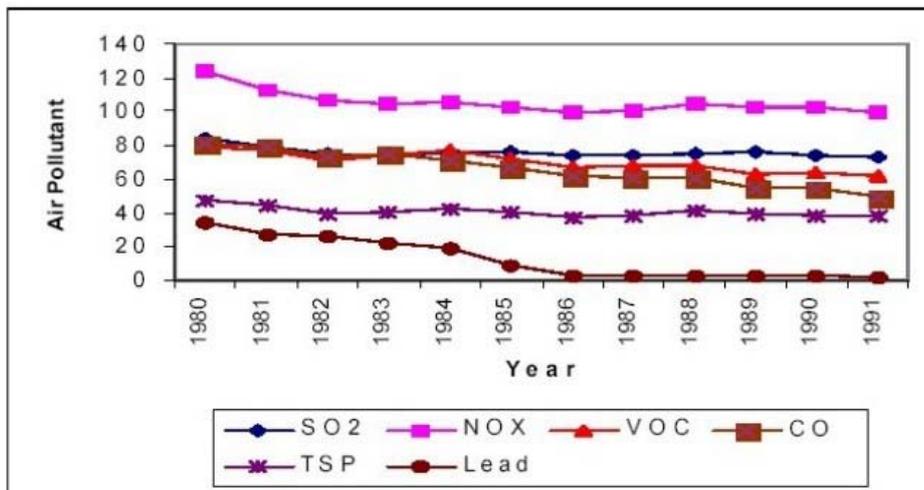
The problem is that the two views of the relationship between trade and the environment are incompatible. Section 2 of this article will offer evidence from studies on the pollution havens hypothesis and on the Porter hypothesis. The general consensus of these studies is that environmental regulations are not a major determinant of firms’ location decisions or direction of trade. Stricter environmental regulations should not therefore be held hostage to the argument that these laws would force firms to migrate out, causing significant job losses. See A.B. Jaffe, S.R. Peterson, P.R. Portney, and R.N. Stavins for an excellent survey of these issues.

Another issue that needs to be discussed is that nations typically enact environmental laws unilaterally. Different levels of development, different kinds of technologies, and different environmental regulations all imply that pollution levels vary significantly across countries. To the extent that environmental problems are contained in the area under the control of one country, coordinated environmental policy is not necessary. Unfortunately, that is rarely the case and pollution that is emitted in one country often causes harm in other (neighboring) countries. This is known as transboundary pollution. For example, the 1997 bushfires in Indonesia caused severe environmental damage in

neighboring Malaysia. In the absence of any supranational institution that could coordinate environmental regulations across different countries, the problem of transboundary pollution is a different problem from domestic pollution. Full cooperation between countries will lead to Pareto efficient outcomes, but such an outcome is difficult to achieve because in this scenario countries are faced with unequal sharing of pollution abatement costs and there is always an incentive to free-ride. One needs to examine possible alternative mechanisms, such as side payments that could help share the burden, and policies that will reduce the incentives to free-ride. Section 3 of this article deals with transboundary pollution.

2. International Competitiveness and the Migration of Dirty Industries

To reiterate, it has often been argued that the relatively low environmental standards in developing countries (combined with the more strict environmental laws in more developed countries) will see what are known as the dirty industries shifting their base of operations to the developing countries. In their quest to attract foreign capital, developing countries may deliberately undervalue the environment, and this will lead to excessive global pollution levels. This is the pollution havens hypothesis. It is also argued that, by increasing the costs borne by firms in developed countries, environmental regulations bring about a loss of competitiveness for these firms, leading to a reduction in exports from and increased imports to developed countries, and hence to a worsening of net exports for developed countries.



^a SO₂: sulfur dioxide; NO_x: nitrogen oxides; VOC: volatile organic compounds; CO: carbon monoxide; TSP: total suspended particulates

Source: Based on U.S. EPA indexed to 1970 emissions = 100

Figure 1. U.S. emissions of six major air pollutants (1980–1991)
(Source: Based on U.S. EPA indexed to 1970 emissions = 100)

There are many reasons why there can be a link between environmental regulation and competitiveness, however it is defined. Indeed, how one should measure competitiveness in this setting is under debate. In the United States, over the period 1970–1991, environmental regulations increased significantly, which resulted in a

significant decline in emissions of the major pollutants (see Figure 1). While it is difficult to measure the burden of compliance with increased environmental regulations, it is generally true that environmental requirements are considerably less stringent in developing countries than in developed countries.

So how is industrial competitiveness affected by environmental regulations? First, environmental regulations affect a firm's costs, in two ways. On one hand, expenditures made in order to comply with environmental regulations increase costs directly (the direct costs of environmental regulations) and, on the other hand, firms have to pay higher prices for inputs that have been affected by environmental regulations (the indirect costs of environmental regulations). Second, environmental regulations can reduce costs for certain firms and industries by lowering input prices or by increasing the productivity of certain inputs. Third, firms in the environmental services sector typically benefit from tougher environmental regulations. Fourth, there are benefits from environmental regulations that accrue to society as a whole. Finally, since trade is never unilateral, the effect of environmental regulations imposed by a particular country also depends on the costs and regulations imposed by other countries on firms that operate within the borders of that country.

Typically, environmental regulations are political or fiscal measures that regulate and limit pollution and activities that lead to increased use of the environment as an input in production. In principle, these regulations can be imposed on the demand side or on the supply side. In the context of environmental competitiveness, the focus has typically been on the supply side.

Possibly the most important issue in the debate on environmental regulation and competitiveness is the costs of environmental regulation. The costs of environmental regulation are usually the change in consumer and producer surpluses associated with the regulations and resultant changes in prices or incomes. What are the costs associated with environmental regulation? First, budgetary costs of governmental administration of environmental statutes and regulations and the associated monitoring and enforcement costs. Second, capital and other operating expenditures associated with regulatory compliance on the part of firms.

Third, legal and other transaction costs, the costs associated with refocusing management attention, and the costs associated with the disruption of production following the introduction of environmental regulations. Fourth, "negative costs" or benefits from environmental regulation, including the productivity effects of a cleaner environment and the effect of environmental regulations on innovation and research for cleaner and more efficient production technologies. Finally, social costs (politically very important), including the effect of environmental regulations on job losses associated with redundancies and firm closures. The most common indicator for environmental regulation in empirical studies is the share of abatement costs in gross domestic product (GDP). Table 1 shows the share of abatement cost in GDP in a set of Organisation for Economic Co-operation and Development (OECD) countries. Notice that the share of environmental costs is never higher than 2.0% (Canada in 1980) and for most countries the share actually fell between 1980 and 1991.

Country	1980	1986	1991
United Kingdom	1.5	1.2	0.9
Japan	1.8	1.3	1.0
Finland	1.3	1.2	1.0
Canada	2.0	1.6	1.3
USA	1.6	1.5	1.4
Netherlands	1.1	1.3	1.5
Germany	1.5	1.5	1.7
Austria	1.2	1.5	1.9
France	0.9	0.9	0.9
Denmark	1.0	0.9	0.8
Norway	1.3	0.8	0.6
Sweden	1.0	0.9	0.9

Table 1. Share of abatement costs in GDP (expressed as percentage of GDP)

2.1. Environmental Regulation and Net Exports

What is the evidence regarding environmental regulation and net exports? When change net exports (in the period 1967–1977 for 78 industrial categories) was regressed on changes in environmental regulation (after controlling for other explanatory variables), no statistically significant relationship was obtained between changes in environmental regulations and changes in net exports. Restricting the sample to include only manufacturing industries, the relationship turned negative and significant, indicating that stricter environmental regulation leads to a reduction in net exports. Finally, when the chemical industry was excluded from the sample, the negative relationship between changes in environmental regulations and changes in net exports became even more negative. This last result is quite surprising because the chemical industry has high environmental compliance costs and one would expect a weakening of the negative relationship if the chemical industry was excluded from the sample.

Econometric studies do not find any evidence that increased pollution abatement costs in U.S. industries caused an increase in U.S. imports from Mexico or from the maquiladora along the U.S.–Mexico border. The maquiladora program was established in Mexico in the 1960s to attract foreign investment. Under this program, firms are exempt from Mexican laws prohibiting foreign ownership and inputs in the production process can be imported duty free as long as at least 80% of the output is exported. Given the close proximity of the U.S. to Mexico, the large volume of trade between the two countries, and their significantly different levels of environmental regulation, that there has been very little effect on net exports as a consequence of increased environmental regulation in the U.S. casts doubt on the argument that industrial competitiveness is adversely affected by environmental regulation. However, it must be noted that evidence from a government survey suggests that a number of U.S. furniture manufacturers migrated across the border from California to Mexico in response to the increasingly stringent air pollution regulations in California affecting paints and solvents.

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Biographical Sketch

Pushkar Maitra is a senior lecturer in the Department of Economics, Monash University, Australia. He completed his Ph.D. in economics from the University of Southern California, Los Angeles, in 1997 and since then has held faculty positions at the University of Sydney, Australia, and Monash University. His primary areas of research are development economics, economic growth, and population economics. He has presented papers at a number of well-known general and field conferences in the United States, Australia, India, and Europe and has been invited to present seminars in several universities in those countries. He has served as a referee for a number of respected international journals and was on the organizing committee of the 27th Conference of Economists held at the University of Sydney in September 1998 and is a member of the organizing committee for the Econometric Society Australasian Meetings to be held at Monash University in 2004.