



# Industriens Utredningsinstitut

THE INDUSTRIAL INSTITUTE FOR ECONOMIC AND SOCIAL RESEARCH

A list of Working Papers on the last pages

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No. 346, 1992

**CARING FOR THE ENVIRONMENT**

**– IS TRADE GOOD OR BAD?**

by

Thomas Andersson

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November 1992

Postadress  
Box 5501  
114 85 Stockholm

Gatuadress  
Industrihuset  
Storgatan 19

Telefon  
08-783 80 00  
Telefax  
08-661 79 69

Bankgiro  
446-9995

Postgiro  
19 15 92-5

# Caring for the Environment - is Trade Good or Bad?

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Thomas Andersson

The Industrial Institute for Economic and Social Research (IUI),

Box 5501, 114 85 Stockholm, Sweden

November, 1992

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*Abstract:*

*Provided that all effects are internalized, free trade is in everybody's interest. In practice, both markets and governments fail to take full account of environmental values. Governments tend to perceive them as substitutes rather than complements with commercial values, which makes them favor trade at the expense of the environment. However, barriers to international trade reduce income, worsen the prospects for cooperation, and risk to be captured by traditional protectionists. Delegating environmental responsibilities to a local level also renders difficulties to handle cross-border effects. We must hasten to address the information failures which allow the mismanagement of the environment.*

## 1. INTRODUCTION<sup>1</sup>

There are strongly divergent views on how trade in goods and factors affects the environment. Settling this matter is crucial for a constructive defence of two of our most important global commons: an open world trade system and the world's environment. In their different ways, both these commons are major cornerstones for the welfare of mankind. Both are seriously hurt by naive arguments concerning the relationship between trade and the environment. Although it is sometimes true both that trade hurts the environment and that it supports it, neither statement can be generalized. Caring for the environment, when is trade good and when is it bad?

Many "environmentalists" view trade as a major cause of environmental destruction, see Daly and Cobb (1989), for example. The potential foreign exchange earnings from exploitation of natural assets may wipe out the possibilities to defend them, and governments may be forced to abstain from pollution abatement in order not to lose industries to other countries. Costanza (1992) argues that "ecological barriers" must be adapted to account for environmental costs and benefits. Economists, on the other hand, tend to stress the welfare-enhancing effects of trade (Baumol, 1971; Sorsa, 1992). More trade makes more means available for pollution abatement and the environment more highly appreciated. In addition, trade enables polluting activities to be located where they inflict the least damage. It has also been warned that environmentalists risk to become prisoners of protectionists, who are looking for arguments to back up their interests (Hillman and Ursprung, 1991).

In trade theory, policies are normally evaluated by their impacts on the relative scarcity of factors of production. A great ability to assimilate pollutants, or a low valuation of environmental values, represents a relatively strong endowment of "waste capacity". On this basis, it is possible to incorporate environmental effects in traditional trade theory, see e.g. Raucher (1992). The present study, however, does not consider whether trade, in private goods or environmental services, is motivated by factor endowments, technology, management, preferences, or economies to scale. The focus is

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<sup>1</sup> Financial support from the Swedish Research Council for the Humanities and Social Sciences is gratefully acknowledged.

on the more fundamental question of how trade effects are influenced by the relationship between environmental and private values. Policy options, in the form of restricting or expanding commercial trade, and internalizing or blocking environmental effects, are evaluated and compared. Analyzing whether commercial and environmental values are, or are perceived to be, substitutes or complements, it is further explained why governments tend to favor commercial trade and downplay environmental concerns. This leads us to the issue of how to address distorted policies, and under what circumstances barriers to commercial trade should be adopted to protect the environment.

The article is organized as follows. The framework of study is laid out in Section 2. Section 3 characterizes conditions for trade. In Section 4, policy options are analyzed and evaluated. Section 5 discusses the motivation of governments' behaviour. Section 6 analyses how to handle distorted policies. The final section concludes.

## 2. BASIC FRAMEWORK

"Trade" can be broadly defined as the interpersonal exchange of "values" in the form of assets, goods or services. International trade, which in focus here, is closely related with domestic trade. Trade also has a time dimension, and often an inter-generational component. More consumption implies less savings, and the depletion of environmental assets may be *irreversible*, meaning that it cannot be undone in retrospect at any reasonable cost.

Distinguish between two kinds of values; private and environmental. Social welfare can then be thought of as a function

$$w = w(x, e), \tag{1}$$

where  $x$  is the consumption of private goods or services, and  $e$  represents environmental quality. Private values are characterized by well specified *property rights*. It is straightforward to claim ownership for factors of production, and to exclude others in consumption. Environmental values, on the other hand, are characterized by a lack of well specified property rights. It is difficult or impossible to claim private ownership, and to exclude others in "consumption". Of course, there are cases when

environmental values are tradable in association with private ones. The owner of a house with a view can appropriate the value of that view as he sells his house. Tourism brings compensation for recreational values. Unless associated with marketed commodities, however, the environment produces non-commercial services. For example, a forest owner can generally not claim compensation for the CO<sub>2</sub>-absorbing function of trees, although that function is valuable from a social perspective.

Unless governments interfere, well specified property rights lay the basis for effective trade between buyers and sellers. In the perfect market of the economic text books, prices are determined by supply and demand, and reflect social scarcity values. Unless governments interfere, however, and compensate for the lack of property rights, non-commercial services take the form of collective goods.<sup>2</sup> Their corollary are *externalities*, by Pigou (1932) defined as transactions occurring without compensation in the market place. *Due to the collective-goods' nature of non-commercial services, costs and benefits fail to be internalized - meaning that they are not taken into account by those who are responsible for them. Supply and demand conditions fail to be rightly reflected in the market place, and prices do not reflect prevailing priorities.*

In the following, it is implicitly assumed that environmental values can be identified, quantified and valued in social terms. The task of determining socially relevant values, i.e. social cost-benefit analysis, has been extensively developed in a number of studies.<sup>3</sup> Applying this perspective, values are influenced by *opportunity costs*. Environmental values typically have an income elasticity greater than one, meaning that an increase in income raises the appreciation of the environment. Reversely speaking, the more pressing other needs are, the smaller the emphasis put on the environment. At the same time, material well-being and a sound environment are complementary rather than conflicting goals. *Poverty* spurs environmental destruction, particularly in Third World countries. Bringing down birth-rates and overcoming the demographic transition, for example, will eventually require that people enjoy a sufficiently high standard of living to choose fewer children.

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<sup>2</sup> This is not to say that environmental issues must be resolved by governments. If consumers react to environmental effects, on their own account or because firms inform about them to acquire goodwill, internalization of environmental effects takes place without government interference.

<sup>3</sup> See, for example, Little and Mirrless (1962), Helmers (1976) and Bojö et al. (1991). The task includes consideration to, e.g., evaluation criteria, uncertainties and risks, the income distribution, etc. Calculating the social value represents an attempt to determine the priorities of society as accurately as possible.

Shortage of capital, information and technology of various sorts similarly influence how environmental assets are valued, or how environmental risks are perceived. Many poor countries have been severely indebted since the late 1970s and are rationed in international financial markets. This shifts their need of foreign exchange earnings from the future towards the present time. With a trade-off between current export earnings and preservation of the environment, the attractiveness of the latter is reduced. Meanwhile, poor countries have particularly limited means to acquire information about the environment, which may directly affect its value. For example, lack of capital and expertise diminishes the ability to appropriate rents from genetic diversity in the form of industrial production. A country's bargaining power is also reduced vis-à-vis foreign investors which contribute financing and technology in exchange for a share of the profits from natural resource use.

On this basis, the utility of an individual,  $j$ , can be written as a function

$$u_j = u_j(x_j + a_j(x_j)e); \quad j = 1, \dots, n. \quad (2)$$

As for society, individual utility depends on the consumption of private goods and the enjoyment of environmental quality. The individual  $j$  consumes the amount  $x_j$  of the private good but, given the collective good's nature of the environment, all individuals enjoy the same environmental quality. Of course, this is a simplification as, e.g., some individuals may have access to greater quality in connection to private goods. In (2), however, the variation lies in the appreciation of environmental quality,  $a$ . This is influenced by the consumption of private goods, including the access to capital and information. As mentioned,  $a_j$  is typically increasing in  $x_j$ .

On the production side, the environment and private factors similarly serve both as *substitutes* and as *complements*. With substitutability, environmental quality is sustained at the expense of commercial values, while more commercial activity occurs at the expense of environmental quality. This is in line with traditional economic perspectives, according to which pollution control costs money and the access to natural resources constrains economic activity. Complementarity, on the other hand, implies a mutually supportive relationship, which has been stressed in recent years (Daly, 1968;

WCED, 1987; Peace and Turner, 1989). The degree to which substitutability or complementarity prevails is influenced by technological, ecological, social and economic factors.

The relationship also depends on what time and space range is considered. Broadly speaking, there is substitutability in the short term, due to the trade-off in how to use scarce resources, while environmental effects may show up later. There is rather complementarity in the long run, because environmental quality serves as infrastructure for economic transactions in a general sense, raising the productivity of private factors. For example, workers are healthier and may be more motivated the better the air they breathe and the recreational opportunities they enjoy. Given that externalities spread in space, there will be relatively more substitutability the smaller the area considered, and relatively more complementarity the larger the area. The locality with a factory has to pay for installment of cleaning equipment, while pollution lowers the productivity of fishermen in villages down the river.

To begin with, we refrain from considering any ambiguous relationship between environmental and private values, but assume a sharp and exogenously determined dividing line between substitutability and complementarity. We return to this matter later.

### 3. CONDITIONS FOR TRADE

To analyse the relationship between trade and the environment, we must specify the conditions for trade which prevail in specific situations. Not only is trade affected by the prevalence of property rights. Governments also intervene with trade in various ways. To simplify, consider three basic conditions for trade:

A) Free trade. There may be functioning and unimpeded markets for trade, meaning that goods and services are freely exchanged with both buyers and sellers able to voice their preferences.

B) Distorted trade. Trade may be impeded because governments prevent buyers and sellers from undertaking transactions. It is difficult to fully wipe out attractive trade,

which often results in "black markets" with unofficial prices. Still, trade is commonly distorted by government interference.

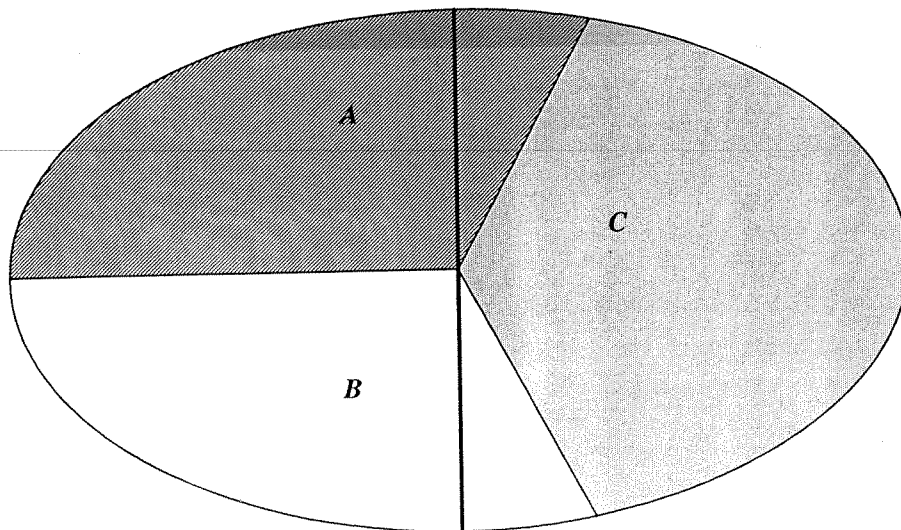
**C) Uncompensated trade.** Some trade occurs although there are no functioning markets which allow for compensating payments. Only the buyers or the sellers are able to influence the transactions.

Figure 1 applies A-C to the global "value set", representing all private and environmental values which prevail at a certain point in time. On the left side we have private values, and on the right environmental ones. It should be stressed that the size of the respective areas in no way pretends to reflect the "real" magnitude of the different values relative to each other. The figure illustrates the conditions for trade which characterize different

FIGURE 1: GLOBAL VALUE SET

**private values**

**environmental values**





values. The darker area indicates free trade (A), the white area distorted trade (B), and the lighter grey area (C) uncompensated trade. Given our definition of private and environmental values, the former are either traded or distorted, while the latter are traded without compensation - except when associated with private ones, or when governments prevent trade.

The multilateral trading system, instituted after the Second World War, lays the basis for commercial trade on conditions which should not discriminate against small countries. Under the umbrella of the General Agreement on Tariffs and Trade (GATT), tariffs have gradually been reduced among developed countries, and more recently among many poor countries as well. Mobility in capital and technology is similarly cherished. With technological advancement in information and communication, and more international experience, there has been a general internationalization of the production processes. Today, a considerable share of world trade occurs within multinational companies, which own and control production in many countries. Moreover, most trade occurs within industries between countries which are highly similar in terms of factor endowments.

On the other hand, a great deal of the potential commercial trade is impeded or distorted. According to OECD (1988), more than a third of the world's trade in goods was affected by preferential arrangements on a regional basis as of the late 1980s. The dividing line between "free" and "distorted" trade is blurred in practice. While GATT has succeeded in lowering tariffs, a range of non-tariff barriers are flourishing instead. Particularly the largest traders, the United States and the European Community, are selectively impeding imports through voluntary export restraints and the threat of antidumping proceedings. The remaining large economy, Japan, is accused of structural or informal barriers. Agricultural products and textiles, which are the most important export items for the developing world as a whole, have been removed from the framework of GATT for years. The multitude of restrictions and subsidies in these fields will be far from removed even with a favorable outcome of the Uruguay Round of multilateral trade talks. In addition, there is a range of product standards and domestic regulations which, in effect, serve as powerful barriers to trade in private goods and services.

Concerning non-commercial services, we have already observed that some can be effectively traded in connection to private goods. Furthermore, the polluter-pays-principle represents an internationally accepted requirement of compensation for outright damage due to pollution by other countries. However, the principle is seldom applied in practice. It has been argued that it would have to include a precautionary component to be effective (Peskin, 1991). Responsible countries would then have to pay compensation for the uncertainty or risk of environmental damage that they inflict on others. In fact, there is a range of mechanisms through which governments could institute a pricing which would internalize the value of non-commercial services. Examples are; pollution taxes, tradable emission rights, deposit-refund systems, or the flexible environmental assurance bonding system (Cropper and Oates, 1992; Costanza and Perrings, 1990).

To the extent that governments do interfere with the uncompensated trade in non-commercial services they tend to lean towards direct regulation in the form of total restrictions or harmonization of standards. Most are domestic, but some are accepted by the international community. Still, most environmental values take the form of non-commercial services which are traded freely, but with little or no monetary compensation.

#### 4. EVALUATING TRADE POLICIES

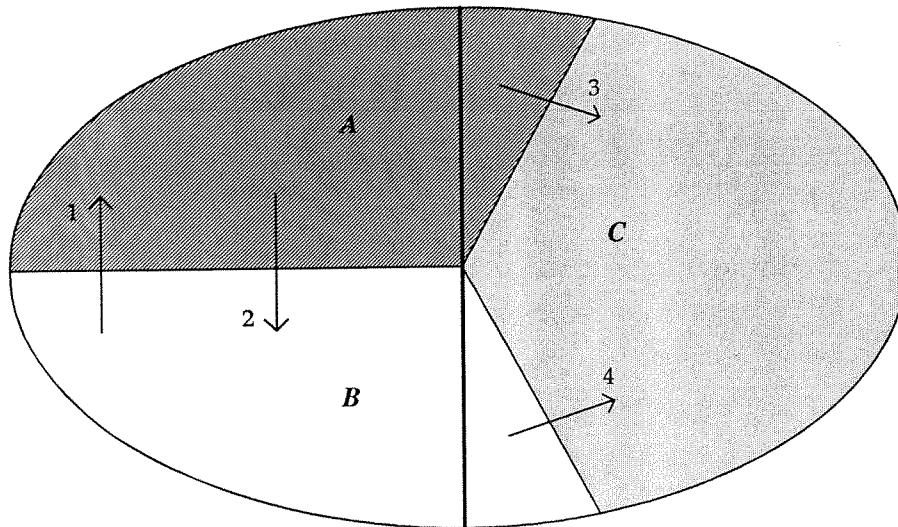
How does trade affect the environment, and how is overall welfare affected? Provided that A) applies to all relevant trade, meaning that property rights are well defined for all assets, the ordinary view of trade is perfectly valid. Putting aside a few anecdotal cases in which free trade has been shown to harm welfare, we can be confident that trade is then in everybody's interest. Both buyers and sellers claim compensation for what they give up, and the resulting allocation is optimal. In this sense, free trade represents the best possible state for managing private as well as environmental assets.

When the conditions above characterized as B) and C) apply to some items, however, we need further analysis. Figure 2 illustrates four sets of trade policies in the shape of arrows. An arrow indicates that a policy moves the dividing line between two

FIGURE 2: TRADE POLICIES

private values

environmental values



areas, for example expanding B) at the expense of A). Below, the respective trade policies are evaluated one by one, with a separation between cases characterized by substitutability and complementarity. The outcomes are specified in Table 1 for the three components in (1), i.e. welfare, conventional income and the environment.

### 1. Restricting trade

Restricting commercial trade reduces the specialization of production, and thereby income. In itself, this damages the environment in two ways. Firstly, there are less resources for pollution abatement and, secondly, the appreciation of environmental values declines. With substitutability, there is a counteracting favorable impact on the environment, however. If trade restrictions are to be accepted, such a beneficial impact must outweigh the loss in income. In case of complementarity, on the other hand, trade restrictions will unambiguously hurt welfare as well as the environment.

## 2. Expanding trade

Expanding commercial trade gives more specialization, higher income, greater means to manage the environment and a higher demand for environmental quality. Given substitutability, the total effect may again be negative. Given complementarity, more trade is unambiguously positive.

## 3. Internalizing trade in non-commercial services

Internalization compensates for the lack of property rights, making those who cause non-commercial effects responsible for the true costs and benefits associated with them. The environment improves as it becomes costly to use it. With substitutability, consumption in private goods decreases, reducing conventional income. However, this is in line with prevailing preferences, allowing everyone to be better off given appropriate compensation. With complementarity, income increases instead.

## 4. Blocking trade in non-commercial services

The direct effect is an improvement of the environment. With substitutability, there is again a negative effect on income. This is not guided by preferences, and the result is an indirect negative impact on the environment which makes the final outcome uncertain for both the environment and welfare. With complementarity, there is a positive effect in all respects.

Table 1: Effects of Trade Policies

S = Substitutability, C = Complementarity

<u>Trade Policies</u>	<u>Effects on</u>		
	<u>Environment</u> <u>S/C</u>	<u>Income</u> <u>S/C</u>	<u>Welfare</u> <u>S/C</u>
1. Restricting	? / -	- / -	? / -
2. Expanding	- / +	+ / +	? / +
3. Internalizing	+ / +	- / +	+ / +
4. Blocking	? / +	- / +	? / +

Internalizing trade in non-commercial services is the only policy option which renders unambiguous effects on social welfare. Restricting commercial trade damages welfare in the case of complementarity, while expanding trade is beneficial in that case. With substitutability, the outcome is uncertain in both these cases, although more trade expands conventional income and restricted trade reduces it. Blocking trade in environmental assets, finally, is beneficial if there is complementarity, while the outcome is uncertain if there is substitutability. In the latter case, income falls, and the environment may be worse off as well.

When commercial trade is complementary with the environment, there does not seem to be much of a problem. Naturally, all policy options have beneficial outcomes in that case, except for restricting trade. When there is substitutability, only internalization is certain to improve welfare. These observations are in line with conventional wisdom. For an empirically relevant analysis, however, we must consider both what determines the pattern A) to C) and whether trade and the environment are, or are perceived to be, complements or substitutes. In fact, these two matters are interlinked, and associated with the behaviour of governments.

## 5. GOVERNMENT BEHAVIOUR

Although the internalization of trade in non-commercial services is a superior policy option, governments tend to prefer regulation of environmental effects to market-based intervention (Kelman, 1981; Safadi and Low, 1992). There are instances when the latter is associated with costs for administration and control, as well as spatial complications, which make it inefficient. While this was widely true when technologies were rudimentary, and the atmosphere, the oceans and the forests were vast relative to the scope of human activities, it does not apply for ever in a general sense. As made clear by Cropper and Oates (1992), economic incentives do not always handle environmental effects more efficiently than regulations, but they are certainly underused in relative terms. Externalities hinge not only on the failure of markets to emerge spontaneously, but also on the failure of governments to respond appropriately.

So far we have not made any distinction between national and international issues. Within jurisdictions, governments are in the power to legislate property rights, impose taxes, create markets for emissions rights, etc. Internationally, however, legislation and even binding commitments are more complicated due to the *sovereignty* of nation states. As some environmental problems are common not only for the citizens of an individual country, but also for other countries, the interaction between different nations is becoming a key issue. Governments may refrain from domestic action because other countries would not follow and, for example, polluting industries would simply relocate their activities. Hoel (1989) shows that the optimal level of pollution may increase abroad if one country unilaterally cleans its industries, leading to a possible increase in the total level of emissions.

Let us first state that even sovereign countries can negotiate, and undertake binding commitments which are converted into international law. In effect, internationally accepted institutions for arbitration create a framework for effective ward enforcement around the world. Meanwhile, a number of game-theoretic studies have demonstrated great potential gains from international coordination of environmental policies (Mäler, 1989; Kverndokk, 1992). There will normally be a considerable redistribution of incomes either due to monetary and technological transfers, or due to the changes in prices which occur as previously "free" services are compensated. With gains in total welfare, however, it is possible to construct solutions which make everybody better off. In the long term, cooperative outcomes can be supported by punishments directed at those who "free ride" on the actions of others.

Although agreements and transfer payments may be covert, and hence more prevalent than commonly thought, there is clearly little international coordination of environmental policies on the whole. This can not be explained by *moral hazard* problems. Checks of pollution abatement can be arranged, or transfer payments be made contingent on programs which realize investments by a recipient country itself on a scale which corresponds with its social priorities. The real reason is a lack of motivation on the part of governments. The school of public choice has made it clear that economics and politics far from always can be separated. Governments need not maximize social welfare, but tend to respond to political pressure. Power is based

relatively more on influential groups than on less articulate ones. The costs of environmental degradation are spread thin on a great many, while only a few have to pay for pollution abatement. As observed by Olson (1965), this accounts for greater difficulties for the former to organize themselves and exert political pressure.

Imperfections in information raise further complications. Odum (1985) noted that it may be too late to deal with environmental degradation at the time when it becomes detectable at the level of ecosystems. Traditional "option" values, which reflect the benefit of not foregoing future possibilities due to the irreversibility of environmental destruction, can in principle compensate for this (Weisbrod, 1964). A "political" issue arises, however, as information tends not only to be costly and incomplete, but also asymmetrically distributed. Those who suffer from environmental degradation may not be aware of it, and the irreversibility of effects may make it too late to react when they know. Because it often takes time before damage becomes visible, the victims may not be present, or even be borne, when the effect is triggered. Politicians and polluters can minimize their own costs from environmental destruction by directing them at those who are the least informed, and/or the least able to protest against their losses. The exploitation of asymmetric information and ignorance is especially likely in autocracies and dictatorships where information can be suppressed. Still, this is not a matter of mere anecdotal relevance, signaling particularly sinister conspiracies against helpless victims. Rather, it is an inherent feature of great environmental values, such as clean air, water, etc, which we are all steadily enjoying without knowledge of what they are used for by others.

On this basis, government behaviour motivated by political concerns explains both domestic and international policy failure in the environmental field. Short-term commercial benefits from not dealing with environmental effects weigh heavily in political decision-making, and long-term environmental costs are downplayed. This makes governments more inclined to perceive private and environmental values as substitutes rather than complements. Such a relationship is also reinforced by a shortage of capital and high real interest rates, as experienced in indebted developing countries which are rationed in financial markets. Provided that governments aim for maximized incomes in the traditional sense, they will then consider the left part of the

second column in Table 1. In this situation, expanding trade is perceived as the only viable policy option. Political motives show up in other ways as well, however. Control makes it easier to achieve political goals, which explains governments' inclination to handle environmental issues, if handling them at all, through blocking rather than internalizing non-commercial services.

## 6. ADDRESSING DISTORTED POLICIES

The political process looks different in different countries. An individual government may strive for maximization of social welfare, but be surrounded by other countries whose governments do not care for the environment (Andersson, 1991). In such a setting, restrictions on commercial trade can prevent industries from relocating to countries with lower emission standards, or hurt polluting industries abroad. Domestic environmental standards and regulations may, in effect, serve the same purpose. Costanza (1992) argues that "ecological tariffs" must be adopted as a form of countervailing duties. These should compensate for the lack of other mechanisms to internalize the true costs and benefits of environmental effects, domestically as well as internationally, he argues. The objective of the barriers should consequently not be to protect domestic industry, but to protect environmental values which are otherwise mismanaged. In essence, restricting commercial trade is suggested to serve as a substitute for internalization of trade in non-commercial services, until such internalization has occurred.

It should be recalled that "true" protectionists, i.e. those who want to relieve the competitive pressure on activities for "other" reasons than environmental ones, constantly seek fuel for their arguments. Vogel (1992) does not see many cases in which environmentalists and protectionists could go together, and Klepper (1992) demonstrates a division in powers within Europe which diminishes the risk in this part of the world. Hillman and Ursprung (1992) draw the opposite conclusion, however, arguing that the public goods' nature of campaign contributions makes the call for ecological barriers support the pressure for protectionism in general. In addition, there is an inherent contradiction in the political power of "protectionists" and



"environmentalists". Similarly to environmental mismanagement, protectionism gives rise to high rents which accrue to small well-organized groups, while the great majority of unorganized consumers pay the bill. In spite of its virtues, the open world trade system is now seriously threatened by such groups. For this reason, trade barriers and environmental protection represent an odd couple. The world's environment and free trade both represent common goods which risk to be downgraded in the political process, and which both badly need to be defended.

We have already seen that barriers to commercial trade, including the adoption of standards on products or production processes, reduce income and may thereby indirectly hurt both the environment and welfare. However, it is perhaps most crucial how trade barriers function as bargaining chips and affect the prospects for negotiation between countries. As seen in Table 1, expansion of trade is a major objective for governments which perceive substitutability between commercial and environmental values, and which do not pay much attention to the latter anyway. Threats to reduce trade may therefore be an effective instrument in negotiations with such countries, at least for those who are sufficiently large to have clout in bilateral negotiations. On the other hand, it is clear that the first best solution is not to distort trade but to achieve well-functioning trade in all respects, including trade in non-commercial services. Reaching this goal undoubtedly requires an atmosphere of cooperation and mutual trust between countries. It may therefore be that the worst effect of trade restrictions is the damage inflicted on the long-run prospects for fruitful cooperation. This is particularly the case when countries already adopt discriminatory measures which have nothing to do with environmental concerns. Trying to adopt trade barriers for the sake of the environment typically involves difficult decisions concerning which standards to adopt, and there is always a risk that better organized "protectionists" of the traditional kind get an upper hand on "environmentalists" in the decision-making.

What are the implications for a delegation of environmental responsibilities from the national to the local level, or to the national level within trade organizations that are establishing common standards, such as the European Community? Given modern technology, there is more substitutability the smaller an area. It is also difficult for local actors to negotiate solutions regarding cross-border effects. The nation, or the trading

organization, must consequently adopt a major responsibility for the establishment of rules that require an internalization of environmental effects by local actors, and prevent them from undermining the standards of each other. Options for the latter will worsen the prospects for effective cooperation, regarding commercial as well as non-commercial trade, not improve them. Applying this reasoning to the global level, it would be welcome with a super-national institution which could effectively coordinate an internalization of environmental effects by the world's nations, thereby paving the way for functioning trade in all respects.

## 7. CONCLUDING REMARKS

Motivated by political factors, governments downgrade environmental values, and tend to perceive commercial and environmental values as substitutes rather than complements. On this basis, they prefer to expand commercial activities and neglect the environment. The first best choice, establishing functioning trade universally, is seldom adopted. Using barriers to commercial trade against "other" countries represents a questionable strategy. It is true that such barriers may be a forceful instrument, at least for large countries, but there are a number of dangers associated with them. Firstly, trade barriers are inefficient. They reduce conventional income and therefore hurt the environment indirectly. Secondly, they worsen the prospects for the cooperation eventually needed to compensate for the lack of spontaneous trade in non-commercial services. Thirdly, the policy risks to be captured by "traditional" protectionists who can organize themselves more easily.

If barriers to trade are to be instituted for environmental reasons, there should be slim prospects without them for successful cooperation to internalize non-commercial services. This implies that the issue at stake should be highly urgent, otherwise leading to a great irreversible destruction within the near future. It must also be clearcut how to differentiate "environmental" from "non-environmental" barriers. Not do damage the prospects for joint action in general, they should not be employed by countries who already practice discriminatory barriers to trade. This leaves us with few candidates for applying them, and probably none among the large countries who have sufficient

bargaining power on a bilateral basis. On the other hand, environmental responsibilities for modern technology should not be delegated to the local level, where it is difficult to handle cross-border effects.

From the scientific side we should be careful to call for trade barriers. Rather, there is a great need to address the fundamental factors which make governments unwilling to take full account of environmental problems as well as to employ discriminatory trade barriers. Above all, this means addressing the lack of information, particular asymmetric information and ignorance. With more knowledge among the general public, we will become more ready to take non-commercial services into account, not only as voters or citizens, but also as consumers and producers.

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