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**Globalisation and National Incentives for
Protecting Environmental Goods**

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Types of Goods, Trade Effects, and International Collective Action Problems

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Abstract	2
1 Introduction	3
2 Types of environmental goods and incentives for environmental protection	6
3 Trade effects and incentives for environmental protection	15
4 Empirical illustrations for specific combinations of goods and trade effects	18
5 Implications for globalisation and national environmental policies	23
6 Summary and conclusions	27
References	30

Abstract

This article tries to explain national incentives for protecting environmental goods either autonomously or collectively; it explores how globalisation has affected those incentives; and it suggests how national environmental policy might respond so as to ensure its effectiveness. The central argument is that national incentives for environmental protection may to a considerable extent be explained by a combination of the type of environmental good to be protected (in terms of public goods theory) and the effects of environmental protection measures on international competitiveness. Arrangements for protecting environmental goods can be ranked according to their centripetal effects on non-participating countries. Centripetal effects are strongest in the case of club goods (1), followed by private goods (2), public goods (3), and common pool resources (4). The centripetal effects resulting from the type of environmental good can be further reinforced by competitive advantages resulting from environmental protection measures; they can be weakened by competitive disadvantages; or they can remain unchanged due to competitive neutrality. The combination of four types of environmental goods and three types of competitive effects (positive, negative, neutral) results in twelve possible cases, with differing national incentives for autonomous and collective environmental protection. Given specific assumptions, these twelve cases can be ranked with regard to the severity of collective action problems they involve. The article includes a short empirical illustration for each case. It also analyses how globalisation (in the form of increasing trade) and some of its driving forces (in the form of free trade agreements) influence national incentives and legal possibilities for environmental protection. This article concludes with a brief discussion of four options for (re-)expanding the action space for national environmental policies under the condition of economic globalisation.

1. Introduction

Subject: National incentives for environmental protection

While nations may have similar preferences with regard to various environmental goods, their incentives to actually protect those goods differ from case to case.¹ The result may be individual action (in the framework of national environmental policies), collective action (in the framework of international environmental agreements), or inactivity. If international environmental agreements already exist, participant countries face incentives to either stay or leave, while non-participant countries may have incentives to either remain outside or join. New entries and sustained participation give evidence of the centripetal effects of international environmental agreements, while exit threats and continued abstention can be interpreted as a sign of centrifugal effects. Centripetal effects refer to the utility of participation in collective action, as opposed to abstention.²

A prominent example illustrates how the incentive structures for nations (or groups of nations) may vary across issue areas and individual cases. The European Union has taken environmental action both by participating in the Kyoto protocol on climate change and by banning meat and products treated with growth-promoting hormones. The United States, by contrast, has abstained from the Kyoto protocol and allow the use of growth-promoting hormones. Incentives for environmental action, however, appear to be entirely different in the two cases: In the case of the Kyoto protocol, the EU has actively and almost desperately tried to bring in the US. In the case of the hormone ban, the EU has not pushed the US to adopt an equivalent policy, but faced strong US resistance to its own policy.

Questions: Which factors influence national incentives?

The comparison between these two cases is puzzling. Why is the EU unhappy about the US abstention in the case of the Kyoto protocol, but indifferent in the case of hormones? And why is the US upset about EU policies in the case of hormones, but not in the Kyoto case?

Two *general questions* which arise in this context are: Which factors influence the initial choices (autonomous action, collective action, no action) of countries with regard to environmental protection in a given area? And what explains the centripetal or centrifugal effects of international environmental agreements once they are established? Theories about the provision of collective goods suggest that the incentives for actors to protect environmental goods are influenced by the character of goods in terms of public goods theory. According to international political economy, moreover, the trade effects of environmental protection may further influence these incentives.

1 I am indebted to Frank Wijen for his very constructive comments on an earlier version of this paper. A number of other participants of the conference "Globalisation and National Environmental Policy" (Veldhoven, 22-24 September 2003) have also provided helpful suggestions. Moreover, I would like to thank Martin Beckenkamp, Christoph Engel and Frank Maier-Rigaud from the Max Planck Institute for Research on Collective Goods for carefully reviewing the original draft of this contribution. Last but not least, Darrell Arnold has helped me with regard to language correction.

2 A more precise definition of centripetal (and centrifugal) effects follows in the next section.

The primary objective of this article is to give a theoretical answer (including some empirical illustrations) to the following *more specific questions*: How do the nature of environmental problems and the trade effects of the solutions to these problems affect the incentives for countries to act either individually, or collectively, or not at all? How do these two explanatory factors influence the centripetal and centrifugal effects of international environmental agreements? And what is their combined impact on the difficulties of autonomous national action and on the severity of international collective action problems?

Answering these questions will make it easier to respond to a *concluding question*, relating to globalisation and national environmental policies. If globalisation is characterised by rapidly expanding trade and driven (among other factors) by international free trade agreements, how do these factors affect nations' incentives and legal possibilities for protecting environmental goods, either on their own or in cooperation with other countries?

Theoretical answers: Types of goods and trade effects of environmental protection

The focus of this article is thus on the possibilities and limits of national environmental policies, on the perspectives for the creation of international environmental agreements, and on the centripetal or centrifugal effects of such agreements on potential further participants. In this context, it is important to note that this contribution concentrates on collective action among countries and their governments, not among individuals, firms, or other non-state actors. It therefore investigates the character of environmental goods, as well as the competitive effects of environmental protection, exclusively from the point of view of countries as a whole. The latter are hence treated as the basic units of analysis.³

The theoretical analysis will be presented in three steps. The first two steps (Section 2) analyse the impact of the character of environmental goods, while neglecting trade effects. The *first step*, reflecting insights from the existing literature on collective goods, argues that the incentives for national environmental protection are strongest in the case of those environmental goods that – from the perspective of the countries involved – represent predominantly private goods (e.g. noise reduction, protection of the soil, protection of lakes). All other categories of environmental goods provide certain incentives for countries to engage in collective action (which explains why non-private goods are also referred to as collective goods). The severity of collective action problems, however, depends on the precise category of the good.

The *second step* ranks the attractiveness (i.e. the centripetal effects) of environmental agreements for potential participants, depending on the character of the environmental good to be protected. The ranking of four types of goods according to their centripetal effects derives from a "theory of differentiated integration" developed elsewhere and applied to various EU policies.⁴ According to

3 An example may underline the importance of this distinction: While national defence is a (non-excludable) public good for individual citizens, it is an (excludable) private good from the perspective of countries as a whole.

4 See Kölliker (2001a, 2002).

this new theory, centripetal effects are strongest in the case of club goods, followed by private goods and public goods. Common pool resources tend to lead to centrifugal rather than centripetal effects and therefore rank at the bottom.⁵

The *third step* (Section 3) combines these type-of-good effects on national incentives with the trade effects of environmental protection measures. Incentives for countries to engage in environmental protection depend not only on the character of environmental goods, but also on the impact of environmental protection measures on the international competitiveness of the domestic industry. The analysis distinguishes between the positive, negative, and neutral effects on competitiveness. Trade effects may therefore combine with type-of-good effects to either alleviate or exacerbate the collective action problem individual countries face when trying to protect environmental goods. As a result, centripetal effects are either weakened (in the case of competitive disadvantages) or reinforced (in the case of competitive advantages).

Significance, empirical illustrations, and implications concerning globalisation

The *significance* of the outlined theoretical analysis lies, first of all, and at a more general level, in the combination of the type-of-good effects with the trade effects of environmental protection. Both effects are important for understanding national incentives for environmental protection. Neglecting one of them may often lead to the wrong conclusions. But together, the two factors might explain a substantial part of the variance in national incentives with regard to various environmental protection measures. A second, more specific innovation presented in this contribution consists in the ranking of environmental goods according to the centripetal effects of international arrangements for their protection. This ranking provides a new measure for the severity of collective action problems. All in all, the contribution might hence serve policy-makers as a rough guide to the incentive structures nations face in different fields and with regard to different instruments of environmental protection. This in turn might help nations to make the right institutional and policy choices for improving environmental quality, both effectively and efficiently, through either autonomous national action or collective international action. For the environmental research community, the contribution might provide a theoretical framework for analysis that permits broad comparisons, and hence learning, across a wide range of sub-fields of environmental protection.

The theoretical considerations regarding types of environmental goods and trade effects could solve the puzzle of the diverging incentives for the EU in the cases of the Kyoto protocol and the hormone ban. Those and other environmental problems are used as *empirical examples* of various combinations of the different types of goods and trade effects (Section 4). It will be argued that the Kyoto protocol involves an international public good, while the hormone ban represents a private good for the countries involved. This explains why the Kyoto protocol involves weaker centripetal

5 The ranking provided by differentiated integration theory also includes two further categories of goods, namely excludable and non-excludable network goods. The reasons for excluding them from the present contribution are explained further below.

effects than the hormone ban. Trade effects even reinforce these tendencies, because participation in the Kyoto protocol may in some areas bring competitive disadvantages, while the hormone ban – acting as a barrier to imports – results in competitive advantages. In short, while the Kyoto protocol combines a public good with competitive disadvantages, the hormone ban combines a private good with competitive advantages.

Towards the end of this article (Section 5), I will explore some *implications* of the outlined theoretical mechanisms with regard to globalisation, national environmental policies, and the instruments of international environmental cooperation. More specifically, I will analyse (1) how globalisation and its driving forces affect national incentives and legal possibilities for environmental protection, (2) how countries can ensure the effectiveness of national environmental policies under the conditions of globalisation, and (3) under which conditions flexible, voluntary and non-binding instruments might be useful in this context.

2. Types of environmental goods and incentives for environmental protection

The value attached to environmental goods is a necessary but insufficient condition for measures undertaken by countries and their governments to protect those goods.⁶ National governments also need incentives to help them to transform preferences into action. A key objective of this article is to better understand national incentives for environmental protection.

Why and how to explain national incentives for environmental protection?

But why should better knowledge of the incentives of national governments be important for improving environmental quality? The answer is that knowing about incentives may help to identify environmental measures likely to be adopted and implemented effectively within a given institutional framework. Beyond that, it may also help to shape institutions such as to create the necessary incentives for specific environmental measures.

The focus here will be on two factors exerting a particularly powerful impact on the incentives for protecting environmental goods. The first factor (analysed in this section) is the nature of environmental goods in terms of public goods theory. The second factor (analysed in the next section) are the side-effects of environmental protection measures on competitiveness and trade. As pointed out in the introduction, both the nature of environmental goods and the trade effects will be analysed from the point of view of countries as a whole and the governments representing them, not from the point of view of individuals, firms, or other non-state actors.

6 Christoph Engel has observed that certain environmental goods may constitute free goods for governments. This is the case if nature provides environmental goods in abundance, but also if scarce environmental goods are sufficiently protected by individual or collective private actors.

This section will be organized as follows: The first step presents the classification of goods as provided by public goods theory. The second step gives some empirical examples of different types of international environmental goods. The third step clarifies which types of environmental goods countries can best protect autonomously, and the goods for which there are incentives to act collectively. This can be established by comparing the gains for a country when acting autonomously (Option 1) and the gains for a country when taking part in collective action (Option 2). However, because it fails to take into account the possibility of free-riding, this comparison does not allow us to properly assess how attractive it is for a country to actually participate in collective action. Therefore, the fourth step compares the gains for a country when participating in collective action (Option 2) with the gains when abstaining from collective action established by other countries (Option 3). In the fifth step, I will present a ranking with regard to the centripetal effects of different types of goods. The final step summarises the findings with regard to the severity of international collective action problems.

Public goods theory and types of environmental goods

Public goods theory uses two criteria to classify goods: excludability and rivalry in consumption.⁷ It argues that the incentives for actors to provide goods depend on the types of goods that result from specific combinations of excludability and rivalry in consumption. Applied to the field of the environment and to the level of nations, this means that the countries' incentives to protect environmental goods are influenced by the character of the goods. In fact, international environmental agreements are often justified by arguing that environmental protection represents an international public good that requires collective international action, since individual countries lack the incentives to act autonomously.

This article identifies in more detail the incentives countries and their governments have to *initiate* new environmental protection measures, either autonomously or collectively, or to remain inactive. Equally important, it also identifies their incentives to *participate in* already existing environmental protection measures, either by unilaterally and autonomously emulating the policies of other countries, or by signing up to international environmental agreements. To make the argument more easily understandable, as well as to underline its practical relevance, the illustrative examples are closely integrated with the presentation of the theoretical argument.

In order to classify environmental goods according to public goods theory, two questions must be answered: First, can countries (or groups of countries) protecting an environmental good exclude other countries from that good? And second, is the utility countries can derive from environmental protection measures affected if other countries can equally profit from the measures? The two questions are, in other words, whether an environmental good is excludable, and whether or not it involves rivalry in consumption. Environmental goods can be either excludable or non-excludable, and consumption can be either rival or non-rival. Combining the possible levels of excludability

⁷ The current economic literature on public goods originates in a seminal piece by Samuelson (1954). For an authoritative overview of public goods theory see Cornes and Sandler (1996).

and rivalry in consumption therefore leads to four ideal types of goods (see also Figure 1 below): *Private goods* are characterised by excludability and rivalry in consumption, while *public goods* are non-excludable goods with non-rival consumption. *Club goods* combine excludability with non-rival consumption, and *common pool resources* are defined by non-excludability and rival consumption.⁸

Public policies can aim either at providing goods or at preventing "bads". Providing a good increases the utility for a given actor compared with the status quo, while preventing a bad prevents her utility from being reduced. In analytical terms, these two cases will be treated here as symmetrical and equivalent, and no distinction will hence be made between environmental policies improving environmental quality and environmental policies preventing a further deterioration thereof.⁹ I will generally refer to the former case as "providing an environmental good", and to the latter as "protecting an environmental good".

Examples of international environmental goods and their protection

Real world environmental goods, as well as measures to protect them, do not always neatly correspond to one of the four categories of goods. Instead, they often have a mixed character. But the overall character of different environmental goods nevertheless often varies considerably. Therefore, the predominant character of environmental goods can often be plausibly established, at least in relation to other environmental goods. The following examples, which will also be used in the rest of the article, illustrate this.

Private goods: Timber is a natural resource with the character of a private good from the perspective of countries. Rivalry in consumption exists, but countries can exclude each other from this resource. Domestic waste collection is also a private good from the perspective of countries. Other countries are clearly excluded from the benefits of local waste collection. Moreover, those benefits are rival: the costs of waste collection increase with the size of the area covered. Prohibiting growth-promoting hormones for meat production can also be considered a private good for the countries concerned. The EU justifies the ban of hormones by referring to the health risks for the European population, which creates a "private" benefit for EU countries.

Common pool resources: High sea fisheries and the prevention of over-fishing involves a resource which is characterised by rivalry in consumption. Moreover, countries cannot exclude each other

8 Strictly speaking, club theory assumes that rivalry in consumption begins as soon as the number of participants crosses a certain threshold. Since we are interested here in the "pure" types of the four goods, it is assumed that consumption is non-rival, independently of the number of participants. Alternatively, it could also be assumed that we only look at club goods with a number of participants which does not cross the rivalry threshold. On clubs and congestion, see Cornes and Sandler (1996: 348, 372-376).

9 This does not mean, however, that actors necessarily have the same intensity in their preferences for providing environmental goods and preventing environmental bads. Experiments conducted by psychologists and economists suggest that actors have a bias towards loss aversion and maintaining the status quo. Kahneman et al. (1991: 205) suggest that "[a] revised version of preference theory would assign a special role to the status quo, giving up some standard assumptions of stability, symmetry and reversibility which the data have shown to be false."

from the resource of sea fish. This good therefore has the character of an international common pool resource.

Public goods: Climate protection is an international public good for countries, since the benefits of climate protection are non-rival and non-excludable at the same time. The benefits of preventing global warming do not depend on the number of countries profiting from it. At the same time, no country can be excluded from those benefits. Contrary to the prevention of over-fishing in the more narrow sense, the reduction of by-catches can be considered an international public goods problem. While no country can be excluded from the benefits of reduced by-catches, such by-catches do not involve rivalry in consumption. This is because fishermen from different countries compete for marketable fish, not for unprofitable by-catches.

Club goods: Environmental research is a club good for countries, provided that full access to research results is restricted to the participating countries. (Otherwise, the research results would represent an international public good.) Exclusionary mechanisms may include both (international) intellectual property law and secrecy. Consumption is non-rival because environmental technology can be used to improve the environmental quality in one country, without diminishing its utility for doing the same thing in other countries.

Figure 1 Public goods theory: Four types of goods

		Excludability	
		Excludable	Non-excludable
Consumption	Rival	Private goods Timber	Common pool resources Sea fish
	Non-rival	Club goods Environmental technology	Public goods Global climate

Autonomous action vs. participation in collective action

The incentives for countries and their governments to protect environmental goods autonomously are fully intact in the case of (national) private goods, and autonomous action (Option 1) leads to a (Pareto-) efficient outcome. For all other categories of goods (i.e. non-private goods or collective goods), collective action (Option 2) is potentially more efficient than autonomous action. The reasons for this can be summarised as follows: For non-excludable goods (public goods and common pool resources), collective action is superior to autonomous action, mainly because positive externalities can be internalised, which leads to greater efficiency. To give an example, the incentives for climate protection (an international public good) are much stronger if a country acts collectively with other countries rather than autonomously. But collective action is also superior to autonomous action when there are no positive externalities, provided that there is no rivalry in consumption. This is the case for club goods. The reason for the superiority of collective action lies in the possibility of sharing the costs for a good for which the costs for an additional unit of consumption are nil (which corresponds to the definition of non-rival consumption).

Participation vs. abstention with regard to collective action

But while collective action potentially leads to a more efficient outcome with regard to non-private goods than does autonomous action, the incentives for individual countries to actually participate in collective action (as opposed to abstaining from it) are not necessarily given and may vary sharply for different types of goods. In my earlier work on legal differentiation in the context of the European Union, I have established a theory of differentiated integration, which includes a ranking of incentives for individual countries for participation in collective action, depending on the type of good involved. While limited space does not allow the full theoretical argument to be presented here, I will briefly provide a summary of the most important points.¹⁰

The theory suggests that the centripetal effects of international collective action on initially non-participating countries are strongest in the case of club goods. Private goods rank second, while public goods rank third. Centripetal effects are weakest – and centrifugal effect strongest – in the case of common pool resources.

What is the theoretical argument leading to this conclusion? The starting point is a more precise definition of centripetal effects. According to this definition, centripetal effects correspond to the likelihood that the utility of participation in collective action for initial non-participants turns positive as the number of participants increases. In his analyses of collective action problems, Thomas Schelling has used diagrams representing separately both the utility of cooperation and

10 For a more complete representation of the theory of differentiated integration, see Kölliker (2001a, 2002). The theory as originally presented takes into account six rather than four types of goods. This is because it subdivides the category "non-rival consumption" into two separate categories ("neutral" and "complementary" consumption). The two categories of goods characterised by complementary consumption, namely excludable and non-excludable network goods, are not included in this contribution. The underlying reason is that empirical examples of environmental goods with a network character are rare. In the narrow sense, they might even be non-existent.

the utility of non-cooperation (or defection) for individual actors, depending on the number of participants.¹¹ Centripetal effects can be depicted in modified "Schelling diagrams", which combine the utility curves for participation with the utility curves for non-participation (see Figure 2). This makes it possible to directly compare Option 2 and Option 3 introduced above.

Using such modified Schelling diagrams, it can be shown that the net utility of participation (and hence the centripetal effects) depends on the type of good. In order to substantiate this claim, the utility curve has to be split again into several components. On the production side, there are the costs for providing the good incurred by the individual participants. On the consumption side, there are the various effects of the good both on participants and non-participants. The effects on non-participants can be divided into positive and negative external effects (or externalities). Analogously, the effects on the participants themselves can be divided into what I call positive and negative "internal" effects.¹²

Ranking types of goods according to their centripetal effects

The development of cost curves, as well as of positive internal effects and positive external effects, depends on the type of good. This is because all of these elements are influenced by exclusiveness and rivalry in consumption.

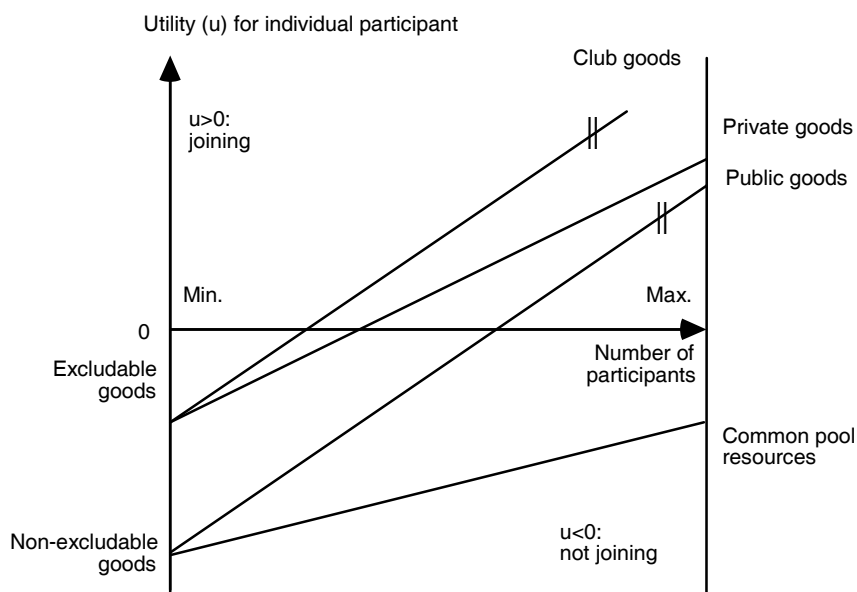
As a result, in the utility curves combining production costs, internal and external effects vary for different types of goods, which hence can be ranked according to their centripetal effects. In the following, I shall summarise why and how the position of the utility curves differs – under otherwise equal circumstances – for the four types of goods. I start with the position of club goods, continue with public goods and private goods, and conclude with common pool resources. In this rough summary, only the most important underlying assumptions are made explicit, however.¹³

11 See Schelling 1978.

12 The following argument is based on the assumption that, independently of the number of participants, the total quantity of the good provided is held constant (rather than the quantity of the good or the cost of participation for each individual participant). However, this is a presentational choice, which does not influence the conclusions with regard to the ranking of the different types of goods.

13 One assumption on which I will not further elaborate is the existence of negative external effects for all types of goods. Such negative externalities account for the fact that the net utility of participation may be positive even in the case of non-excludable goods. However, the ranking of the different types of goods with regard to their centripetal effects is independent of this assumption.

Figure 2 The net utility of participation in the provision of different types of goods



The utility curve of *club goods* slopes upwards, chiefly because an increasing number of participants makes it possible for the individual shares in the production costs to decrease. The other relevant components of the utility curve, positive internal and external effects, do not change as the number of participants increases. Positive internal effects remain stable because consumption is non-rival. And due to exclusiveness, positive external effects are nil.

The utility curve of *public goods* runs parallel to club goods, yet at a lower level. Because non-participants cannot be excluded from benefits in the case of public goods, positive external effects equal positive internal effects. This possibility of free-riding explains why the net utility of participation is lower in the case of public goods than in the case of club goods. The difference between the two curves corresponds precisely to the positive internal effects. Since for all non-rival goods positive internal effects are independent of the number of participants, the difference remains stable and the two curves run in parallel.

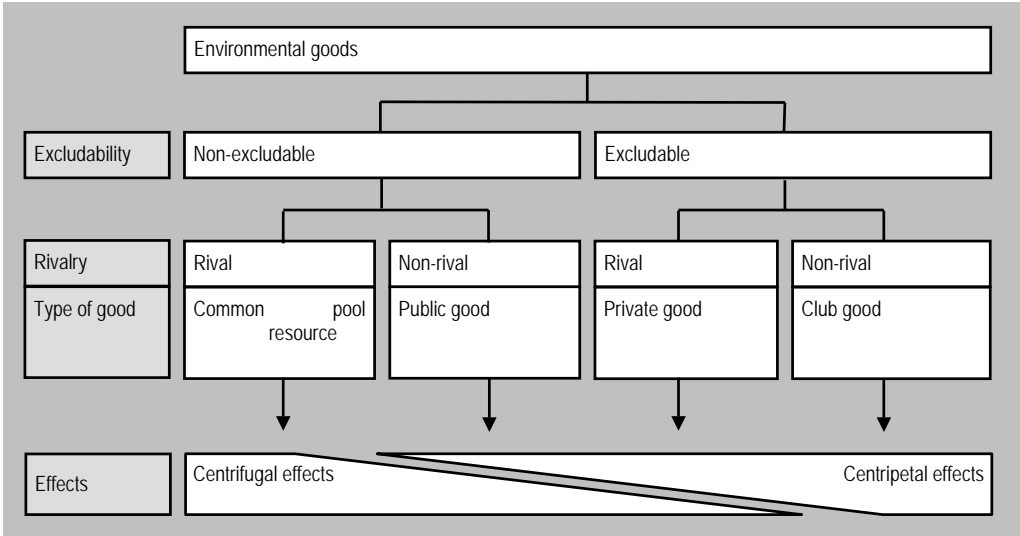
The situation is different in the case of *private goods*. Since private goods involve rivalry in consumption, positive internal effects decrease as the number of participants increases. This explains why the utility curve for private goods starts at the same point as the utility curve for club goods. As participation expands, however, positive internal effects decrease and eventually approach zero. This is why, when there is a large number of participants, the utility curve for private goods approaches the utility curve of public goods.

In principle, the net utility of participation for *common pool resources* is similar to that for public goods. Since both goods are non-exclusive, non-participants cannot be excluded from the benefits. This results in positive external effects. But the special nature of common pool resources, charac-

terised by a combination of non-exclusiveness and rivalry in consumption, leads to an effect which is often referred to as "leakage". This means that the benefits of cooperation may leak from the participants to the non-participants. Because they combine non-exclusiveness with rivalry in consumption, common pool resources involve such adverse incentive structures that collective action is mostly limited to the protection and common use of already existing resources, rather than to the active production thereof. This explains why the application of the concept of common pool resources to date has mostly been limited to natural resources rather than man-made resources. Leakage tends to lead to a situation in which, contrary to public goods, positive external effects exceed positive internal effects. This gap is small if only a few participants provide (or protect) the good, while many non-participant free-riders have a share in the leaking benefits. But if increasing participation leaves only a few non-participants to free-ride and appropriate ever bigger shares of the leaked benefits, the net utility of participation decreases more and more in comparison with public goods. Hence, the utility curve for common pool resources runs below the utility curve for public goods, and the gap between the two increases with the number of participants.

Figure 3 summarises the theoretical conclusions by representing the four types of (environmental) goods and their diverging centripetal effects in a different manner.

Figure 3 Ranking the four types of goods according to centripetal effects



The severity of collective action problems

What can be concluded from the analysis so far? The character of environmental goods in terms of public goods theory helps to understand under which circumstances countries can efficiently act alone, and under which circumstances international collective action is potentially more efficient. From the point of view of public goods theory, environmental resources that predominantly repre-

sent private goods from the perspective of the countries concerned (e.g. the soil, non-border rivers and lakes) are best protected within the framework of national environmental policies. Non-private environmental goods, by contrast, can potentially be better protected or provided by international collective action (e.g. the global climate).

The problem is, however, that collective action often involves collective action problems. The severity of collective action problems is strongly influenced by the type of the environmental good involved.¹⁴ It is closely related to the centripetal (or centrifugal) effects of different types of environmental goods. What accounts for the difficulties in organising collective action, and why do the difficulties vary across different types of collective (i.e. non-private) goods?

In the case of *excludable collective goods (club goods)*, the interests of participants and non-participants converge: participants have an incentive to let non-participants participate (for reasons of cost-sharing), while non-participants have an incentive to participate (because free-riding is impossible). The collective action problem here is thus not one of diverging interests; it is merely a matter of transaction costs for organising collective action and finding acceptable cost-sharing arrangements.

In the case of *non-excludable collective goods (common pool resources and public goods)*, collective action problems arise from diverging interests: non-participants are able to free-ride without sharing the costs of provision, while participants would like non-participants to pay an appropriate share of the provision costs. While the collective action problems with regard to the production side are similar for the two types of goods, they vary for the consumption side. The reason is that different levels of rivalry in consumption can make free-riding either harmful or harmless with regard to the benefits of the good as such (while the free-riding problem with regard to cost-sharing remains in any case!).

Free-riding in the case of rival consumption (*common pool resources*) is harmful, because goods consumed by free-riding non-participants can no longer be consumed by the participants. Countries increasing their catches of sea fish, while other countries limit their catches to prevent over-fishing, provide one example of harmful free-riding in the case of a common pool resource.

In the case of non-rival consumption (*public goods*), free-riding is harmless, because non-participants do not deprive the participants of the benefits of the good as such. Countries abstaining from the Kyoto protocol clearly free-ride on the efforts made by the participant countries. But their free-riding is not harmful in the sense of depriving the participant countries of the expected benefits of reduced greenhouse gas emissions.

14 However, while the literature on collective goods identifies the type of good as a key determinant of collective action problems, it also points to a number of other influential factors, such as the number and heterogeneity of actors (see Keohane and Ostrom 1994: 406-415). See also Holzinger (2002: 217-227).

3. Trade effects and incentives for environmental protection

The previous section has shown how the incentives of individual countries to protect environmental goods depend on the nature of these goods in terms of public goods theory. Type-of-good effects can theoretically be expected to have a strong impact on the capacity of countries to solve environmental problems either autonomously or collectively. But other influential factors exist. This section focuses on the effects on trade and competitiveness, which will then be combined with the results of the previous section.

The side-effects of environmental protection on trade

Like most other policies, environmental policies tend to have side-effects on other issue-areas. Environmental policies may regulate products and their production and thereby also affect the prices of production factors and products, as well as the conditions for selling products. To the extent that national economies open up, environmental policies also influence trade and investment flows. Environmental policies thus can have effects on the competitiveness of domestic industries. As a result, governments might also reconsider the costs and benefits of environmental policies, and hence their attitudes towards environmental protection measures. This is why it is important for environmental regulators to understand the side-effects of environmental policies on competitiveness.

Environmental protection measures harming competitiveness discourage countries from acting autonomously and exacerbate collective action problems. Some scholars and practitioners point to this mechanism to justify strong international and/or European institutions for environmental action.¹⁵ By contrast, protection measures strengthening competitiveness may encourage autonomous action and facilitate collective action. But why do some environmental policies have a negative impact on competitiveness, while others have a positive impact, or no impact at all?

To answer this question, the remainder of this section will briefly explore competitive advantages and disadvantages of environmental protection, and explain the distinction between product and process standards, which plays an important role in this context. It will then identify the potential ways that type-of-good effects and trade effects are combined, and discuss their ranking according to the severity of collective action problems. Empirical illustrations follow in the next section.

Competitive (dis-)advantages, product standards and process standards

Environmental protection results in *competitive disadvantages* for the domestic industry, if it leads to higher costs for production factors and products. Environmental regulation may concern either production processes or products. Both types of regulation impose additional costs on the products. This may negatively affect inward investment and/or demand for domestically produced goods and services. Competitive disadvantages provide individual countries with incentives to

15 See, for example, Moussis (1998: 184-185).

lower regulatory standards. Since there is a risk that different national regulations will converge towards the lowest common denominator, a "race to the bottom" may ensue. In the literature this phenomenon is also referred to as the "Delaware effect".¹⁶

But the literature also points out that the opposite phenomenon is equally possible. Environmental regulation may result in *competitive advantages* for the domestic industry. This is the case if environmental regulation favours domestic producers by imposing higher costs of compliance on imported goods, thus creating a technical barrier to trade. The underlying assumption here is that it is sometimes easier for domestic producers to comply with specific environmental rules than it is for non-domestic producers. If environmental regulation leads to competitive advantages for the domestic economy of one country, other countries are likely to follow. The resulting "race to the top" with regard to environmental standards has also been referred to as the "California effect".¹⁷

How can competitive advantages and disadvantages be explained at a deeper level? The literature has identified the distinction between *product standards* and *process standards* as a crucial variable. While it predicts a race to the bottom in the case of standards regulating production processes, it predicts a race to the top in the case of product standards. The enforcement of product standards is relatively easy both for domestic and imported products. But as argued before, compliance may impose disproportionate costs on non-domestic producers and therefore lead to competitive advantages for the domestic industry. Process standards, by contrast, can only be directly enforced on domestic producers. Non-domestic producers are not subject to the direct enforcement of process standards. However, these standards may be indirectly enforced by banning imports of goods produced without respect for process standards.¹⁸ Yet it is more difficult to monitor the compliance of non-domestic producers than that of domestic producers. This may explain why process standards are more likely than product standards to lead to competitive disadvantages for the domestic industry. Nevertheless, some examples of process standards involving competitive advantages exist. The tuna-dolphin case, discussed further below, is a case in point.

16 Due to its business-friendly corporate law, Delaware has managed to attract many major US firms, thereby contributing to a regulatory race to the bottom among US states. This specific example of regulatory competition, discussed by Cary (1974), was at the origin of the notion "Delaware effect".

17 For a brief summary of the background of the California effect, see Vogel (1997: 561-563). In this context it should be noted that international convergence at a high level of environmental protection may also have roots other than barriers to trade for "dirty" products. It is often argued, for example, that multinational firms apply uniform standards higher than the locally required level, for reasons which are related to economies of scale rather than market access.

18 Frank Wijen has pointed out that the extraterritorial enforcement of environmental standards can also be achieved by softer means, such as certification and labelling. The effectiveness of those instruments, it must be specified, relies on a number of conditions. If one does not assume altruistic consumers, green labels are only effective if they signal a private benefit for individual consumers (for example, with regard to their personal health). This is generally not the case for process standard labels. Exceptions include labels that simultaneously provide information on both production processes and products (for example, in the case of genetically modified food). Problems regarding information and trust come on top of the incentive problems: consumers must know the relevant green labels, and trust the information they convey.

Combining type-of-good and trade effects and ranking collective action problems

It has been argued that both the type of environmental good to be protected, and the side-effects of environmental protection measures on trade are important determinants of countries' incentives to engage in environmental protection, either alone or collectively. *Combining the two factors* should lead to a more comprehensive understanding of the problems of both autonomous national action and collective international action. Figure 4 shows all possible combinations of type-of-good effects and trade effects. It also provides empirical examples of each combination, which will be discussed in the following section. In the figure, the four types of goods are ranked according to their centripetal effects: these are very strong in the case of club goods (+), less strong in the case of private goods (=), weak in the case of public goods (-), and very weak in the case of common pool resources (- -). Trade effects are ranked according to the incentives for protecting the environment, either unilaterally or in a group (as opposed to remaining inactive). Competitive advantages provide positive incentives (+) for environmental action; competitive disadvantages provide negative incentives (-); and competitive neutrality leaves incentives unchanged (=). The combination of four different types of goods and three different kinds of trade effects leads to twelve possible cases. The most difficult case results if the protection of an international common pool resource leads to competitive disadvantages (Case 1: - \ - -). Collective action problems become less severe as we move downwards and to the right. The easiest case for collective action combines club goods with competitive advantages (Case 12: + \ +).

While every move to the right and/or downwards means that the collective action problem becomes less severe, the exact *ranking of the twelve possible combinations* depends on the relative strength of type-of-good effects and trade effects. If trade effects cannot alter the order of the ranking resulting from the type-of-good effects, they can be considered dominant. To give an example, if common pool resources lead to a more severe collective action problem than public goods, no matter whether the competitive side-effects in the concrete case are positive, negative or neutral, one can consider the type-of-good effects as dominant. But the opposite case, characterised by the dominance of trade effects, is also possible. In this case, type-of-good effects cannot alter the basic ranking resulting from the trade effects: No matter which type of good is involved, it always matters more whether the competitive side-effects of environmental protection are positive, negative or neutral. In between these two extreme cases, which are characterised by the dominance of either trade effects or type-of-good effects, there are intermediary cases in which neither of the two effects is dominant in the sense of the definition that has been offered. Overall, the assumption of dominant type-of-good effects seems empirically somewhat more plausible than the assumption of dominant trade effects. The numbering used in Figure 4 therefore can but does not have to be interpreted as a ranking of the severity of collective action problems.¹⁹

19 If dominant type-of-good effects are assumed, the ranking of the severity of collective action problems (from most severe to least severe) follows the numbering of the twelve cases as indicated in Figure 4: 1>2>3>4>5>6>7>8>9>10>11>12. If dominant trade effects are assumed, the ranking of the severity of collective action problems of the twelve cases is: 1>4>7>10>2>5>8>11>3>6>9>12.

Figure 4 The severity of collective action problems

		Environmental goods			
		Non-excludable		Excludable	
		Rival	Non-rival	Rival	Non-rival
		Common pool resource	Public good	Private good	Club good
		(--)	(-)	(=)	(+)
Trade effects	Competitive disadvantages (-)	1: - \ - - Sea fish (I)	4: - \ - Kyoto protocol (I)	7: - \ = Sustainable timber harvesting	10: - \ + Environmental research (I)
	Competitive neutrality (=)	2: = \ - - Sea fish (II)	5: = \ - Kyoto protocol (II)	8: = \ = Domestic waste collection	11: = \ + Environmental research (II)
	Competitive advantages (+)	3: + \ - - Sea fish (III)	6: + \ - Tuna-Dolphin case	9: + \ = Hormone ban	12: + \ + Environmental research (III)

4. Empirical illustrations for specific combinations of goods and trade effects

In order to demonstrate how the four types of goods combine with positive, negative and neutral trade effects, I will build upon the examples already used to illustrate different types of environmental goods. In some of these empirical examples, the competitive effects depend on the sub-field or the specific aspect under inquiry. This is why the issues of high sea fisheries, the Kyoto protocol, and environmental research are split into two or three cases, representing different aspects with different competitive effects. The empirical illustrations include a number of cases which have received a high level of public attention, and therefore represent convenient points of reference for a discussion of type-of-good and trade effects on national incentives for environmental protection. Since the empirical cases are used to illustrate rather than test the theoretical claims on the severity of collective action problems, more rigorous selection criteria are not necessarily required.

Common pool resources

Common pool resource plus competitive disadvantages – High sea fisheries (I): The most severe collective action problems arise when countries need to protect an international common pool resource and when the measures to protect this environmental good lead to competitive disadvantages for the domestic industry (Case 1: $- \setminus - -$). This may happen if countries try to prevent the over-fishing of sea fish that are traded internationally. High sea fisheries involve a common pool resource problem, which already in itself leads to grave collective action problems. Free trade in fish exacerbates these collective action problems and further reduces the incentives for acting autonomously. This is because measures against over-fishing may increase the production costs for participating countries in comparison to non-participating countries. Under the mentioned conditions of open access (non-excludability) and free trade, countries trying to prevent over-fishing are thus doubly penalised: not only do they catch less fish than other countries, but higher production costs might also make their products less competitive. A number of international fisheries commissions play an important role in the difficult task of managing international fisheries.²⁰ Some international common pool resource problems related to fisheries were solved by the adoption of a 200-nautical-mile exclusive economic zone in the framework of the international law of the sea in 1977. This step made "national" private goods out of what were previously international common pool resources.

Common pool resource plus competitive neutrality – High sea fisheries (II): Collective action problems are somewhat less severe, but still serious, if the protection of common pool resources does not entail any trade effects (Case 2: $= \setminus - -$). This is the case if countries act to prevent the over-fishing of sea fish that is not traded internationally (be it for the lack of free trade arrangements or for other reasons). The argument also applies to whaling. The prohibition of the trade of whales makes it less painful for countries to unilaterally restrict or stop whaling.

Common pool resource plus competitive advantages – High sea fisheries (III): If the protection of a common pool resource goes hand in hand with competitive advantages, the incentives for autonomous action again increase (Case 3: $+ \setminus - -$). With regard to high sea fisheries, this may occur if countries combine rules to prevent over-fishing with mechanisms to shield their domestic fishing industry from foreign competitors who do not respect such rules. The result is a competitive advantage for domestic fishermen. This said, it must not be forgotten that the common pool resource problems as such continue to exist and to make autonomous action relatively unattractive.

20 Peterson (in Haas et al. 1993: 249-305) provides an overview of the management of fisheries through international commissions.

Public goods

Public good plus competitive disadvantages – Climate protection (I): Difficult though they might be, the collective action problems in the context of the Kyoto protocol are less severe than those of high sea fisheries in at least one respect.²¹ As already argued, the potential benefits of the Kyoto protocol in terms of curbing global warming are non-rival rather than rival. Since those benefits are also non-excludable, the Kyoto protocol represents an international public good. Measures to save carbon energy, including CO₂ taxes and participation in emissions trading schemes, are often expensive. As a result, energy-intensive industries exposed to international competition fear negative effects.²² In this regard, the Kyoto protocol combines a public good with competitive disadvantages (Case 4: – \ –). It hence poses collective action problems which are still severe – although less so than the previously discussed combination of common pool resources and competitive disadvantages.

Public good plus competitive neutrality – Climate protection (II): But the Kyoto protocol may also be effective without jeopardising national competitiveness. This is the case whenever the Kyoto protocol affects households and industries protected from international competition. In such cases, the Kyoto protocol represents a public good combined with competitive neutrality (Case 5: = \ –). Accordingly, the incentives for autonomous action are slightly better than in the preceding case. The exemptions national climate protection legislation occasionally provides for energy-intensive sectors exposed to international competition underline the practical relevance of this distinction.

Public good plus competitive advantages – The US dolphin protection standards: "In eastern tropical areas of the Pacific Ocean, schools of yellowfin tuna often swim beneath schools of dolphins. When tuna is harvested with purse seine nets, dolphins are trapped in the nets. They often die unless they are released." This is how the World Trade Organization (WTO) describes the problem of by-catches that was at the centre of a controversial GATT panel report involving a trade dispute between the United States (as the defendant) and Mexico.²³ We will come back to this issue below. Just like the prevention of global warming, the reduction of by-catches can be characterised as an international public good. But while the implementation of the Kyoto protocol is likely to go hand in hand with competitive disadvantages in some cases, and competitive neutrality in others, dolphin protection in the framework of the US Marine Mammal Protection Act is likely to produce competitive advantages for the domestic industry (Case 6: + \ –). Since the Marine Mammal Protection Act sets process rather than product standards, its existence stands in contradiction to the race-to-the-bottom thesis for process standards.²⁴ According to the Marine Mammal Protection Act, the domestic American fishing fleet must comply with certain dolphin

21 On the negotiation and substance of the Kyoto protocol, see Oberthür and Ott (1999).

22 Brack et al. (2000) comprehensively analyse the potential trade effects of climate protection policies. The European Commission (2001: 3) estimates that the overall compliance costs of the Kyoto protocol could range between 0.06 and 0.30 percent of EU GDP.

23 See Beyond the agreements: The tuna-dolphin dispute, http://www.wto.org/english/thewto_e/whatis_e/tif_e/bey5_e.htm (visited in July 2003). See also Goode (1998: 292-294). An overview and related documents on the tuna-dolphin case can be found at <http://www.oceanlaw.net/netpath/page4-byc1.htm> (visited in July 2003).

24 I owe this point to Frank Wijen.

protection standards. This measure alone would expose the American fishing industry to competitive disadvantages with regard to their foreign competitors. As a result, the US would be subject to race-to-the-bottom pressures. In order to prevent this from happening, the Marine Mammal Protection Act protects the domestic fishing industry from such competition by allowing tuna imports exclusively from countries complying with US dolphin protection standards. Consequently, the potential competitive disadvantages for the domestic industry are likely to be turned into competitive advantages. While the public good problem as such is not eliminated, the incentives for autonomous environmental protection are better than in any of the previously discussed cases of public goods and common pool resources.

Private goods

Private good plus competitive disadvantages – Sustainable timber harvesting: I have argued that timber has the character of a private good for countries. As in the case of sea fish, countries generally have an interest in harvesting timber in a sustainable manner. But the difference is that timber has the character of a "national" private good. Harvesting timber as such therefore does not lead to an international collective action problem with regard to the type of good it represents. Yet to the extent to which sustainable harvesting methods lead to higher production costs for the domestic industry, such methods are likely to be subject to competitive pressures from timber-producing countries with lower standards. Such race-to-the-bottom pressures reduce national incentives to autonomously enforce sustainable harvesting methods. They can be countered by international standards for sustainable timber harvesting. The timber case illustrates a widespread fallacy, which considers collective action unnecessary as long as the environmental good concerned represents a purely "national" private good. If the protection of private goods leads to competitive disadvantages, the incentives for effective autonomous action may be insufficient (Case 7: – \ =).²⁵

Private good plus competitive neutrality – Domestic waste collection: Although in different ways than timber, domestic waste collection also represents a private good for countries. Many countries impose standards with regard to waste collection on households, such as requirements to separate different categories of waste. Such standards may be a burden for households, yet they do not affect trade. Consequently, they neither result in competitive advantages nor disadvantages for the domestic industry (Case 8: = \ =).

Private good plus competitive advantages – The hormone ban case: The EU ban on meat hormones constitutes a private good from the perspective of the EU.²⁶ The import ban on hormone meat turns a potential competitive disadvantage for European farmers into a competitive advantage.

25 See Bourke (1995) (also published under <http://www.fao.org/docrep/v7850e/v7850e03.htm>; visited in July 2003). See also Barbier (1995).

26 Some background information on the EU and meat hormones has been published at http://europa.eu.int/comm/food/fs/him/him_index_en.html (visited in July 2003).

tage (Case 9: + \ =). Since the hormone ban combines the protection of a private good with competitive advantages, the incentives for the EU to maintain this measure remain intact.²⁷

Club goods

Club good plus competitive disadvantages – Environmental research (I): To the extent that environmental research represents a club good for the countries involved, the incentives for countries to participate in international environmental research programs are intact and no serious collective action problem exists. However, there may be cases in which environmental research, representing a club good, brings negative trade effects for the domestic industry (Case 10: – \ +). This is the case if environmental research leads to the substitution of products that the domestic industry is specialized in, hence removing a comparative advantage.²⁸ An oil-producing and oil-exporting country probably has fewer incentives to promote research into alternative energy sources than a country depending on oil imports.

Club good plus competitive neutrality – Environmental research (II): Environmental research does not always involve trade effects (Case 11: = \ +). Trade effects are absent if the cleaner products resulting from environmental research are not internationally traded, or if environmental research is not strictly product related in the first place. The latter may, for example, be the case if research is directed at safeguarding plants and animals that have no immediate value as tradable goods.

Club good plus competitive advantages – Environmental research (III): The incentives to produce environmental research results are, of course, even reinforced by positive competitive effects. Countries promoting new environmental technologies may provide their domestic industries competitive advantages (Case 12: + \ +). This is the case when countries lock out dirty products from the domestic market, while helping the domestic industry to establish a monopoly in clean products. In contrast to other cases that have been discussed, these competitive advantages do not result from barriers to imports alone. Rather, they result from combining environmental standards with the promotion of new technologies. Since club goods encourage collective action without involving major collective action problems, it could be expected that international cooperation with regard to environmental research might generally develop more easily than cooperation involving other types of goods. There might indeed be some evidence that environmental research cooperation often emerges at an early stage and without major difficulties. One example might be the Convention on Long-range Transboundary Air Pollution (LRTAP), which was signed in 1979

27 As Konrad von Moltke has correctly observed, the EU hormone ban represents primarily a health issue rather than an environmental issue. However, health issues are often interconnected with environmental issues. While pollution is an environmental issue often closely related to health issues, food safety is a health issue often closely related to environmental issues. In the context of this contribution, I therefore consider the hormone ban case as an issue with strong environmental policy concerns in the wider sense.

28 Frank Maier-Rigaud has drawn my attention to the substitution effects of environmental protection measures (including environmental research).

by thirty-four European governments and the European Community. An important early objective of the convention was the coordination of national research programs.²⁹

5. Implications for globalisation and national environmental policies

The analysis so far has shown how the incentives of countries to protect environmental goods either autonomously or collectively are influenced both by the nature of these goods in terms of public goods theory and by the side-effects of environmental protection measures on trade. I will now turn towards some related questions and explore to what extent they might be answered on the basis of the previous analysis. Three overlapping questions shall be addressed: First, how does globalisation affect environmental protection? Second, how can the effectiveness of domestic environmental policies be increased? And third, what are the scope and limits of flexible, voluntary and non-binding international environmental agreements?

How does globalisation affect environmental protection?

In order to evaluate the effect of globalisation on environmental protection, one must distinguish between economic globalisation, on the one hand, and its driving forces, on the other.³⁰ According to an often used and simple definition, globalisation is characterised by an accelerated increase in the mobility of products and production factors. Technology and international economic law are identified as two main driving forces of globalisation. The focus here will be on international economic law, which promotes globalisation through "negative integration". Negative integration, often in the form of free trade agreements, removes barriers to trade resulting from national legislation, such as tariffs, quotas, technical barriers to trade, and discriminatory taxes.

In the wake of this conceptual clarification, we can now focus on the effects of globalisation on environmental protection. Globalisation in the form of growing trade flows reinforces the competitive effects of environmental regulation. These effects of globalisation may go in both directions: competitive advantages that result from environmental protection measures may make autonomous national policies more attractive, while competitive disadvantages may make autonomous environmental protection measures less attractive. Hence, while globalisation may make national environmental policies more attractive in some cases, and less attractive in others, it does not necessarily affect the average level of environmental protection in any given country.

Yet what has been neglected so far is the effect of international economic law, one of the driving forces of globalisation. International free trade agreements prohibit or limit protectionist measures. They thereby may also restrict the use of environmental protection measures which create competitive advantages for the domestic industry, and competitive disadvantages for foreign competi-

29 See Haas et al. (1993: 87-90).

30 In the following, the term "globalisation" shall essentially mean "economic globalisation". It therefore does not cover political, cultural, or social globalisation, whatever the precise definition of those concepts might be.

tors.³¹ Hence, whilst trade flows themselves do not necessarily affect the average level of environmental protection afforded by individual countries, trade agreements may introduce a bias. The combined impact of international trade and international free trade agreements may hence negatively affect the overall incentives and possibilities of countries to protect the environment autonomously: while trade itself may limit the incentives countries have for acting (in the case of environmental measures generating competitive disadvantages), trade agreements may prohibit action where countries still have incentives to act (i.e. when environmental measures create competitive advantages). The GATT panel report on the tuna-dolphin dispute may illustrate this. The panel found that the US dolphin protection measures violated GATT rules.³² The bias against national environmental policies that results from free trade agreements may be reduced by the inclusion of environmental safeguard clauses into free trade agreements, a possibility which will be further explored below.

How can the effectiveness of domestic environmental policies be increased?

This leads to the second and related question of how national governments facing the effects of globalisation can increase the effectiveness of domestic environmental policies. Four options shall be briefly discussed. The first two options concern the international legal framework, the third concerns policy choices at the national level, and the fourth concerns the information available to actors. In game theoretical terms, the outcome with regard to the environment can be improved by changing the (international) rules of the game, by intelligent choices of (national) strategies, and by providing specific information to the players. It might, at first sight, appear paradoxical that increasing the scope for effective national environmental policy as outlined in the first two options should start with the international legal framework and hence with international collective action. In both cases, however, amending the international legal framework – or the application thereof – aims at restoring national sovereignty concerning environmental policies in areas where international trade law may have limited it excessively.

The first option is the *better enforcement and reinforcement of environmental safeguard clauses* provided by international economic law. Such safeguard clauses allow countries to take environmental protection measures despite their potential effect as barriers to trade, which might result in competitive advantages for the domestic industry.³³ But at the same time, environmental safeguard clauses also require national measures that might constitute a barrier to trade to be motivated by environmental concerns, not by protectionism. In reality, it is often difficult to prove either of the two. To the extent that environmental safeguard clauses are subject to judicial or quasi-judicial review (as in the EU and the WTO respectively), international courts therefore have a very significant role to play in the application of such safeguard clauses.

31 See Oberthür and Ott (1999: 279-282).

32 See Goode (1998: 292-294). An overview and related documents on the tuna-dolphin case can be found at <http://www.oceanlaw.net/netpath/page4-byc1.htm> (visited in July 2003).

33 Examples of such clauses include Articles 30(4), 30(5), 95(4), 95(5) and 176 of the EC Treaty, as well as Article XX of the GATT.

The second option is to *make sure that international trade law does not prevent individual countries from adopting measures implementing international environmental agreements*. Critics assert that the current international system in fact privileges international economic law over international environmental law. An important reason for this is that international economic law can be more easily enforced, thanks to traditional unilateral instruments such as retaliation in trade policy, and new multilateral instruments such as international courts. While countries can often break international environmental agreements without facing major consequences, breaking international trade agreements tends to be punished more harshly. If international environmental law conflicts with international trade law, it is only logical that countries would often disregard the former rather than the latter. It is not yet clear what the best way is to prevent or solve conflicts between international trade law and international environmental law. The international system is predominantly organised according to functional principles, and coordination between the different functional international organisations is weak. The single institutional framework provided by the United Nations is far too weak, not only with respect to the member states, but also with regard to its functional components. The situation is different in the EU, with its much stronger single institutional framework.³⁴ The competences of the European Commission, the European Parliament, and the European Court of Justice cover nearly all aspects of the European Community pillar of the EU, and increasingly also parts of the other two pillars (foreign policy and the fight against crime). At the international level, the only realistic, albeit imperfect, solution seems to be to integrate environmental concerns more strongly into the jurisdiction of the WTO.

The third option is for national environmental policies to circumvent the problems posed by international trade law. Individual countries could simply accept the modified action space as given and *refocus their attention on environmental problems and environmental protection measures with few or no competitive effects*. Specific environmental goods can often be protected by different measures. If globalisation renders the application of particular instruments more difficult (either because competitive disadvantages make them unattractive, or because competitive advantages make them illegal in terms of international trade law), it may be possible to switch to measures which are either unaffected or even encouraged by globalisation.³⁵ To give an example, when implementing the Kyoto protocol, governments might focus their efforts on measures minimising competitive disadvantages. They might, for instance, impose limits on CO₂ emissions by households (heating and private cars) and industries that are not exposed to international competition. In line with the "polluter pays" principle, which is also enshrined in EU law,³⁶ the costs of compliance would be borne by the households and industries concerned. In sectors exposed to international competition, limiting emissions might lead to competitive disadvantages if the polluter paid. But to the extent that polluters escape the costs for reducing emissions, they will not be subject to competitive disadvantages. This is why subsidies might be the only viable way to cut emissions unilaterally in energy-intensive, export-oriented industries. However, direct subsidies (e.g. for

34 Article 3 of the EU Treaty provides: "The Union shall be served by a single institutional framework which shall ensure the consistency and the continuity of the activities carried out [...]."

35 Verweij (2001) has suggested such a strategy for the problem of global warming.

36 See Article 174(2) of the EC Treaty.

emissions-reducing equipment) might potentially run into the barriers set up by EU and international competition law.³⁷ Indirect subsidies (e.g. through publicly funded research providing clean technology) are somewhat less problematic in this respect.

A fourth option for individual countries is to *ignore the problems globalisation apparently causes for certain environmental policies*, arguing that such problems are relatively minor. Although this proposal sounds extremely trivial in theory, it might be of some significance in practice. Competitive disadvantages are an often-used argument against national environmental policies. It is not unreasonable to assume that such arguments, which assume strong regulatory competition, sometimes prevent environmental measures from being taken. However, there is some literature which points out that, in the final analysis, the competitive effects of environmental regulation may often not be very significant.³⁸ To the extent that this is true, governments might increase their environmental action space by presenting research and disseminating information which reduces the gap between public perceptions and the reality with regard to regulatory competition in the environmental field.

What are the scope and limits of flexible and non-binding environmental agreements?

Within the EU, and not only with regard to environmental policies, there is a discussion of "softer" forms of regulation with more respect for national sovereignty and autonomy. Such softer forms of regulation are characterised by their flexible, voluntary and non-binding nature. In this context, "flexible" means that not all member states need to participate, "voluntary" means that no participating country can be forced to act against its will, and that decision-making must therefore be unanimous, and "non-binding" means that countries are not actually legally required to implement decisions, while Community institutions are neither mandated nor entitled to enforce them.³⁹

The effectiveness of flexible, voluntary and non-binding EU measures is influenced by their centripetal effects. Such measures therefore seem unfit for environmental policies involving centrifugal rather than centripetal effects. They should therefore not be relied upon if environmental problems involve (non-excludable) international public goods or common pool resources, or if they go hand in hand with competitive disadvantages.⁴⁰ Flexible, voluntary, and non-binding measures are

37 Article 8.2(c) of the WTO Agreement on Subsidies and Countervailing Measures allows "assistance to promote adaptation of existing facilities to new environmental requirements imposed by law and/or regulations which result in greater constraints and financial burden on firms." However, national subsidies can be challenged if they do not conform to a number of fairly restrictive conditions. For instance, the subsidy must be "limited to 20 per cent of the cost of adaptation." The WTO has published the agreement under http://www.wto.org/english/docs_e/legal_e/24-scm.pdf (visited in November 2003). See in this context also Kölliker 2001b.

38 See for instance Vogel (1997: 558-560) and Faure (in Esty and Gerardin 2001: 272). At a more general level, Krugman (1994) has warned of what he portrayed as "a dangerous obsession" with international competitiveness.

39 "Flexibility" might also refer to the differentiated implementation of EU directives. With regard to such flexibility in the field of environmental policies, see Scott (in de Búrca and Scott 2000: 260-262).

40 In her article on flexible integration and environmental policy in the EU, Müller-Brandeck-Bocquet (1997: 299) considers competitive advantages for the participants in flexible arrangements among willing EU member states as a *conditio sine qua non*. In this context, it is interesting to note that the Article 43 of the EU Treaty

likely to be more appropriate in the case of (excludable) club goods, and if positive trade effects can be expected.⁴¹

6. Summary and conclusions

This article aims at explaining how globalisation modifies the incentives of countries and their governments to protect environmental goods autonomously or in cooperation with other countries. It thereby helps in identifying the possibilities and limits of national environmental policy, as well as the necessity for and difficulties of international environmental agreements, under the condition of globalisation. The article is largely theoretical in character, but empirical examples illustrate the outlined mechanisms.

Type-of-good effects

In a first step, the focus is on the protection of environmental goods as such, while side-effects are not taken into consideration. The analysis applies public goods theory to collective action among countries at the international level. According to the theory of public goods, environmental goods that have the character of private goods from the perspective of countries are best protected through national environmental policies. For all other categories of goods, international collective action may potentially lead to better results. However, different types of non-private (or collective) goods involve different kinds of collective action problems. The success of collective action often depends on the attractiveness of international environmental agreements for initially non-participating countries. As I have shown elsewhere (Kölliker 2001a, 2002), different types of goods can be ranked according to their centripetal effects. Club goods involve the strongest centripetal effects, followed by private goods and public goods. Common pool resources rank at the bottom of the list. So far, the incentives for autonomous and collective action are given by the nature of the environmental problem. The boundary of the collective action problem is given by the boundary of the environmental good. A "national" private good requires autonomous domestic action, while a "international" non-private good requires collective international action.

sets the condition that closer cooperation among member states "does not constitute a barrier to or a discrimination in trade between the Member States and does not distort competition between them".

41 This paragraph refers to collective action problems among countries rather than non-state actors. It is a well-known fact that voluntary environmental agreements among non-state actors or between non-state actors and the state often work well under the shadow of hierarchy. The latter means that states demonstrate their readiness to impose effective environmental protection should voluntary agreements fail to produce the desired results. Grepperud and Pedersen (2003) have presented a formal model of voluntary environmental agreements.

Trade effects

A second step analyses the side-effects of environmental protection on trade and the feedback effects of such trade effects on environmental protection. If trade effects are taken into account, the incentives of countries and their governments to protect environmental goods may change significantly. Other things being equal, individual countries are more willing to adopt environmental protection measures if those measures lead to competitive advantages, and they are less willing if they lead to competitive disadvantages. Competitive advantages thus encourage autonomous action and facilitate collective action, while competitive disadvantages discourage autonomous action and exacerbate collective action problems.

The geographical scope of the international collective action problem

It is important to note that the geographical scope of the environmental goods to be protected and geographical scope of the trade effects resulting from environmental protection do not necessarily coincide. In fact, the two are basically independent from each other and hence can normally be expected to diverge. It can be concluded that the need for international collective action is not only determined by the geographical boundaries of the environmental goods concerned, but also by the geographical boundaries of the markets for the products affected by environmental protection measures. Taking into account the trade effects of environmental protection thus prevents a naïve application of the subsidiarity principle, which would focus exclusively on the nature of the environmental good. If environmental protection affects trade, the geographical scope of an environmental problem is twofold: On one hand, it coincides with the geographical scope of the natural resource concerned. On the other hand, the scope of the markets for the affected products is equally relevant. If no traded goods are affected, the scope of the environmental problem is confined to the geographical scope of the environmental good.

The impact of globalisation

Globalisation is characterised by the accelerated increase in the mobility of products and production factors. Apart from new technologies, globalisation is also driven by international free trade agreements. Increasing trade flows and stronger international free trade commitments influence environmental policies in two separate ways. Increasing trade flows reinforce both the positive and negative competitive effects of environmental protection measures. This leads to increased incentives for environmental protection in some cases, and to lower incentives in other cases. While globalisation thus affects many environmental protection measures either positively or negatively, the average level of environmental protection need not necessarily be negatively affected. This conclusion must be modified if international free trade commitments are taken into account. Environmental policies creating competitive advantages face the barrier of international economic law, which restricts policies with protectionist effects. Free trade agreements restrict the ability of countries to adopt environmental protection measures that lead to competitive advantages for the domestic industry. This tendency exists despite safeguard clauses in some agree-

ments, such as, for example, in the EC Treaty. It leads to a bias, whereby the overall effect of globalisation on environmental protection may become negative.

The effectiveness of domestic environmental policy

Against this backdrop, four options for enlarging the action space of individual countries and their governments have been discussed. The four options concern the relationship between international economic law and national environmental law, the relationship between international economic law and international environmental law, the national strategies for environmental protection, and the knowledge on the basis of which countries make decisions. More specifically, the four options aim at (1) strengthening safeguard clauses that allow national environmental law exceptions to international economic law; (2) ending the de facto hierarchy of international economic law over international environmental law; (3) circumventing problems created by globalisation by focusing on environmental protection measures without negative competitive effects; and (4) generating and disseminating information on the actual extent of the competitive disadvantages of environmental protection measures, which tend to be overestimated.

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