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Are international environmental agreements enforceable? implications for institutional design

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Abstract Over the past several decades, European international environmental institutions have evolved, heeding institutionalist calls for stronger institutions backed by sanctioning and dispute settlement mechanisms. This apparent increase in institutional strength has led to a corresponding increase of the behavioral effectiveness, or active compliance management of institutions as observed in the incidence of arbitral tribunal decisions. However, upon closer examination, it is apparent that this behavioral effectiveness has not been exclusively due to provisions for arbitral tribunal decisions within international environmental agreements. Rather, the incidence and enforcement of these arbitral tribunal decisions is linked to the institutional design of the enforcement mechanisms. Most international environmental agreements rely on parties to raise disputes and enforce commitments, causing individual countries to bear the cost of enforcement. In addition, bringing a dispute to an arbitral tribunal requires the accordance of the parties to the dispute. In contrast, the European Court of Justice allows for enforcement to originate from a strong central authority and for the cases of arbitration to be filed unilaterally. International environmental agreements that have been joined by the European Community and have a provision for an arbitral tribunal have stronger enforcement mechanisms, are more likely to result in enforcement action, and are more effective in generating behavioral change.

Keywords Arbitral tribunals · International environmental agreements · International environmental law · European Court of Justice · International regimes

1 Introduction

Over the last few decades, regional and global environmental problems have been increasingly addressed through international institutions. One count estimates that there are, or have been over 700 multilateral environmental agreements and more than 1000

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bilateral environmental agreements (Mitchell 2003). Additionally there have been over 155 agreements registered with the United Nations since 1921, and over 90 International Environmental Agreements (IEAs) have been negotiated since the 1972 UN Conference on the Human Environment in Stockholm (Chasek 2001). Similarly, there has been a trend towards an increasing number of IEAs in Europe over the past several decades (Ringquist et al. 2005). These agreements are generally negotiated outside of European Union framework, but may be later included and enforced by European Union law. These agreements seek to protect and improve the environment by inducing cooperation and compliance with institutional rules and norms. While cooperation in an anarchic global environment can be difficult, many international relations theorists have argued that under certain conditions, cooperation can be achieved (Barrett 1994; Keohane 1984; Krasner 1983; Snidal 1993).

Setting the age-old debate between neo-realists and neo-liberals aside, some IEAs have been viewed as more effective than others; similarly, wide variation in institutional designs has been observed. Increasingly, the focus for institutionalist scholars has shifted from whether or not institutions can be effective[1] to what institutional characteristics allow them to be most effective (Botcheva and Martin 2001; Ostrom 2005; Ringquist et al. 2005; Zürn 1998).

In addition to the observed abundance of IEAs, an increase in the perceived strength, increased legalization, and movement towards "hard law" has been observed by a number of scholars (Goldstein et al. 2000b). The movement towards stronger institutions has been accompanied by a corresponding proliferation of dispute resolution mechanisms in IEAs to the extent that most recent European IEAs contain provisions for dispute settlement by third parties, most typically in the form of arbitral tribunals. For example, the Agreement on the International Commission for Protection of the Rhine Against Chemical Pollution (hereinafter: the Rhine Convention) contains the following provision: "Any dispute between the Contracting Parties as to the interpretation or application of this Convention that cannot be resolved through negotiation shall, unless the parties to the dispute decide otherwise, be submitted at the request of one of the parties to arbitration". The Agreement further contains specific detailed procedures for arbitration (Data from the Multilaterals Project 2010). Typically, arbitral tribunals contain three arbitrators: each party to the dispute names one arbitrator, and these two arbitrators decide on a third, who becomes the president of the tribunal. If three arbiters are not named within several months, a third party, usually a neutral body, will appoint arbitrators to the remaining slots. While many European IEAs contain similar provisions, little is known about the implications of these provisions for IEA effectiveness.

Due to the difficulties of measuring the environmental effectiveness of a large number of treaties, this study seeks to explain the behavioral effectiveness of European IEAs as a function of their institutional design. Specifically, I compare the strength of enforcement mechanisms in IEAs with outcomes of behavioral effectiveness as observed through enforcement actions—measured by the number of arbitral tribunal decisions. Stronger enforcement mechanisms should lead to an increase in the number arbitral tribunal decisions.

In addition, I seek to provide a better descriptive understanding of arbitral tribunals, international environmental agreements, and the types of cases that have been resolved through the use of these tribunals.

[1] Institutional effectiveness has a variety of definitions including participation, compliance, behavioral, and environmental effectiveness. These competing/complementary definitions will be discussed in detail below.

In order to demonstrate the causal relationship between institutional design and behavioral effectiveness, I will first define behavioral effectiveness in relation to other definitions of effectiveness. Second, I will draw upon existing theory regarding the enforcement of institutions and discuss arbitral tribunal decisions as a measurement of behavioral effectiveness. Third, I will present my data and model that posits the number of arbitral tribunal decisions as a function of the strength of enforcement mechanisms and I will characterize the incidence of arbitral tribunal decisions. Fourth, I will explain the incidence of arbitral tribunal decisions as a function of the institutional design of the European IEAs. I conclude by considering the implications and limitations of my results, and directions for future research.

2 Defining behavioral effectiveness

2.1 Perspectives of institutional effectiveness

While it has become increasingly important for scholars and policy practitioners to distinguish among the "effectiveness" of institutions in order to design more successful institutions, there has been little accordance regarding the definition of effectiveness. While Young has suggested a comprehensive definition of effectiveness (Young 1997, 1999), encompassing several dimensions of effectiveness including environmental improvement, efficiency, fairness, and change in political behavior, it is helpful to present perspectives of institutional effectiveness within a context of competing perspectives of institutional goals and measurement.

Some scholars see regime goals as changing the nature of the international political environment (Young 1997, 1999). By bringing nations into the global political community, states will change behavior in order to comply with international norms. In contrast, some scholars have presented IEA goals as specific attempts to solve an environmental problem (Helm and Sprinz 2000; Miles et al. 2002; Ringquist et al. 2005; Salamon 2002; Underdal 2002). This definition includes whether the environmental goal was achieved (Weiss and Jacobson 1998) or the progress made in improving the environmental condition that spurred the development of the institution (Bernauer 1995). However, due to difficulties in measurement and a lack of data, these effects often cannot be observed or attributed to the institutions. Instead of viewing the direct environmental effects of institutions, the "effectiveness" of institutions can be viewed through changes in political behavior (Chayes and Chayes 1993, 1998; Chayes et al. 1995; Keohane et al. 1993; Victor et al. 1998b). These two perspectives lead to the definition and measurement of effectiveness as participation in an institution, compliance with an institution, or a marked change in state behavior due to the institution.

When attempting to determine institutional effectiveness, it is important to consider the counterfactual of what would have happened without the institution (Helm and Sprinz 2000; Ringquist and Kostadinova 2005; Underdal 2002). In addition, it is important to distinguish between participation or compliance and effectiveness (Raustiala 2000). High compliance or participation may often times indicate low effectiveness, especially when rules have codified existing behavior. Similarly, low compliance may not necessarily signify a lack of effectiveness. Further, compliance as a concept draws no causal linkage between a legal rule and behavior (Raustiala 2000). Favoring a definition that allows the determination of causal relationships between policy outcomes and institutional design

leads me to focus on two types of institutional effectiveness: environmental effectiveness and behavioral effectiveness.

2.2 Environmental effectiveness of institutions

If institutions are designed to address an environmental problem, environmental improvements should accrue due to the institution, compared to what would have happened without the institution (Helm and Sprinz 2000; Keohane et al. 1993; Ringquist and Kostadinova 2005). However, for a variety of reasons, the environmental effectiveness has been difficult to measure, and to a large extent existing studies of IEAs have not gone far enough to establish causal relationships between institutions and environmental outcomes (Ringquist et al. 2005). While there are several case studies that examine environmental effectiveness using game theoretic and statistical methods, these assessments are quite few in number (Bratberg et al. 2005; Helm and Sprinz 2000; Ringquist and Kostadinova 2005). While environmental effectiveness may thus be the desired measurement, there are difficulties associated with measuring environmental effectiveness that support the use of alternative measurements of institutional effectiveness (Keohane et al. 1993).

2.3 Behavioral effectiveness of institutions

In contrast to environmental improvements, for which data are scarce, changes in state behavior are generally observable, and outcomes pertaining specifically to individual treaties are observable. If a change in state behavior due to an IEA is observed, compared to what would have happened without the IEA, evidence exists of the behavioral effectiveness of international environmental institutions. Chayes and Chayes have termed this phenomenon active compliance management (Chayes and Chayes 1993, 1998; Chayes et al. 1995). Data on the behavioral effectiveness of a large number of international institutions may allow an assessment of the relative effectiveness of a large number of institutions as a function of their institutional design. Next, I will further describe how behavioral effectiveness of IEAs might be measured and how this measurement can be compared with what would have happened in the absence of the IEA.

3 Assessing the behavioral effectiveness of institutions

3.1 Benefits of assessing behavioral effectiveness

In addition to avoiding the pitfalls encountered when attempting to measure the environmental effectiveness of institutions, there are a variety of other benefits that might be obtained from the examination of behavioral effectiveness. Primarily, the varied goals of institutions may not lend themselves to analyses of environmental effectiveness. Many of these IEAs do not directly address an environmental problem. Rather, they address information problems, provide frameworks for other conventions, and even specifically seek to change national level behavior. For example, many of the European IEAs require the harmonization of national laws to an international standard, particularly in areas of transport. A reading of the European IEAs demonstrates the varied nature of the goals of the IEAs and tools employed in achieving these goals.[2] Because of the diversity of these

[2] Ringquist et al. (2005) provide an excellent overview of the institutional design of European IEAs.

IEAs, it may not even be appropriate to attempt to assess the environmental effectiveness of many of these IEAs, but rather, assessing the behavioral effectiveness of many of the IEAs may be more theoretically justified. While IEAs that specifically address an environmental problem are best addressed by studies that examine environmental outcomes, IEAs that seek to develop norms and harmonize national laws can be examined through the lens of behavioral effectiveness.

3.2 Methods of assessing behavioral effectiveness

While I have turned away from assessing the environmental effectiveness of institutions due in part because of difficulty posed by measuring many of these problems, assessing the behavioral effectiveness of these institutions may be similarly difficult. However, several studies that have sought to examine compliance, changes in national behavior, and enforcement actions provide some direction and have attempted to measure the effectiveness of a regime through behavioral mechanisms.

3.2.1 Effectiveness as compliance

Studies that examine treaty compliance as effectiveness have been quite typical and numerous in the legal community (Chayes and Chayes 1993, 1998; Raustiala 2000). From a legal standpoint, it is important to view state action with respect to the treaty in terms of compliance versus non-compliance. While some studies have shown that institutional design may lead to changes in treaty compliance, studies that examine compliance in relation to environmental effectiveness have also determined that compliance and effectiveness are quite different (Alder et al. 2002; Mitchell 1994a, b, 2008; Raustiala 2000). While states may comply, the rules may have been shaped to match current state behavior. Compliance, in this case, would not indicate any change in state behavior due to the institution. Alternatively, compliance may be driven by selection bias when a state's decision to join an agreement is correlated with their likelihood of complying with the rules (von Stein 2005). Similarly, non-compliance may not indicate that a state has not changed its behavior. In reality, the behavior of most states lies somewhere between complete compliance and non-compliance and the nature of compliance versus non-compliance has to do with the difficulties and cost incurred with reaching compliance and the credible threat of enforcement and sanctions (Hunter et al. 2002).

3.2.2 Effectiveness as national level implementation

Keohane et al. (1993) focus instead on national level behavioral change through the implementation of international policy at the national level. IEAs, as political institutions, can affect the political process through agenda setting, the presence of more specific international level policies, and through specific national policy responses. The impact of IEAs can be observed through the domestic implementation of IEA requirements.

There are a variety of ways of gauging national level implementation. For example, the extent to which national laws are changed and harmonized with an international standard can lead to greater domestic compliance with international commitments (Skjærseth 2000). Alternatively, the role that national institutions play in the implementation of international commitments can help measure national implementation (Victor et al. 1998a).

When studied through the lens of the national implementation of IEAs, stronger institutional design is thought to improve the overall effectiveness of environmental institutions by increasing government concern, enhancing the contractual environment, and monitoring and national implementation measures. However, there is "little evidence that international organizations enforce rules" (Levy et al. 1993, p. 398).

3.2.3 Behavioral effectiveness through enforcement and dispute resolution

Over the past several decades, the legalization of the international political environment has increased and has drawn attention to enforcement mechanisms (Goldstein et al. 2000a). The increasing proliferation of legally binding international environmental agreements and the enforcement of international law at both the domestic and international levels warrants a more thorough investigation of the role that more legalized institutions play in international governance.

Arbitral tribunal and international court decisions have received attention in relation to regime compliance, and enforcement of international law (Chayes and Chayes 1993, 1998; Chayes et al. 1995). Several authors have begun to distinguish among the types of international law that exist and the implications for enforcement due to these characteristics of international law. For example, "hard law" refers to "legally binding obligations that are precise and that delegate authority for interpreting and implementing the law" (Abbott and Snidal 2000, p. 421). In contrast, "soft law", which describes most international law, encompasses a broader array of rules that are weakened among varying degrees of the dimensions of obligation, precision, and delegation (Abbott et al. 2000). While this is not a binary outcome, it represents a tradeoff between enforceability and flexibility leading to different outcomes of institutional effectiveness. Smith (2000) recognizes this tradeoff and measures the degree of legalism against asymmetry and integration in regional trade pacts, finding that when economic asymmetry is high, or integration is shallow, states are unlikely to delegate third party arbitration authority. Where integration is deep and asymmetry is low, states are much more willing to consent to harder law (Smith 2000).

In an examination of interstate and transnational arbitral tribunal mechanisms, Keohane et al. (2000) observe that transnational courts ought to receive more decisions due to greater access to justice on the part of individuals and firms. Further, they draw a typology based on the level of embeddedness (i.e. the extent to which transnational court decisions are linked to domestic law) and the enforcement mechanism that brings about greater enforcement actions (Keohane et al. 2000). They show that international tribunals and international courts have vastly different rates of cases per year held at the tribunals, correlating with the level of access. Courts and arbitral tribunals with higher levels of access appear to experience more cases than courts and arbitral tribunals that have less accessibility.

In addition to providing insight into the trends of legalization of the international political environment, arbitral tribunals may indicate the behavioral effectiveness of a given treaty, independent of selection bias. In the absence of an environmental treaty, states are forced to use unilateral or diplomatic measures in order to resolve disputes (Keohane et al. 2000; Smith 2000). Unilateral or diplomatic measures continue to be first choice effort for dispute resolution even in the presence of a treaty. It is not until this dispute remains unresolved that it would be sent to arbitration.[3] Arbitral tribunal and

[3] Or the dispute could linger on if the costs of arbitration are deemed to be higher than the benefits gained by resolution.

international court decisions, as an outcome, are only observable in conditions of non-compliance, eliminating the selection bias that is present in measures of compliance.

According to the functional institutionalist argument, the presence of increased legalization allows for harder, more enforceable law, making treaties with hard law more likely to be effective than those treaties with soft law (Abbott et al. 2000; Abbott and Snidal 2000). Hard law includes more stringent requirements and has legally binding force, making it possible that these requirements can be enforced by states party to a treaty or even by third party enforcement mechanisms. In contrast, soft law lacks enforceable commitments, and is more akin to customs or norms that cannot be enforced in court. Thus, states can be held accountable for commitments made in hard law, and hard law is more likely to generate behavioral or environmental change compared to what would have occurred without a treaty. While social constructivists and scholars promoting a management approach to international environmental governance argue that the best way to improve compliance is through capacity building and improving norms of cooperation, functional institutionalists are more likely to emphasize credible rules and strong enforcement mechanisms (Coglianese 2000).

Measuring the number of arbitral tribunal and international court decisions does not give an exact measurement of relative behavioral effectiveness among institutions, but it allows scholars to begin to think about how the increased strength of enforcement mechanisms leads to an increase in the number of arbitral tribunal decisions. In particular, if arbitral tribunal decisions have been enforced and adhered to, the presence of enforceable IEAs should make it more likely that IEAs change state behavior and are behaviorally effective.

4 Do provisions for arbitral tribunals lead to the enforcement of international environmental agreements?

4.1 Collection and coding of the data

The list of European IEAs and much of the treaty data were acquired in conjunction to a project seeking to understand institutional effectiveness as a function of institutional design. Out of the 70 IEAs currently in force in Europe identified in this research, 30 have provisions for arbitral tribunals. IEAs were considered "European" if the majority of the states participating in the treaty were European or if the treaty specifically targeted environmental problems in Europe.[4] Environmental treaties included a broad array of treaties where the primary intent of the treaty involved environmental protection or animal rights. These generally included straightforward environmental issues such as water quality, air quality, and species and habitat protection, as well less environmentally oriented treaties such as the protection of animals during transport, protection of pet animals, and the protection of archaeological heritage. Appendix A lists the IEAs considered in this research.

Environmental treaties in Europe are subject to a complex array of competing jurisdictions and influences. While environmental treaties were traditionally concluded by individual states, the European Community (EC) has the legal personality to conclude international environmental agreements under EU law (Delreux 2006). Throughout the 1970 s, the ECJ expanded the implied powers of the European Community, allowing it to

[4] Europe, in this paper, is defined in a geographical sense and includes both EU and non-EU states.

Table 1 Number of arbitral tribunal decisions per venue–1991–2009

Arbitral tribunal authority	Number of decisions
Permanent Court of Arbitration	2
International tribunal of the law of the sea	1
International Court of Justice	0
European Court of Justice	89

become a party to IEAs without any express environmental competency (Delreux 2006). Because the environmental competencies of the EC are considered to be non-exclusive, member states can conclude environmental treaties with or without EC participation. This division of authority between the EC and the member states can be extremely complex and changes rapidly.

If the EC ratifies the treaty, the treaty is transposed as an EU directive, and it can be enforced through the European Court of Justice. While I hypothesize that provisions for an arbitral tribunal in the negotiated treaty increase the treaty's likelihood for effectiveness, treaties that do not contain provisions for arbitral tribunals may still be enforced through the European Court of Justice, as EU directives that transpose international law are enforceable through the ECJ.

In order to measure the dependent variable–the number of arbitral tribunal decisions per treaty–I visited the case archives for the four major arbitral tribunal courts that would have jurisdiction over European IEA arbitral tribunal cases. These courts are: the Permanent Court of Arbitration (PCA); the International Court of Justice (ICJ); the International Tribunal for the Law of the Sea (ITLOS); and the Court of Justice of the European Communities (ECJ).[5] The ICJ, PCA and the ITLOS publish their cases and decisions online, and due to the small number of cases, data collection was simple. The European Court of Justice publishes its cases and decisions online through EUR-Lex and Curia. The Westlaw database was also used to identify older arbitral tribunal decisions. Decisions were attributed to a particular treaty if the case specifically referenced the treaty, or if the case specifically referenced the implementing EU directive for the treaty. Decisions were included if they resulted in a specific judgment regarding the implementation of a treaty.

Cases can be heard by the ECJ if there is a dispute in a treaty between EU states, or if the treaty has been transposed under an EU directive. Once the European Community ratifies an IEA, it transposes the law as an EU directive, making the agreement enforceable under EU law. Thus IEAs that have been transposed into EU law can be enforced through the ECJ. In recent years, the ECJ has specifically aimed to increase enforcement of international environmental commitments, while the European Commission views itself as the guardian of environmental treaties (Hansjürgens 2005). In 2006, the ECJ ruled that it alone had jurisdiction over inter-state disputes when the European Community had acceded to a treaty, and that states did not have the right to bring cases before other arbitral tribunals. This shift has enormous implications, in that it specifically prohibits European states from settling arbitral tribunal decisions through the PCA or ITLOS. Table 1 below describes the distribution of venues for international arbitration and demonstrates the role of the ECJ in enforcing international environmental agreements.

[5] The Court of First Instance was not considered because it does not have authority over interstate disputes involving IEAs.

4.2 Dependent variable: number of arbitral tribunal decisions per treaty

Cases were included in the analysis only if they had states or the European Commission as a defendant.[6] Between 1991 and 2009, there are 92 arbitral tribunal decisions covering 27 different treaties that specifically relate to European IEAs. Treaties with provisions for arbitral tribunals appear more likely to have enforcement actions: 15 of the 30 treaties containing arbitral tribunal provisions account for 85 of the 92 arbitral tribunal decisions while 3 of the 40 treaties not containing provisions for an arbitral tribunal account for 8 of the decisions.

In 88 decisions, a state is the defendant, and in three cases, the European Commission is the defendant; one case lists the EU Parliament as a defendant. In 85 decisions, the Commission is the applicant, and in 7 cases, a state is a applicant. In 82 of these decisions the court finds in favor of the applicant. Of the 92 total decisions, 84 of these decisions find that a state failed to adhere to provisions in an IEA and lead to increased enforcement of an IEA. These results suggest that the EC and the ECJ are interested in enforcing behavioral change; however, the types of cases that reach arbitration or court may be cases where evidence is clear and easy to win. Interestingly, states never seek to resolve disputes with each other through the European Court of Justice–every single case in the ECJ is between the Commission and a state. In the ECJ cases where states take sides against each other, the Commission is always listed as an intermediary–as either the defendant or the applicant, with the other states listed as "supporting" the position of the Commission. The states rarely seek arbitration against each other, but when they do, they preferred the Permanent Court of Arbitration, and the International Tribunal for the Law of the Sea until the ECJ ruled that cases between EU member states must be heard through the ECJ.

The decisions also fall heavily into certain types of cases, and into certain environmental agreements. The Bern Convention for the Protection of Wildlife Habitats (hereinafter referred to as the Bern Convention) and the Bonn Convention for the Protection of Migratory Birds (hereinafter referred to as the Bonn Convention) each account for 27 of the cases. The Aarhus Convention on Access to Information, Public participation in Decision-Making and Access to Justice in Environmental Matters (hereinafter referred to as the Aarhus Convention) accounts for 14 cases. These cases often relate to a state's failure to transpose the corresponding EU directive adequately, or discrepancies between a state's laws, and the requirements set forth by the treaty. In contrast, environmental agreements that have specific environmental quality goals have very few arbitral tribunal decisions. The Barcelona Convention governing Mediterranean Water Quality and its related Protocols only account for 1 case; the Rhine Convention and its related protocols account for only two cases; the HELCOM Convention to Protect the Baltic Sea produced two cases; the OSPAR treaty for the Protection of the Marine Environment of the North East Atlantic resulted in three cases in three different venues of arbitration – all relating to the same dispute between the UK and Ireland over discharges from a mixed oxide fuel plant and the related transboundary movement of radioactive material in the Irish Sea, which has yet to be fully resolved.

Damages were never awarded by the ECJ, and were rarely awarded in other cases. In 13 cases, the costs were split between the plaintiff and the defendant. In 78 cases, costs were

[6] Cases where individuals or firms were defendants were not considered because the level of analysis that I am interested in relates to state behavior, and how international environmental agreements change state behavior.

awarded to the winning party. In only one case—a case between the Netherlands and France over chloride pollution in the Rhine—was monetary damage of approximately 18 million Euros awarded through the Permanent Court of Arbitration.

Without any quantitative modeling, it is possible to draw basic conclusions regarding the enforcement of international environmental agreements in Europe. Treaty negotiation and enforcement appears to be a two-stage process. Treaty requirements and dispute mechanisms are negotiated with provisions, which may include provisions for an arbitral tribunal to resolve disputes. After the European Community ratifies a treaty, it is more likely to see enforcement actions because the European Community acts as an enforcement authority. While many treaties are ratified by the European Community without provisions for arbitral tribunals, these seem unlikely to be enforced through the court system. The lack of provisions for an arbitral tribunal appears associated with the lack of enforcement of a treaty leading to two possibilities. Either the lack of provisions for arbitral tribunals in a treaty leads the EC to forgo the enforcement of the treaty, or forgoing provisions for dispute resolution leads to a treaty design that is unenforceable. Thus, treaty enforcement depends jointly on provisions for an arbitral tribunal, and accession of the European Community. If treaties do not contain provisions for arbitral tribunals, or are not joined by the European Community, they seem to be unenforced.

Enforcement seems much more likely to occur if the European Community is a member of the treaty; the European Commission also wins most of the time. Many cases the Commission chooses to enforce relate to the harmonization of national laws and standards with the implementing EU directive, rather the enforcement of specific environmental quality standards laid down in IEAs. Nearly every case pertaining to the Bern, Bonn, or Aarhus conventions relates to the transposition of international law, or the harmonization of international law and domestic law and policy. Inter-state disputes occur rarely, and until 2006 were handled outside of the European Court of Justice.

While these conclusions can be drawn without a quantitative analysis of the dataset, a quantitative approach might allow a better understanding of the enforcement of IEAs, and test the hypotheses above. In the next sections, I develop a quantitative model that explains the incidence of arbitral tribunal decisions as a function of the strength of the enforcement mechanism in a treaty, the requirements of the treaty, the number of parties that have ratified a treaty, and the length of time the treaty has been in effect.

4.3 Dependent variable: number of arbitral tribunal decisions per treaty

In the quantitative model, the dependent variable is measured as the number of arbitral tribunal decisions per treaty that resulted in the stronger enforcement of environmental goals. Across all treaties, there are 84 decisions resulting in stronger enforcement of environmental goals. Behavioral effectiveness of each treaty is measured as the number of enforcement actions taken through arbitral tribunal decisions.[7]

[7] Unfortunately, it is impossible to determine when or why the provisions of a treaty are not enforced. When a treaty is not enforced it is often unobservable, because there is no independent measurement of compliance for the treaties. Cases where the defendant wins does not necessarily mean that the treaty was unenforced, but may instead pertain to the specifics of the case. Thus, the number of enforcement actions that lead to greater enforcement of a treaty is the only observable measurement of treaty enforcement and is used in this study as an indicator of the enforcement of each treaty.

4.4 Independent variables: strength of enforcement mechanism, institutional strength and commitments, and years in force

4.4.1 Strength of enforcement mechanism

I hypothesize that treaty enforcement is a combination of the inclusion of an arbitral tribunal in treaty design and accession by the European Community, which allows for third party enforcement of international environmental treaties. Treaties were coded as 'weak' (0) or 'strong' (1) with respect to their enforcement mechanisms. If a treaty has provisions for an arbitral tribunal and is joined by the European Community, then it has a much stronger enforcement mechanism than if it only has provisions for an arbitral tribunal or than if it is joined by the European Community but does not contain provisions for an arbitral tribunal.

Most treaties delegate enforcement authority to one of the four courts listed above, or they do not specify a particular court for disputes. The PCA, ICJ, and ITLOS have similar rules regarding the hearing of arbitration decisions (Keohane et al. 2000).[8] While the texts of their rules suggests that cases can be brought with respect to violations of an international treaty, a closer reading and understanding of these tribunals demonstrates the barriers of bringing a case before these courts (Hunter et al. 2002; International Court of Justice 1978, 1996; Keohane et al. 2000; Permanent Court of Arbitration 2001). In reality, in order for one of these courts to hear a dispute, states must agree that a dispute exists, and agree to bring the case before the court. While states can recognize the compulsory jurisdiction of the court, few states have accepted this clause (and many of those, with reservations), and in order for a case to occur without the specific consent of the states, both states must have accepted this clause, without reservations. Finally, in these courts, only the states can be parties to a case, shouldering the burden of enforcement on the states. Treaties that must rely on these 3 tribunals received a rating of 'weak' for strength of enforcement mechanism.

In contrast, the ECJ accepts cases from not just the states in the EU, but also from the European Commission. This access provides for a third party enforcement mechanism that does not require states to directly bear the burden of the cost for enforcement. In addition, the Commission or any state can bring a case unilaterally, without the 'agreement' of the existence of a dispute, also greatly increasing the access to the court (Keohane et al. 2000; The Court of Justice of the European Communities 2005). Treaties that have provisions for an arbitral tribunal and have been acceded by the EU are coded as having a strong enforcement mechanism.

4.4.2 Institutional strength

The measure of institutional strength is the sum of the individual measurements of institutional strength as coded by Ringquist et al. (2005). This measure is comprised of a variety of different characteristics of expected institutional strength as supported by IEA literature. It includes measurements for transparency, information requirements, regulatory approach, reservations, sanctioning, side payments, financial, technological, and scientific

[8] The PCA and the ICJ can hear cases across a broad variety of issue areas and interstate disputes, while the ITLOS can only hear cases pertaining to ocean space, its uses, and resources. In 2001, the PCA adopted a special set of rules specifically pertaining to environmental dispute resolution and is designed to help resolve disputes arising from IEAs.

capacity building, and the administrative strength of the IEA.[9] Overall, it sums 13 categories and is scored on a scale of 12 to 56. By controlling for institutional strength, I control for the type of commitments made to IEAs and the difficulty involved in keeping those commitments. Stronger institutions typically are characterized by increases in monitoring, transparency, and commitments that states are more likely shirk. I expect that stronger institutions will produce more enforcement actions due to the stricter requirements of the treaty.

4.4.3 Number of parties and years in force

As the number of European parties to the agreement increases and as the number of years the IEA is in force, the likelihood of an arbitral tribunal decision should increase. Thus, I control for both of these factors in the model by including them as variables.

4.5 The model

The model described above can be

$$Y = e^{(\alpha+\beta_1+\beta_2+\beta_3+\beta_4+\varepsilon)}$$

Where Y is defined as the number of arbitral tribunal decisions per treaty, β_1 is defined as enforcement mechanism strength, β_2, is defined as the summation of institutional strength, β_3 is defined as the number of parties to the agreement, and β_4 is defined as the number of years the agreement has been in effect.

4.6 Estimation

The process of the number of arbitral tribunal decisions per treaty should be estimated using a count process, which assumes a Poisson distribution of the dependent variable. A Poisson distribution is bounded by 0 on the left side of the distribution, and is unbounded on the right side of the distribution, which reflects the nature of count data. I choose a negative binomial estimation due to its flexibility, in contrast with a Poisson model, which requires the equivalence of the mean and the variance (Long 1997). The negative binomial model is very similar to the Poisson model, but it estimates a separate variance parameter, which allows for the variance to be larger than the mean and is particularly important given the dispersion of the dependent variable in this dataset. The negative binomial model is estimated using maximum likelihood estimation. I also employ robust standard errors to control for additional heterogeneity, which might not be captured by the independent variables in the model. For additional information regarding the negative binomial regression model and other count models, see Long (1997).

5 Results

Table 2 above demonstrates the statistical and substantive significance of the model parameters. The model as a whole is significant (Wald χ^2 value of 45.80). In addition, the primary variable of interest—the strength of the enforcement mechanism is significant at the .01 significance level. The parameter estimate of 1.75 demonstrates treaties that contain

[9] For a discussion of the coding instrument, please see Ringquist et al. (2005).

Table 2 Explaining the number of arbitral tribunal decisions enforcing international environmental treaty provisions

Variable	Observed coefficient	Robust standard error	%[a]	e^b $\Delta\sigma x^b$|
Strength of enforcement mechanism	1.760***	0.664	481.2	2.33
Institutional strength	−0.015	0.044	−1.5	0.91
# of parties	0.078***	0.015	8.2	2.51
Years in force	0.008	0.016	.8	1.14
Constant	−2.967*	1.517		

Results negative binomial regression ($n = 70$)

* Statistical significance at $\alpha = .10$

** Statistical significance at $\alpha = .05$

*** Statistical significance at $\alpha = .01$

[a] The percent change in the expected count for a one unit increase in x

[b] The change in the expected count for a one standard deviation increase in x

provisions for an arbitral tribunal and are subsequently ratified by the EU were likely to experience 4.82 more arbitral tribunal decisions leading to greater enforcement than those that do not contain an arbitral tribunal and were not ratified by the EU, with all other factors held at their means.

The strength and requirements of the treaty, as measured by Ringquist et al. (2005), suggests that there is a slightly negative, though not statistically significant relationship between the treaty requirements and arbitral tribunal decisions. This suggests that more stringent treaties are no more likely to be enforced, perhaps due to arduous data and monitoring requirements. Stronger treaties are more likely to require environmental goals, as well as monitoring and data collection to support their enforcement. However, these types of treaties receive fewer enforcement actions. Treaties with less complex design, requiring the transposition of international law protecting habitats or requiring information disclosure are much more likely to have enforcement actions, perhaps due to the ease of detecting noncompliance.

The number of years that a treaty is in force has no relationship with the number of enforcement actions. This is likely due to improvements in treaty design over time. While older treaties have had more time to be enforced, the oldest treaties are also more likely to be weak and unenforced. Treaty enforcement is a relatively new phenomenon—treaties generated from 1902 through the 1950 s have few or no enforcement actions associated with them.

The number of parties belonging to a treaty is positively related to the number of enforcement actions, with a one standard deviation increase in the number of parties to a treaty resulting in approximately 2.5 more enforcement actions, with all other factors held at their means. This finding may indicate that treaties that are widely joined, such as the Bern Convention or the Bonn Convention, are more likely to be enforced. A treaty that has broad participation across the EU, or even across the globe, may be more likely to be enforced than a treaty that is more regional in nature, because these treaties might represent more firmly established and respected law. Numerous specifications demonstrate a strong positive relationship between the number of parties to an agreement and the number of enforcement actions. Unfortunately, it is not possible to distinguish this hypothesis with an alternative explanation that the more countries that join a treaty simply leads to increased

opportunities for enforcement. Further research into the relationship between widely joined treaties versus regional treaties may be able to better inform these competing hypotheses.

6 Sanctioning

The results presented thus far demonstrate the role of enforcement mechanisms in the enforcement of IEAs. However, because these regimes are voluntary, and because international law is essentially voluntary, due to the anarchic nature of the international system and the principle of national sovereignty, it follows that even that once arbitral tribunal decisions are made, there is no enforcement body capable of enforcing the agreement (O'Connell 1995). Indeed some have advocated for enforcement of IEAs in domestic courts for their ability to seize assets and enforce court decisions (O'Connell 1995). However, it is widely believed that ECJ decisions are generally adhered to with the threat of future fines and sanctioning from the EU (Carrubba 2005). Further, while extensive evidence regarding sanctioning is not widely available, some evidence suggests that arbitral tribunal decisions are enforced. Due to an arbitral tribunal decision addressing a violation of the Convention for the Protection of the Rhine from Chemical Pollution, where the PCA ruled against France and in favor of the Netherlands, France paid the Netherlands ministry of Traffic, Public Works and Water Management €18,119,353 on September 2, 2004 to conform to the tribunal decision.[10] While one case of verified sanctioning does not indicate that all arbitral tribunal decisions are adhered to or that IEAs are no longer voluntary, it indicates that under some specific circumstances, IEAs are strongly enforced.

7 Discussion and conclusions

7.1 Implications of results

The results demonstrate the importance of credible enforcement mechanisms for the enforceability of international commitments, providing support for the functional institutionalist theory. Further, these results suggest that neither the inclusion of arbitral tribunals alone, nor the ratification by the EU alone is sufficient to create enforceable international environmental agreements. Many IEAs contain an arbitral tribunal provision, but do not have an established means of enforcement and have been unable to generate visible outcomes of behavioral effectiveness. Conversely, many IEAs are ratified by the European Community, but are not enforced through international law. Most arbitral tribunals rely on bilateral consent to settle a dispute through arbitration (Hunter et al. 2002). This requirement results in states needing to agree that a dispute exists in order to bring it before an arbitration hearing and serves as a great barrier to dispute resolution and the enforcement of commitments. While disputes are now required to be heard through the ECJ, the data demonstrate that a strong enforcement mechanism can improve the prospects for changing state behavior, even when the disputes could have been heard in a variety of venues. Several of these cases were heard in other courts, such as the PCA, indicating that EC ratification improves the prospects for treaty enforcement, even outside of EU jurisdiction.

[10] Communication with Jeannettine Veldhuijzen, Environmental Officer, Royal Netherlands Embassy 11 July, 2006.

In addition to demonstrating the importance of accessibility of the arbitral tribunal and the ability for the European Commission or a state to bring a case unilaterally, these results indicate that having an independent enforcement body will likely improve sanctioning and enforcement. In the European Union, the Commission is able to bring cases against states for their failure to abide by an EU directive. Thus, for IEAs that have been ratified by the EU, it is possible that the European Commission may provide the mechanism for enforcement of commitments. In contrast, agreements that have not been acceded by the European Community appear to lack the enforcement capacity to strengthen and insure that institutional commitments are upheld. For example, the Convention on the Prevention of Pollution from Land Based Sources (PARCOM), the Convention on the Conduct of Fishing Operations in the North Atlantic, and the International Convention for the Prevention of Pollution from Ships (MARPOL) are all relatively strong treaties, with strict requirements and provisions for an arbitral tribunal, but accounted for no arbitral tribunal cases. By having a sanctioning mechanism independent of the states, the enforcement of institutional commitments appears to be much greater.

While these treaties may be environmentally or behaviorally effective, it is likely that treaties that have active and usable enforcement mechanisms are more behaviorally effective than those that do not appear to be enforced. These results demonstrate the importance of not only including a sanctioning and enforcement mechanism in an IEA, but also finding a way that it will be accessible and used by the parties to the agreement.

Finally, the lack of statistical significance on the institutional strength variable, which measures the level and types of commitments required by the IEAs, combined with qualitative findings that most of the arbitral tribunal decisions are clustered on a few treaties that require observable behavioral change—such as the transposition of a law, the accessibility of information (such as in the Aarhus Convention), and the protection of wildlife (in the Bern and Bonn Conventions), suggest that weaker international agreements are more likely to be enforced than stronger international environmental agreements addressing environmental quality (such as the Rhine Convention, PARCOM, HELCOM, the Convention for the Protection of the Mediterranean Sea and its related protocols, and the protocols relating to the Convention on Long-Range Transboundary Air Pollution). Nevertheless, it remains unclear whether changes in domestic and international law lead to environmental improvements. In addition, environmental agreements that address specific environmental quality goals ought to be evaluated through environmental quality improvements, rather than through the number of enforcement actions.

7.2 Directions for further research

While the results of this study demonstrate a compelling story for the effectiveness of arbitral tribunals in cases where the European Community ratifies an IEA, there are several limitations to the quantitative model. In addition, this study provides direction for a variety of new research questions regarding the nature, enforcement, and effectiveness of international environmental agreements.

First, the data is restricted to observable outcomes of arbitral tribunal effectiveness. A large amount of heterogeneity of types of arbitral tribunal decisions exist, ranging from minor product labeling changes or information disclosure to a large monetary settlement. In a count model, each of these enforcement actions must be treated identically. Some cases address large amounts of environmental damage, while others simply address the failure to harmonize national laws with the requirements of an IEA. Future research could use individual cases as the unit of measurement and seek to learn more about the types of

enforcement action. Individual case studies that track cases through the court system would be useful for learning more about the enforcement of treaties as well.

Many other types of enforcement action exist within an IEA that may lead to greater enforceability and strength of institutions. For example, while the Bern Convention had only two cases that were decided by an arbitral tribunal in favor of greater enforceability, the Convention itself has regular meetings where it tracks cases of disputes, offers recommendations and non-binding opinions. Since its inception in 1982, the convention has registered more than 400 complaints that have resulted in the creation of over 76 cases and claims to have resolved all but two of these cases satisfactorily and within 6 years (Council of Europe 1999).

In addition to other enforcement and sanctioning mechanisms within IEAs, there have been some states that have provisions for the enforcement of international commitments in domestic courts, and some European states have reciprocity agreements, allowing citizens of one state to file suit in another state. Future efforts at examining enforcement mechanisms would benefit by including other types of IEA enforcement alongside the arbitral tribunal decisions.

Second, this sample of European IEAs covered most environmentally related arbitral tribunal decisions that exist throughout the world and provided many benefits, including reduced heterogeneity among actors and problem types. However, the enforcement of international law within the EU is increasingly distinct from the enforcement of international law around the globe. Thus, it is uncertain the extent to which this study holds broad external generalizability. International environmental law is becoming more complex. There are disputes between states and multinational corporations that are resolved through arbitral tribunals. There are also non-European disputes that are handled through the PCA, ICJ, and ITLOS. This research may have limited lessons for understanding these types of disputes. Increased research into disputes between corporations and states, and non-European IEAs would be welcome, though it is unlikely that there are sufficient numbers of cases for a similar quantitative analysis.

Finally, this research did not demonstrate a relationship between the strength of institutions and the number of arbitral tribunal decisions. First, there may not be a linear relationship strength of IEAs and enforcement actions. Stronger commitments may be more difficult to enforce due to a greater burden of proof. Further, as discussed earlier, the measurement of institutional strength is a sum of individual aspects of institutional strength. While this is an adequate measurement of institutional strength, it may be better to scale some of the factors that comprise the overall measurement or to examine several specific components of the measurement that more accurately explain the strength of the institutional commitment (McIver and Carmines 1981).

Many of the arbitral tribunal decisions pertained to only a few treaties. While I have hypothesized that these treaties have specific types of commitments that lead to them to be easily enforced, more research could help policy-makers and academics understand why certain types of IEAs result in increased enforcement, and why other types of IEAs seem to receive little attention.

7.3 Conclusions

While many international agreements should be assessed for their contributions to environmental benefits, there are some international agreements that may be better assessed through an analysis of their behavioral effectiveness—that is—the extent to which the IEA changes national level behavior. While there are a variety of ways that behavioral

effectiveness can be assessed, an analysis of arbitral tribunal outcomes gives some insight into the behavioral effectiveness of IEAs.

This study provides evidence regarding the role that enforcement mechanisms play in the behavioral effectiveness of international environmental institutions. Most importantly, the results demonstrate the role that EU directives play in transposing negotiated international environmental law in individual EU states.

While the entire sample of IEAs include very similarly designed enforcement mechanisms, the application of these mechanisms depends on the EC accession to a treaty and the enforcement by the European Commission. Agreements that rely solely on the ICJ, PCA, or ITLS for enforcement tend not to result in many enforcement actions. Likewise, agreements that do not contain negotiated provisions for arbitral tribunals in the treaty also do not see many enforcement actions. In contrast, agreements that include arbitral tribunals, and are ratified by the European Commission result in many more enforcement actions. This process emphasizes a reinforcing relationship between the European Community and the provisions in international environmental agreements.

Despite a small sample size, there is reason to believe that there is a link between the strength of the enforcement mechanism and behavioral effectiveness through observable arbitral tribunal outcomes. While future research is needed to validate the implications of this research, these conclusions have implications for the design and assessment of institutional arrangements and in particular—to international environmental agreements.

International environmental agreements appear to be more likely to be enforced when provisions for an arbitral tribunal are included in the institutional design of international environmental commitments. Further, these results emphasize the importance of having a third party authority with the power to enforce those commitments through the arbitral tribunals.

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Appendix A: European environmental agreements[11]

Soil quality and conservation

Convention on the Protection of the Alps (Alpine Convention), Salzburg, 1991

Water quality and pollution

Agreement on the International Commission for the Protection of the Rhine against Pollution, Bern, 1963
Convention on the Protection of the Rhine against Chemical Pollution, Bonn, 1976
Convention on the Protection of the Rhine against Pollution from Chlorides, Bonn, 1976
European Outline Convention on Transfrontier Co-operation between Territorial Communities or Authorities, Madrid, 1980
Protocol Amending the European Agreement on the Restriction of the Use of Certain Detergents in Washing and Cleaning Products, Strasbourg, 1983

[11] For additional information regarding the dataset or to obtain data for replication purposes, please contact the author.

Additional Protocol to the European Outline Convention on Transfrontier Co-operation between Territorial Communities or Authorities, Strasbourg, 1995
Convention on the Protection of the Rhine, Rotterdam, 1998
Protocol No. 2 to the European Outline Convention on Transfrontier Co-operation between Territorial Communities or Authorities Concerning Interterritorial Co-operation, Strasbourg, 1998

Sea/river water quality and pollution

Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft, Oslo, 1972
Convention for the Prevention of Marine Pollution from Land-Based Sources, Paris, 1974
Convention on the Protection of the Marine Environment of the Baltic Sea Area, Helsinki, 1974
Agreement for Cooperation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances, Bonn, 1983
Convention for the Protection of the Marine Environment of the North-East Atlantic, Paris, 1992
Convention on the Protection of the Black Sea against Pollution, Bucharest, 1992
Convention on the Protection of the Marine Environment of the Baltic Sea Area, Helsinki, 1992
Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Helsinki, 1992
Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, New York, 1992
Protocol on Protection of the Black Sea Marine Environment against Pollution from Land Based Sources, Bucharest, 1992
Convention on Cooperation for the Protection and Sustainable Use of the Danube River, Sofia, 1994
Protocol on Cooperation in Combating Pollution of the Black Sea Marine Environment by Oil and Other Harmful Substances in Emergency Situations, 1994
Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, London, 1999
Convention For The Protection Of The Mediterranean Sea Against Pollution, Barcelona, 1976
Protocol For The Prevention Of Pollution Of The Mediterranean Sea By Dumping From Ships And Aircraft, Barcelona, 1976
Protocol Concerning Co-Operation In Combating Pollution Of The Mediterranean Sea By Oil And Other Harmful Substances In Cases Of Emergency, Barcelona, 1976
Protocol For The Protection Of The Mediterranean Sea Against Pollution From Land-Based Sources, Barcelona, 1980
Convention For The Protection Of The Mediterranean Sea Against Pollution: Protocol Concerning Mediterranean Specially Protected Areas (1982, 1995), Barcelona, 1982
Cooperation Agreement for the Protection of the Coasts and Waters of the North-East Atlantic against Pollution, Lisbon, 1990

Animal/species protection and management

Convention for the Protection of Birds Useful to Agriculture, Paris, 1902

International Convention for the Protection of Birds, Paris, 1950
European Convention for the Protection of Animals during International Transport, Paris, 1968
European Convention for the Protection of Animals Kept for Farming Purposes, Strasbourg, 1976
Additional Protocol to the European Convention for the Protection of Animals during International Transport, Strasbourg, 1979
European Convention for the Protection of Animals for Slaughter, Strasbourg, 1979
European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes, Strasbourg, 1986
European Convention for the Protection of Pet Animals, Strasbourg, 1987
Agreement on the Conservation of Bats in Europe (EUROBATS), London, 1991
Protocol of Amendment to the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes, Strasbourg, 1998
Memorandum of Understanding on the Conservation and Management of the Middle European Population of the Great Bustard (MOU), 2000
Agreement on the Conservation of Polar Bears, Oslo, 1973

Fishing/management/use of harvestable fish

Convention for the Regulation of the Meshes of Fishing Nets and the Size Limits of Fish, London, 1946
Convention Concerning Fishing in the Waters of the Danube, Bucharest, 1958
Fisheries Convention, London, 1964
Convention on Fishing and Conservation of the Living Resources in the Baltic Sea and the Belts, Gdansk, 1973
Protocol on the Conservation, Rational Utilization and Management of Norwegian Spring Spawning in the Northeast Atlantic, Oslo, 1996
Agreed Record of Conclusions of Fisheries Consultations on the Management of the Norwegian Spring Spawning Herring Stock in the Northeast Atlantic for 1997, Oslo, 1996
Convention On The Conduct Of Fishing Operations In The North Atlantic, London, 1967
Convention On Future Multilateral Cooperation In Northeast Atlantic Fisheries, London, 1980
Convention For The Conservation Of Salmon In The North Atlantic Ocean, Reykjavik, 1982

Hazardous substances

European Agreement Concerning the International Carriage of Dangerous Goods by Road, Geneva, 1957
European Agreement Concerning the International Carriage of Dangerous Goods by Inland Waterways (AND), Geneva, 2000
Agreement on International Carriage of Dangerous Goods by Road (ADR), applicable as from 1 July 2001, 2001
Agreement on International Carriage of Dangerous Goods by Road (ADR), applicable as from 1 January 2003, 2002

Land use and land use planning

European Convention on the Protection of the Archaeological Heritage, London, 1969
European Convention on the Protection of the Archaeological Heritage, La Valette, 1992

Air quality

Convention on long-range transboundary air pollution, Geneva, 1979
Protocol on the reduction of sulfur emissions, Helsinki, 1985
Protocol concerning the control of nitrogen oxides or their transboundary fluxes, 1988, Sofia
Protocol concerning the control of emissions of voc or their transboundary fluxes, 1991, Geneva
Protocol on further reduction of sulfur emissions, 1994, Oslo
Protocol on persistent organic pollutants, 1998, Aarhus
Protocol on heavy metals, 1998, Aarhus

Atmosphere/climate/outer space

Convention Establishing the European Centre for Medium-range Weather Forecasts, Brussels, 1973

Environmental conservation

Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, Aarhus (Denmark), 1998
Convention For The Establishment Of The European And Mediterranean Plant Protection Organization, Paris, 1951

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