Is There a 'Depth versus Participation' Dilemma in International Cooperation?

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Abstract

This paper analyzes how key features of international institutions that reflect the depth of cooperation affect participation. We derive a set of arguments from the enforcement, managerial and rational design literatures and test these arguments on a new dataset that covers more than 200 global environmental treaties since 1950. We find very little support for the enforcement school's claim of a depth versus participation dilemma: the

specificity of obligations has only a minor and statistically insignificant negative effect on participation rates (measured by treaty ratifications). The existence of monitoring and enforcement mechanisms has no significant effect either, and results for variables capturing other forms of delegating authority (e.g. treaty-specific secretariat, decision-making rules) are mixed. In contrast, we find more support for the managerial and rational design schools' arguments: assistance provisions in treaties have a significant and substantial positive effect on participation. Similarly, most dispute settlement mechanisms promote treaty participation. While countries do not appear to stay away from treaties that mandate deeper cooperation, the inclusion of positive incentives and dispute resolution mechanisms promotes the formation of international institutions.

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Introduction

We contribute to an emerging literature that focuses on a critical phase in the formation of international institutions, namely the stage where countries formally decide on whether or not to participate in the respective institution. Legally binding international agreements, usually called treaties, conventions, protocols and the like, are the backbone of most international institutions. A major challenge democratic and in many instances also non-democratic governments face once they have negotiated a legally binding international agreement concerns ratification.

Ratification means that the 'principal' approves an act of its 'agent' through which the latter seeks to legally bind the 'principal'. In practice, ratification of international agreements usually involves a formal decision by the legislature (principal) that authorizes the government (agent) to legally commit the country to the respective international agreement. Not every international agreement requires ratification, but the large majority of agreements that form the basis of international institutions and thus advance the process of legalization in world politics[1] in fact do.

The failure of the US Congress to ratify the Kyoto Protocol on climate change mitigation is one prominent example that illustrates the importance of the ratification phase. But there are also many other cases in which legislatures have refused to support international bargaining outcomes. More generally, even a cursory look at key international agreements in areas such as trade, finance/investment, arms control, human rights, and

[1] Goldstein et al. 2000.

the environment suggests that there is strong variation of ratification rates within and between international agreements.

We study the determinants of ratification in the context of a larger scientific debate on whether there is a 'depth versus participation' dilemma in processes of international cooperation. We derive competing hypotheses on how institutional design, which presumably reflects the depth (or ambition level) of cooperation, may affect participation and in particular ratification. We then test these hypotheses on a new dataset for global environmental agreements.

While the so-called managerial school[2] has been quite optimistic with respect to the problem solving capacity of international institutions, the enforcement school[3] claims that such optimism is an illusion. Specifically, the enforcement school argues that deep cooperation – cooperation that produces problem-solving outcomes that differ substantively from non-cooperative equilibrium outcomes – usually requires strong enforcement. Consequently, it claims that high levels of compliance with international agreements in the absence of strong enforcement mechanisms – arguably a frequent observation in reality – are likely to result from 'shallow' agreements rather than from successful managerial compliance mechanisms. Managerial compliance mechanisms are mechanisms that do not rely on traditional 'detect-and-punish' strategies with respect to 'hard' treaty commitments, but on more cooperative techniques, such as negotiation and assistance designed to bring non-complying countries back into good standing[4].

[2] e.g. Mitchell 1994; Young 1994, Chayes and Chayes 1993.
[3] e.g. Downs et al. 1996.
[4] e.g. Chayes and Chayes 1993.

In an attempt to counter the pessimistic view of international cooperation held by the enforcement school, the 'rational design of international institutions' literature[5] has sought to explain how particular types of preference or problem structures motivate states to design international institutions in particular ways. The underlying assumption is that states are more ingenious than the enforcement school assumes: they avoid all-or-nothing dilemmas between substantive treaties with strong enforcement but high rates of non-compliance on the one hand, or shallow cooperation with high rates of compliance on the other, by 'fine-tuning' the design of treaties, so that substantive problem solving becomes possible.

Our paper focuses on an important challenge that has been emphasized by the enforcement school, but has not yet been systematically addressed in follow-up research, namely the (potential) trade-off between the depth of cooperation and participation. Downs et al.[6] illustrate this challenge with a specific example, an international environmental agreement for the Mediterranean area:

"The Mediterranean Plan achieved consensus by eliminating any meaningful restrictions on dumping and providing no enforcement mechanism for those minimal targets and restrictions that were agreed to. As a result, it has been an embarrassing failure. Pollution has increased, dolphin hunting continues, and despite a European Union ban on drift nets longer than 2.5 kilometers, the rules are widely flouted. The result has been a collapsing ecosystem in the Mediterranean."

[5] e.g. Abbott and Snidal 2000; Koremenos, Lipson and Snidal 2001; Mitchell and Keilbach 2001.
[6] Downs, Rocke and Barsoom 1996, 396.

This example implicitly illustrates risks of policy-failure at several stages of the international cooperation process. First, international negotiations may end in deadlock and fail to produce an international agreement. Second, bargaining may result in a weak international agreement that would, even if joined by many countries and fully complied with, not solve the problem it was meant to solve. Third, bargaining may produce a substantive agreement that would in principle solve the problem, but many countries may then decide not to join this agreement or may join but fail to comply with their obligations. All of these three stages – bargaining, ratification, and compliance – are therefore crucial for successful international cooperation.

The existing literature focuses mainly on either the negotiation stage or compliance with treaties. The ratification stage, however, is often left aside[7]. Since ratification is an important prerequisite for compliance and problem solving, we focus on the trade-off between the depth of cooperation and participation. We regard this trade-off as the key issue at that stage. More precisely, we study the depth versus participation dilemma by analyzing ratification behavior with regard to all global environmental treaties.

Drawing on the enforcement, managerial and rational design literatures we develop arguments on how institutional design characteristics of treaties affect participation rates and then examine the empirical relevance of these predictions. Specifically, and reflecting the arguments of the enforcement and rational design literatures, we hypothesize that treaties with more specific obligations, monitoring and enforcement mechanisms and decision-making bodies using a majority rule are likely to attract fewer countries. In contrast, and reflecting the arguments of the managerial and also the rational

[7] exceptions are von Stein 2008; Author.

design literatures, we hypothesize that treaties with 'positive' compliance mechanisms, such as assistance and dispute settlement mechanisms as well as treaty-specific secretariats, are likely to attract more countries.

We test these arguments on a new dataset that covers more than 200 global environmental treaties since 1950. With this empirical focus we hold the pool of potential member countries constant and limit unit heterogeneity at least to some extent while still allowing for strong variation in institutional design features.

We find very little support for the enforcement school's claim of a depth versus participation dilemma. The specificity of obligations has a negative but statistically insignificant effect on participation rates (measured by treaty ratifications). The existence of monitoring and enforcement mechanisms has no significant effect either. In contrast, we find more support for the managerial and rational design schools' arguments: assistance provisions in treaties have a significant and substantial positive effect on participation. Dispute settlement mechanisms increase the number of ratifications if we consider only weak types of dispute settlement mechanisms. We interpret these findings as good news for international cooperation. While countries do not appear to stay away from treaties that mandate deeper cooperation, the inclusion of positive incentives and certain dispute resolution mechanisms promote the formation of international institutions.

The next section of the paper develops the theoretical arguments and hypotheses to be tested. The third section defines the variables and presents the research design. The fourth section presents the results. Section five concludes and discusses implications of our findings.

Theory

Much of the existing literature concentrates primarily on processes in which international institutions are designed, with an emphasis on explaining institutional design characteristics[8]. Other studies focus on the implications of (prospective) ratification for international cooperation[9], and on the effectiveness of international institutions[10].

Only few studies have thus far sought to explain ratification behavior[11]. These studies focus mainly on explanatory factors pertaining to country characteristics and, in very few cases, also on interdependent behavior, that is, how ratification by one country or group of countries affects the ratification behavior of other countries.

With the exception of von Stein[12] we have not found any studies that systematically examine the implications of institutional design choices for ratification behavior. Building on arguments by the enforcement, compliance management and rational design of institutions literatures von Stein argues that policy-makers face the challenge of designing institutions in ways that „deter defection without deterring participation“[13]. While ‘soft’ commitments are likely to attract more states but result in less problem solving, ‘hard’ commitments are likely to deter participation, particularly by those countries whose behavior is least consistent with treaty objectives. She then argues that

[8] e.g. Abbott and Snidal 2000; Koremenos, Lipson and Snidal 2000; Marcoux 2009.
[9] e.g. Iida 1996; Rosendorff and Milner 2001; Schneider and Cederman 1994.
[10] e.g. Mitchell 1994; Author.
[11] e.g. Fredriksson and Gaston 2000; Neumayer 2002a; Neumayer 2002b; Beron, Murdoch and Vijverberg 2003; Neumayer 2002b; Roberts, Park and Vasquez 2004; Cole 2005; Fredriksson and Ujhelyi 2006; von Stein 2008; Author.
[12] von Stein 2008.
[13] Ibid., 243.

flexibility mechanisms are one possibility states can use to mitigate this dilemma. The empirical results are in part supportive of this argument.

The study by von Stein is important in that it has established an explicit link between the debates on compliance and institutional design on the one hand and ratification behavior on the other. We take this research further in two ways. First, we examine the effects of a larger set of institutional design characteristics, with particular emphasis on design characteristics highlighted by opposing arguments in the existing literatures. Flexibility mechanisms, which have received a lot of attention in the rational design of institutions literature[14], are less than ideal candidates for such analysis because the empirical implications one can derive for this particular design feature are consistent with predications of both the enforcement and managerial school; the implication is that flexibility mechanisms make international commitments softer and thus have a positive effect on participation. Hence the need to study the implications of institutional design features other than flexibility mechanisms. Second, we test our hypotheses on a large number of international agreements. This approach allows for strong variation on a wide range of institutional design characteristics. So far, this approach has been employed to study the causes of particular institutional design choices[15], but not the effects of institutional design choices on ratification.

The hypotheses developed in the remainder of this section are organized in terms of arguments advanced by the enforcement, managerial and rational design literatures. Drawing on the enforcement school, which claims that there is a strong depth versus participation dilemma, we should expect several institutional design variables to have

[14] e.g Abbott and Snidal 2000; Marcoux 2009; Boockmann and Thurner 2006.
[15] e.g. Koremenos 2005, Marcoux 2009, Boockmann and Thurner 2006.

negative effects on participation. Those variables include the commitment level, monitoring and enforcement mechanisms, and delegation of authority. In contrast, building on the managerial school we should expect 'positive' compliance mechanisms, such as financial and technical assistance and dispute settlement procedures, to have a participation promoting effect. Finally, some elements from the rational design literature are used to identify treaty design features that may foster or deter participation.

Commitment level

The most fundamental argument of the enforcement school is that treaties creating 'soft' commitments are likely to attract more countries than treaties creating 'hard' commitments. This very general distinction of treaty characteristics can be specified more clearly with reference to the literature on legalization[16].

Traditional international law scholars assume that "legality is best understood as a binary, rather than a continuous attribute"[17]. In their view, hard law creates legally binding obligations for states, whereas soft law creates only political or moral obligations. However, this binary view has in recent years gradually given way to notions of soft law not only as non-legally binding agreements, but also as legally binding agreements that lack features deemed necessary for an agreement to be 'hard law', such as precision of obligations or enforcement mechanisms. Consequently, many legal scholars now accept that 'hard law' can vary significantly in substance and structure. Substance refers to the precision of the agreement and the obligations imposed on the contracting parties by the

[16] e.g. Goldstein et al. 2000.
[17] Raustiala 2005, 586.

agreement; and structure refers to provisions for monitoring and enforcing commitments. Chinkin[18], for example, argues that "the use of a treaty form does not of itself ensure a hard obligation. […] If a treaty is to be regarded as 'hard', it must be precisely worded and specify the exact obligations undertaken or the rights granted."

This trend in how legal scholars define hard and soft law is also reflected in political science research on legalization. Abbott and Snidal[19] argue that legalization is not binary. That is, international rules/laws are not simply present or absent in a given policy area. Rather, the degree of their legalization varies from hard law to soft law. They distinguish between hard and soft law according to three dimensions: obligation, precision, and delegation.[20] In this context, obligation means that states are legally bound by the respective agreement and therefore subject to scrutiny under the rules and procedures of international law. Precision means that the regime's "rules unambiguously define the conduct they authorize, require, or proscribe"[21]. Delegation means that third parties are granted authority to implement, interpret, and apply the rules, and that a dispute resolution mechanism and an amendment process exist.

Both international relations and international law scholars agree that international treaties vary to a great extent in terms of the precision and depth of obligations as well as compliance mechanisms set forth therein. Some treaties do not require states to implement any changes in their policies, whereas others require major changes. For example, the UN Framework Convention on Climate change (FCCC) has imposed only

[18] Chinkin 1989, 851.
[19] Abbott and Snidal 2000.
[20] Note that Abbott and Snidal (2000) define legalization in terms of key characteristics of rules and procedures, and not in terms of their effects on state behavior.
[21] Ibid., 401.

minor obligations on states, with primary obligations concerning reporting and review, whereas the Kyoto Protocol contains clearly specified quantitative emission reduction targets that a specific group of countries must reach by a specific year.

Treaties that require clearly visible, substantial changes in existing policies are likely to generate credibility and reputation costs if a country fails to fulfill or reneges on its obligations in the future[22]. Moreover, clear targets in treaties impose implementation costs as well as costs related to a loss of flexibility, that is, the loss of ability to respond to unanticipated shocks as well as special domestic circumstances without compromising existing institutional arrangements[23]. In addition, more precise obligations lead to more and better information regarding the distributional effects of an international agreement. Hence they can generate distributional conflict and make participation in international agreements difficult[24].

The above discussion suggests that if an international agreement creates no specific obligations, all treaty members will be able to comply and participation should be high. In contrast, if obligations are specific and clearly stated then the distance between any country's current (or anticipated) policies/practices and treaty targets begins to matter. On average, therefore, treaties creating specific obligations are likely to attract fewer countries.[25]

Hypothesis 1: International agreements creating specific obligations are ratified by fewer countries.

[22] Martin 2000; Simmons 2000.
[23] e.g. Koremenos 2005; von Stein 2008.
[24] Goldstein and Martin 2000.
[25] This argument assumes of course that specific obligations are on average more costly than non-specific obligations. Particularly in view of reputation costs we think that this assumption is very plausible.

Negative compliance mechanisms

In line with the literature on legalization we do not only consider the precision of obligations, but also the existence of negative compliance mechanisms. That is, in examining the depth versus participation dilemma we also need to investigate the implications of monitoring and enforcement provisions. With reference to the enforcement school's arguments, we label these mechanisms as 'negative' compliance mechanisms, assuming that they are mainly meant to enable cooperating states to detect and punish defection.

Many, but by no means all, international agreements set up monitoring and enforcement mechanisms. Strong monitoring and enforcement measures are widely thought to promote compliance with agreements: they increase the credibility of commitments and reputation costs associated with reneging on commitments; hence they serve to prevent opportunistic behavior and decrease post agreement costs. However, agreements that delegate authority for such purposes to an international or supranational body are often perceived by states as a threat to their sovereignty and autonomy.

For instance, Goldstein and Martin[26] examine the effect of WTO legalization on trade liberalization and argue that in light of uncertainty regarding the costs of trade agreements at the domestic level "[…] fully legalized procedures that apply high, deterministic penalties for non-compliance could backfire leading to an unraveling of the process of liberalization"[27]. Also, Abbott and Snidal[28] note that delegation of monitoring authority makes it more difficult for states to interpret the respective agreement in a self-

[26] Goldstein and Martin 2000.
[27] Ibid., 621.
[28] Abbott and Snidal 2000.

serving or biased manner. This makes states reluctant to delegate authority for the purpose of monitoring and enforcement. Similarly, Downs et al.[29] argue that states avoid agreements that have strong enforcement mechanisms. Consequently, Goldstein and Martin[30] suggest that international agreements should incorporate only some flexibility in their enforcement procedures since too little enforcement may encourage opportunism and too much may deter cooperative deals all together. Cole[31] argues that states ratify international treaties with monitoring mechanisms only when the compliance costs are low.

Building on this literature, we argue that countries perceive both monitoring and enforcement mechanisms as limiting their autonomy and sovereignty and thus as costly. Consequently, countries should be more reluctant to join treaties that create monitoring and/or enforcement mechanisms.

Hypothesis 2a: International agreements with monitoring mechanisms are ratified by fewer countries.

Hypothesis 2b: International agreements with enforcement mechanisms are ratified by fewer countries.

Following the logic of the enforcement school we should also expect differences in ratification rates depending on the combination of institutional design variables. Notably, treaty participation should be most negatively affected by a combination of specific obligations and the existence of monitoring and enforcement mechanisms, and less so if only specific obligations but no monitoring and enforcement mechanisms are present.

[29] Downs, Rocke and Barsoom 1996.
[30] Goldstein and Martin 2000.
[31] Cole 2005.

Decision making rules

While monitoring and enforcement mechanisms involve some delegation of authority there are also other treaty design features that have similar consequences. One of these features concerns voting rules.

Assuming that countries join international treaties to advance their own interests they should be concerned with the formal voting procedures that treaty members use to reach collective decisions – for instance decisions to amend the treaty, interpret treaty rules in particular ways, appoint key officials in the treaty secretariat, or allocate funding for treaty-related activities. Existing international agreements use a wide variety of decision-making rules, such as unanimity, consensus, majority, veto, weighted voting, etc. Unanimity is often the default voting-rule in international decision making bodies and international treaties because it entails low sovereignty costs[32]. It implies that decisions can only be taken with the explicit or implicit (e.g. through abstention) endorsement of all members. This implies that every treaty member has veto power.

Majority voting, in contrast, prevents individual member countries from blocking a decision and, with very few exceptions (e.g. the World Bank or the IMF), each country has one vote – that is, each country's vote carries the same weight. In most cases, majority rule requires approval by 50 percent plus one of the voting members to pass a measure. In some cases, treaties require super-majorities (e.g. two-thirds and/or a quorum). Unlike unanimity, under majority rule no single country has a significant formal capacity to block or prevent a proposed measure. Consequently, majority voting entails a greater loss of sovereignty over treaty-related decisions than unanimity voting.

[32] Zamora 1980.

Accordingly, we should expect countries to be more reluctant to join agreements that operate with a majority voting rule.

Hypothesis 3: International agreements with majority voting are ratified by fewer countries than agreements with unanimity voting.

Assistance

Both the managerial perspective and the rational design literature emphasize 'positive' compliance mechanisms. According to these two schools of thought, we should expect treaty design features that help countries implement their commitments to have a positive effect on participation. Such features include financial and technical assistance, dispute settlement procedures, treaty-specific secretariats, and regular meetings.

The enforcement school assumes that states are less willing to ratify international agreements that are costly to implement. Policy-makers do, of course, know this when designing agreements. In many cases they try to affect cost/benefit calculations of potential member countries by offering treaty-sponsored positive incentives, most notably technical and financial assistance[33]. From a managerial and rational design viewpoint, we should expect such assistance to affect participation positively.

Hypothesis 4: International agreements that include provisions for technical and financial assistance are ratified by more countries.

[33] Abbott and Snidal 1998.

Assistance provisions may also bear on cost/benefit calculations of states concerning commitment levels. In particular, agreements with more specific obligations are likely to attract more countries if they also offer assistance.

Dispute settlement

States incorporate dispute settlement procedures in some (but by no means all) agreements to strengthen the credibility of commitments and enhance compliance with and thus the value of these agreements[34]. Several authors have argued that dispute settlement procedures can enhance compliance by clarifying legal rules and the meaning of an agreement in disputes over how to interpret its terms in particular cases[35]. In addition, dispute settlement procedures can help mitigate problems of information regarding the implementation of an agreement. Hence they can increase transparency and reduce transaction costs[36].

Dispute settlement procedures may, however, also deter participation because they tend to decrease governments' policy discretion and control over disputes and their outcomes. Morris[37], for instance, argues that "[…] states are particularly unwilling to enter into broad commitments to adjudicate future disputes, the content and contours of which cannot be foreseen." While the loss of policy discretion and control over potential future disputes, which is also a delegation problem, may negatively affect participation, governments may still be willing to ratify agreements that include dispute settlement

[34] e.g. Guzman 2002.
[35] e.g. Chayes and Chayes 1993.
[36] e.g. Smith 2000 Rosendorff 2005.
[37] Morris 2001, 15.

provisions in order to obtain a credible (because of a dispute settlement procedure) commitment by other countries to comply with the agreement. Indeed, Rosendorff[38], for example, shows that preferential trade agreements (PTAs) that include dispute settlement procedures are more acceptable to a wider range of countries.

Based on the theoretical arguments just discussed, the effect of dispute settlement mechanisms is theoretically ambiguous. That is, it remains empirically open whether positive managerial compliance benefits or negative delegation (sovereignty and autonomy) costs dominate ratification choices.

Hypothesis 5: Agreements including dispute settlement mechanisms are ratified by more (fewer) countries.

Secretariats

International agreements often create treaty-specific secretariats or delegate tasks to existing international bodies[39]. Sandford[40] notes that the most important tasks of such secretariats are: to help parties meet their commitments, and prevent and manage implementation conflicts; to assist countries, especially developing ones, with capacity building; and to provide policy guidance. Treaty secretariats usually also play a central role in coordinating and managing data/information flows. They coordinate information collection by individual countries, information analysis and dissemination. Another important task of secretariats is to assist member countries in preparing treaty-related conferences and associated negotiations and providing them with logistical and

[38] Rosendorff 2005.
[39] Abbott and Snidal 1998.
[40] Sandford 1994.

administrative support for these. Secretariats are, in many cases, also tasked to mobilize financial resources and technical expertise to support countries in implementing treaty commitments.

Similar to the argument on dispute settlement procedures the effect of secretariats is theoretically ambiguous. Following the managerial logic we should expect a positive effect on participation because secretariats support countries in implementing their treaty commitments. In contrast, to the extent prospective member states expect principal-agent problems (the secretariat developing 'a life of its own') strong secretariats could also deter participation; again, this is a delegation problem.[41] Moreover, from an empirical viewpoint it is possible that treaty secretariats are installed primarily for treaties with a more ambitious agenda. The existence of a treaty-specific secretariat may thus proxy for deeper cooperation and affect participation negatively. Empirically, it is therefore open whether, with respect to this particular treaty design feature, the depth versus participation or the managerial logic dominates ratification decisions.

Hypothesis 6: International agreements with treaty-specific secretariats are ratified by more (fewer) countries.

Meetings

Treaties also differ with regard to whether they require regular meetings of member states. Similar to the argument on treaty-specific secretariats, provisions on regular meetings could have a positive or a negative effect on ratification rates.

[41] cf. Frey 1997; Pollack 1997.

On the one hand, regular meetings can help countries implement their treaty commitments more efficiently, for instance because they facilitate exchanges of information on best practices. They can also help countries resolve disagreements and reduce transactions costs of treaty revisions or extensions. In this sense, and in line with the managerial school's logic, treaties that require regular meetings should attract more countries. On the other hand, regular meetings are associated with costs, such as coordinating the members to the treaty, arranging for a time and place and taking decisions. They may also proxy for treaties that are more demanding. Consequently, the effect of treaty provisions mandating regular meetings on ratification rates is theoretically ambiguous.

Hypothesis 7: International agreements requiring regular meetings are ratified by more (fewer) countries.

Research Design

We test the above hypotheses on a new dataset that includes information on ratification behavior with respect to more than 200 global environmental agreements in 1950 - 2006. We have chosen global environmental agreements for two reasons.

First, by restricting the analysis to one policy-area we are able to limit unit-heterogeneity at least to some extent and are thus able to take care of remaining heterogeneity quite efficiently by means of a limited set of control variables. At the same time, there is sufficient variation on all key explanatory variables in the analysis.

Second, our analysis requires a sample of treaties that can, in principle, attract participants (ratifying countries) from exactly the same population of countries in any given year. Global environmental treaties, which are open for ratification by all countries in the international system, meet this criterion and also meet our interest in obtaining a rather large sample (in our case 212 treaties).

Our **dependent variable** is the number of ratifications per global environmental agreement at the end of our time-period of analysis. It captures how many ratifications a given agreement has attracted by the year 2006. This implies that the analysis is cross-sectional. The cross-sectional design is motivated by the fact that all of our key explanatory variables vary across treaties, but not across time or across countries.

The information on ratifications was retrieved from CIESIN and Mitchell[42]. Our sample includes global environmental treaties and protocols to those treaties, but excludes amendments to treaties or protocols. For example, we include both the UN Framework Convention on Climate Change and the Kyoto Protocol. Protocols are usually not fully independent of treaties. However, there are sufficient institutional/design differences between the large majority of treaties and related protocols to warrant inclusion of both types in our sample. For example, the Vienna framework convention for protecting the stratospheric ozone layer does not include specific reduction targets for ozone depleting substances, and it does not provide for assistance; but subsequent protocols to this convention include such measures. In contrast, amendments to treaties are often minor adjustments that in most cases do not introduce design modifications that would change the values of our key explanatory variables. To examine whether our results are robust to

[42] CIESIN 2006; Mitchell 2002-2008.

potential problems associated with non-independent observations we run all statistical models with two samples, one that includes treaties and protocols (n=212), and one that includes only treaties (n=145). As shown in the descriptive statistics (see Appendix), the number of ratifications per treaty/protocol varies from 1 to 180.

Since we are dealing with count data (number of countries that have ratified a given treaty by the end of the period of analysis) we assume a negative binomial process with the number of years a treaty has been open for ratification as exposure time. The latter means that we control for the fact that treaties that were concluded earlier have had more time to attract ratifications. We use the negative binomial rather than a poisson specification because of overdispersion.

The **independent variables** in hypotheses 1-7 are coded by means of a content-analysis of treaty texts. The coding instructions and the dataset are available from the authors. The explanatory variable in Hypothesis 1, **obligation**, captures whether a treaty contains ambiguous or no specifications pertaining to standards or goals to be achieved, or whether it quantifies standards or goals, for example in the form of specific emission targets. It is coded 1 if the treaty includes specific quantitative targets and 0 otherwise.

The first explanatory variable in Hypothesis 2, **monitoring**, is a dummy variable indicating whether or not the treaty includes monitoring provisions. The second explanatory variable in Hypothesis 2, **enforcement**, is also a dummy variable indicating whether or not the treaty includes enforcement provisions.

With regard to hypothesis 3, we operationalize **majority** and **unanimity** to take the value one if decisions in the highest treaty-related body are taken by majority, respectively unanimity, and 0 otherwise.

Assistance, which is the explanatory variable in Hypothesis 4, indicates whether member countries are to be granted technological and/or financial assistance to meet the treaty's goals. It is coded 1 if such assistance provisions are included in the treaty, and 0 otherwise. Since international treaties often mandate preferential assistance for developing countries, we distinguish between assistance that is aimed at all member countries of a treaty and assistance that is aimed only at developing countries.

The explanatory variable in Hypothesis 5, **dispute settlement**, indicates whether an agreement includes dispute settlement provisions. It is coded 1 if the respective agreement includes such provisions, and 0 otherwise. We distinguish three categories of dispute settlement: highly elaborated dispute settlement mechanisms that are institutionalized within the treaty (**dispute, elaborated**)[43], those that are part of the treaty framework, but only on an ad hoc basis (**dispute, ad hoc**) and those that delegate dispute settlement to a different, treaty-external institution (**dispute, delegated**); with no dispute settlement provisions serving as the baseline category.

We measure **secretariat**, the explanatory variable in Hypothesis 6, with two dummy variables, one indicating whether a treaty establishes its own, treaty-specific secretariat and the other indicating whether the treaty associates itself with an existing secretariat (e.g. by delegating this task to UNEP). For both dummy variables the baseline category (0) is that a treaty does not create any secretariat.

Finally, **meetings** (hypothesis 7) is a dummy variable measuring whether or not an agreement requires regular meetings of its member states.

[43] For example, the Convention on the Prevention of Marine Pollution from Land-Based Sources elaborates in great detail the establishment of a tribunal to resolve disputes occurring among its member countries.

In addition, we control for general environmental issue characteristics that may affect both treaty design characteristics and participation rates. **Global public good** indicates whether an agreement deals with a global public good or a national or sub-national public good. It is coded 1 if the treaty deals with internationally or globally shared natural resources or ecosystems, and 0 if there is explicit reference to national territory/waterways, domestic animals, etc. An additional variable deals with those agreements for which the distinction between international/global and domestic public goods is not sufficiently clear. This variable, **global/domestic public good**, is coded 1 if the distinction is difficult, and 0 for clearly domestic public goods. In line with the literature on global public goods[44] we expect that the free-rider problem will make countries more reluctant to join agreements that seek to produce such international or global goods.

We also use several dummy variables to control for specific issue areas treaties deal with. In particular, we include dummies for the following issue areas: **pollution**, **species**, **nuclear**, and **habitat**, with treaties dealing with agricultural issues serving as the baseline category.

Descriptive statistics and binary correlations are shown in Tables A.1, A.2 and A.6 of the Appendix.

[44] e.g. Barrett 2006.

Results

We begin with a discussion of the main results. We then examine how different combinations of our independent variables affect ratification rates and also discuss the robustness of our results.

Main Results

Table 1 displays the main results. The second column reports the negative binomial coefficients (beta). Column three shows the exponent of these coefficients (exp(beta)) and the last column indicates percentage changes to facilitate quantitative interpretation.

Insert Table 1 about here

Overall, we find very little support for the 'depth versus participation' claim. The coefficient on the specificity of obligations variable (obligation) is negative, but statistically insignificant. Hence the evidence does not support Hypothesis 1. Furthermore, the coefficients on both the monitoring and enforcement variables are not statistically significant. The empirical analysis does, therefore, not support Hypotheses 2a and 2b. This finding suggests that demanding treaties, in the sense that they incorporate clear-cut targets and provide for monitoring and enforcement mechanisms, do not deter ratification.

Contrary to our expectations, treaties that use majority voting are joined by more countries, whereas unanimity voting does not have a statistically significant effect. This result is surprising, given that majority voting imposes more constraints on countries' autonomy and sovereignty and thus one should expect treaties with majority voting to be ratified by fewer countries.

Turning to the managerial perspective, Hypothesis 4 receives strong support. The coefficients both on assistance to all countries and assistance to developing countries are positive and highly significant. The effect is also very strong in substantive terms. General assistance increases participation by 81% and assistance to developing countries increases participation by 446%.

The effect of dispute settlement mechanisms depends on the type of dispute mechanisms set up by a treaty. The existence of provisions delegating dispute settlement to bodies outside a treaty (such as the International Court of Justice) increases the ratification rate by 124%. Similarly, provisions for ad hoc dispute settlement procedures within a treaty increase the ratification rate by 74%. Such ad-hoc provisions usually hold that countries, in case of a dispute, should find a mutually acceptable solution, but do not specify in detail what mechanisms should be used to that end. These findings support the argument that dispute settlement mechanisms help to reduce ambiguity, clarify the treaty rules and provide information, and are thus attractive to countries. Surprisingly, however, the existence of elaborate dispute settlement procedures inside a treaty does not have a statistically significant effect. We interpret these findings as supporting the management and rational design school perspective because the presumably somewhat weaker dispute

settlement mechanisms promote participation, whereas the more complex and presumably more costly mechanisms of this kind do not deter participation.

With regard to Hypothesis 6, the ratification propensity for treaties with their own secretariat is 46% lower. This finding is in line with the argument that agreements establishing a new secretariat are also agreements with a more ambitious agenda and are therefore more burdensome for countries. This interpretation is in line with the enforcement school, which posits that more demanding treaties discourage ratification. Finally, in contrast to hypothesis 7, regular meetings mandated by a treaty do not have a statistically significant effect on participation.

The control variables behave largely as expected. Agreements dealing with global public goods attract fewer countries, compared to agreements dealing with local public goods. The coefficients of both indicators for public goods are negative and significant. Agreements dealing with global public goods are around 50% less likely to be ratified. With regard to issue areas, agreements on species and habitat appear to be less attractive than other agreements.

Regarding the appropriateness of the negative binomial model, alpha is statistically significantly larger than zero. We thus have to reject the null hypothesis of no over-dispersion. This implies that the negative binomial rather than a simple poisson model is the adequate model specification.

Combined effects of independent variables

To illustrate how different combinations of our independent variables affect the number of countries ratifying a specific treaty, Table 2 shows the number of ratifications our regression models predict for certain combinations of institutional design features. Such analysis is interesting because, for instance, the effects of specificity of obligations and monitoring and enforcement might be mutually reinforcing. That is, monitoring and enforcement of obligations, to the extent the latter are specific, are likely to generate higher implementation costs and higher non-compliance costs for countries that join the respective treaty. In contrast, those costs are likely to be smaller for agreements with specific obligations but no monitoring and enforcement mechanisms. Similarly, the specificity of obligations and assistance could be important in combination because assistance could offset the costs imposed by specific treaty obligations.

Insert Table 2 and 3 about here

For the purpose of this analysis we focus on several well-known global environmental treaties. We set all independent and control variables to the values for the respective treaty and show both our predictions and the actual ratification rates for these treaties. We opt for this approach because all independent variables need to be set to a specific value in order to obtain predicted values for the dependent variable.

With respect to different combinations of monitoring, enforcement and specificity of obligations we do not observe the negatively reinforcing effect the enforcement school

would have expected. Both the Protocol on Substances that Deplete the Ozone Layer and the Kyoto Protocol are characterized by a relatively high number of predicted ratifications, despite combining specific obligations with monitoring and enforcement mechanisms. Similarly, the United Nations Convention on the Law of the Sea and the International Convention to Combat Desertification are characterized by a high number of predicted ratifications, although they combine monitoring provisions with specific obligations. In contrast, the Convention on the High Seas and the Convention on the Conservation of Migratory Species come with a relatively low number of predicted ratifications, although both of them contain neither specific obligations nor enforcement provisions. Consequently, the enforcement school's prediction that specific obligations combined with monitoring and enforcement provisions should reduce the ratification rate is not supported. This result is not too surprising, however, because none of the three variables has a significant effect on treaty ratification to begin with.

Interestingly, we observe that all treaties mandating assistance to developing countries (see Table 2) are characterized by a rather high number of predicted ratifications, independently of whether they also contain specific obligations or not. This result lends some support to the conjecture that assistance can indeed offset costs imposed by specific treaty obligations.

Concerning the fit of our model more generally, we observe that in most cases, such as the Convention on the High Seas, the International Convention for the Regulation of Whaling, and the Protocol on Substances that Deplete the Ozone Layer, the predicted number of ratifications is very close to the actual number of ratifications. However, in some cases our predictions deviate from the actual number of ratifications. Examples are

the United Nations Framework Convention on Climate Change (UNFCC), for which we predict ratification by 115 countries, whereas in reality 170 countries have ratified, and the Kyoto Protocol, for which we predict 76 ratification, whereas in reality 109 countries have ratified. One reason for underestimating ratifications in those two cases is that they deal with a global public good. Treaties dealing with global public goods are, according to theory and in correspondence with our models shown in Table 1, ratified by fewer countries. Nonetheless, both the UNFCC and the Kyoto Protocol reached high popularity, which makes them exceptional and explains the deviation between the actual and predicted ratification number.[45]

Robustness of Results

The results discussed so far are based on the sample including both 'stand-alone' global environmental agreements and related protocols (but excluding amendments). Table A.3 in the Appendix shows that our main results are robust to the exclusion of protocols, which may not be independent of the respective main agreement. The only exceptions are the coefficients on majority voting and secretariat, which turn insignificant (but do not change signs) when protocols are excluded. This might be due to the smaller sample size.

Another, quite fundamental, conceptual challenge to our findings could be that international agreements are, a priori, designed in ways that accommodate most countries' interests. In the most extreme case, treaties may simply reflect lowest common denominator bargaining outcomes. If this were the case, our empirical approach might

[45] In fact, if we calculate the predicted number of ratifications for both treaties while setting the value of global public goods to zero, we predict a much higher number of countries to ratify the specific treaty.

produce biased estimates because we have not explicitly accounted for the factors that lead to specific bargaining outcomes and how those outcomes then influence ratification behavior. We do not know of any large-N empirical work that includes both the bargaining and ratification process in one model. We submit, however, that our results are unlikely to be biased for at least two reasons.

First, if international agreements were, as the neo-realist school of thought in International Relations tends to argue, only 'frozen interests', we should not observe such strong variation in ratification behavior across agreements (see descriptive statistics in the Appendix). In other words, if negotiators were willing and able to design treaties so that these treaties accommodate most or even all potential member countries' (and also legislatures') interests, we should see only little or even no variation in ratification rates between different treaties. In most international negotiations we know of, a large majority or even all bargaining parties must accept, adopt or sign a treaty text before the ratification phase can begin. If the bargaining process thus acted as an effective filter through which only those agreement acceptable to the large majority of negotiating countries could pass why do not all treaties that make it through this filter eventually attract the same number of countries? Following a similar logic we should not observe statistically significant and substantively important effects of our key independent variables if variation in ratification rates across treaties were driven primarily by factors that determine bargaining outcomes.

Second, neo-realist scholars will probably argue that bargaining outcomes are unlikely to be congruent with every participant country's preferences (see first point), but are more likely to correspond to what powerful countries want. That is, less powerful countries

may accept bargaining outcomes and thereby allow for the ratification phase to begin, but only because of political or other pressure by more powerful countries. The empirical implication of this argument is that, to the extent more powerful countries are more likely to obtain the bargaining outcomes they want, they should be more likely to ratify international agreements in whose negotiation they have participated.

In most general terms, the two aforementioned points also imply that the coefficients in our models could be biased if we did not control for variables that could influence both the bargaining and the ratification outcome. Power, political regime type, and level of development (income) are arguably the most serious candidate variables of this kind. Hence, we examine the possibility that the effect of our key independent variables is conditional on countries' power, regime type, or income. To that end, we estimate our model for ten different samples, split according to a country's population or income, two distinct proxies for power and capacity, and according to whether the country is a democracy or an autocracy. By considering the number of ratifications for different groups of countries (e.g. the top 10% in terms of income), we control for whether the coefficients change when looking at specific subgroups of countries only. If the results differed significantly across sub-samples this could indicate that specific types of countries may have obtained systematically better (or worse) bargaining outcomes.

Tables A.4 and A.5 in the Appendix show that our main findings survive in the different sub-samples. This result supports the assumption that treaty design characteristics are indeed important determinants of ratification behavior. This assumption is also supported by Table A.6 in the Appendix, which shows the correlations between ratification rates in the different sub-samples. Table A.6 indicates that ratification rates in the various income

and population groups, and between democracies and autocracies are highly correlated. That is, the effects of our explanatory variables on ratification behavior do not vary much between more and less powerful (in terms of population and income) and between democratic and non-democratic countries.

Conclusion

The formation of international treaties is not complete when formal international bargaining comes to an end. International treaties can only get off to an effective start once bargaining outcomes, which in most cases are formalized through a legally binding treaty, are ratified by the negotiators' home countries. While most of the existing literature on the formation of international treaties concentrates on the negotiation of treaties as well as treaty compliance and effectiveness, we focus on the ratification stage. The reason is that ratification is a key prerequisite for treaty compliance, effectiveness of international treaties, and thus ultimately successful international problem solving. In particular we examine whether treaty design features that are expected to increase the depth of cooperation among countries affect participation in those treaties.

Building on arguments advanced by the enforcement and rational design schools' we hypothesize that treaty design features aimed at increasing the depth of cooperation, such as clearly stated targets, monitoring and enforcement mechanisms, or majority decision-making, should decrease treaty participation mainly because of loss of sovereignty concerns. In contrast, based on arguments advanced by the managerial and also the rational design school, we hypothesize that 'positive' compliance mechanisms that aim at

clarifying and facilitating the implementation of treaty rules, such as technical and financial assistance and dispute settlement mechanisms, should have a positive effect on treaty participation .

We test these arguments on a new dataset that covers more than 200 global environmental treaties since 1950. We do not find significant support for the enforcement school's argument that more demanding treaties deter participation. In other words, we do not find convincing evidence for a depth versus participation dilemma in global environmental cooperation. To the contrary, our results strongly support the managerial and rational design schools' presupposition that treaties with assistance provisions and dispute resolution mechanisms are more attractive.

Of course, we cannot exclude the possibility that some of the toughest international problems are kept off the international agenda or that negotiations fail to produce treaties. Since our analysis focuses on the ratification stage of international cooperation only, we cannot rule out that such difficulties exist at the bargaining stage. In this sense, it is therefore possible that at the bargaining stage there exist some form of a 'depth versus participation' dilemma as postulated by the enforcement school. Nevertheless, once the ratification stage is reached our results leave considerable room for optimism regarding the prospects for international environmental cooperation.

Our optimism is based on the rational behavior of states. Given that countries do not appear to stay away from treaties that mandate deeper cooperation, as shown by our analysis, particular treaty designs, such as treaties including dispute resolution mechanisms, can foster cooperation. The main reason is that such mechanisms carry the potential of enticing hesitant countries to participate by decreasing uncertainty

surrounding the behavior of others. In addition, financial, technical or other types of assistance that help countries, especially less developed ones, implement treaty obligations can serve as an important tool for securing ratification and solving international problems. The very strong global participation in the Montreal Protocol for protecting the stratospheric ozone layer, for example, can to a considerable degree be attributed to very substantive assistance mechanisms in that treaty and its amendments. Recent rounds of negotiation on climate change mitigation, such as the Copenhagen conference, have also made it obvious that a very strong assistance mechanism within the FCCC will be required to achieve emissions cuts in developing countries.

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Table 1: Main results

	coefficient β	exp(β)	%
obligations	-0.13	0.87	-12.6
	(0.17)		
monitoring	0.08	1.09	8.7
	(0.17)		
enforcement	0.01	1.01	0.9
	(0.16)		
majority	0.40	1.49	48.5
	(0.21)*		
unanimity	0.02	1.02	1.6
	(0.23)		
assistance, all	0.59	1.81	81.0
	(0.22)***		
assistance, developing	1.70	5.46	446.3
	(0.22)***		
dispute, delegated	0.79	2.21	121.2
	(0.17)***		
dispute, ad hoc	0.55	1.74	73.6
	(0.24)**		
dispute, elaborated	-0.22	0.81	-19.3
	(0.22)		
own secretariat	-0.63	0.53	-46.8
	(0.25)**		
existing secretariat	-0.36	0.70	-29.9
	(0.22)		
meetings	-0.32	0.72	-27.6
	(0.21)		
global public good	-0.74	0.48	-52.2
	(0.18)***		
global/domestic public good	-0.67	0.51	-48.8
	(0.30)**		
pollution	-0.12	0.89	-11.0
	(0.17)		
species	-0.48	0.62	-38.2
	(0.17)***		
nuclear	-0.23	0.79	-20.7
	(0.22)		
habitat	-0.35	0.70	-29.6
	(0.16)**		
Constant	0.94		
	(0.24)***		
alpha	0.72		
	(.07)***		
Observations	212		
Log likelihood	-890.42		
LR chi2(11)	165.58		
Prob > chi2	0.00		
Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%			

Table 2: Combinations of certain treaty characteristics

	United Nations Framework Convention on Climate Change	Kyoto Protocol To The United Nations Framework Convention On Climate Change	International Convention to Combat Desertification in those Countries Experiencing Serious Drought and or Desertification	Protocol on Substances that Deplete the Ozone Layer	United Nations Convention on the Law of the Sea
Predicted ratifications	115	76	130	171	121
Actual ratifications	170	109	161	164	115
obligations	0	1	1	1	1
monitoring	1	1	1	1	1
enforcement	0	1	0	1	0
majority	1	1	1	1	1
unanimity	0	0	0	0	0
assistance, all	0	0	0	0	0
assistance, developing	1	1	1	1	1
dispute, delegated	1	1	1	1	1
dispute, ad hoc	0	0	0	0	0
dispute, elaborated	0	0	0	0	0
own secretariat	1	0	1	0	1
existing secretariat	0	1	0	1	0
meetings	1	1	1	1	1
global public good	1	1	0	1	1
global/domestic public good	0	0	0	0	0
pollution	1	1	0	1	1
species	0	0	0	0	0
nuclear	0	0	0	0	0
habitat	0	0	1	0	0

Table 3: Combinations of certain treaty characteristics

	Convention on the High Seas	International Convention for the Prevention of Pollution from Ships (MARPOL)	International Convention for the Regulation of Whaling	Convention on the Conservation of Migratory Species of Wild Animals
Predicted ratifications	41	49	24	34
Actual ratifications	59	26	32	59
obligations	0	1	1	0
monitoring	0	1	1	1
enforcement	0	0	0	0
majority	0	1	1	1
unanimity	0	0	0	0
assistance, all	0	1	0	0
assistance, developing	0	0	0	0
dispute, delegated	0	0	0	1
dispute, ad hoc	0	0	0	0
dispute, elaborated	0	1	0	0
own secretariat	0	0	1	0
existing secretariat	0	1	0	1
meetings	0	0	1	1
global public good	1	1	1	1
global/domestic public good	0	0	0	0
pollution	1	1	0	0
species	0	0	1	1
nuclear	0	0	0	0
habitat	0	0	1	0

Appendix

Table A.1 Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
number of ratifications	212	32.46	40.55	1	180
obligations	215	.75	.43	0	1
monitoring	215	.68	.47	0	1
enforcement	215	.30	.46	0	1
majority	215	.53	.50	0	1
unanimity	215	.26	.44	0	1
assistance, all	215	.11	.32	0	1
assistance, developing	215	.12	.32	0	1
dispute, delegated	215	.36	.48	0	1
dispute, ad hoc	215	.10	.30	0	1
dispute, elaborated	215	.19	.39	0	1
own secretariat	215	.30	.46	0	1
existing secretariat	215	.44	.50	0	1
meetings	215	.73	.44	0	1
global public good	215	.69	.46	0	1
global/domestic public good	215	.08	.27	0	1
pollution	215	.45	.50	0	1
species	215	.34	.48	0	1
nuclear	215	.13	.34	0	1
habitat	215	.23	.42	0	1

Table A.2 Frequencies

		Frequency	Percent
obligations	0	54	25.12
	1	161	74.88
monitoring	0	69	32.09
	1	146	67.91
enforcement	0	150	69.77
	1	65	30.23
majority	0	101	46.98
	1	114	53.02
unanimity	0	159	73.95
	1	56	26.05
assistance, all	0	191	88.84
	1	24	11.16
assistance, developing	0	190	88.37
	1	25	11.63
dispute, delegated	0	138	64.19
	1	77	35.81
dispute, ad hoc	0	194	90.23
	1	21	9.77
dispute, elaborated	0	174	80.93
	1	41	19.07
own secretariat	0	151	70.23
	1	64	29.77
existing secretariat	0	121	56.28
	1	94	43.72
meetings	0	58	26.98
	1	157	73.02
global public good	0	66	30.70
	1	149	69.30
global/domestic public good	0	198	92.09
	1	17	7.91
pollution	0	118	54.88
	1	97	45.12
species	0	141	65.58
	1	74	34.42
nuclear	0	186	86.51
	1	29	13.49
habitat	0	165	76.74
	1	50	23.26

Table A.3 Main results, excluding protocols

	coefficient β
obligations	-0.21
	(0.17)
monitoring	0.26
	(0.17)
enforcement	-0.21
	(0.18)
majority	0.33
	(0.22)
unanimity	-0.22
	(0.22)
assistance, all	0.61
	(0.25)**
assistance, developing	1.87
	(0.26)***
dispute, delegated	0.73
	(0.17)***
dispute, ad hoc	0.59
	(0.27)**
dispute, elaborated	-0.26
	(0.25)
own secretariat	-0.37
	(0.24)
existing secretariat	-0.22
	(0.23)
meetings	-0.50
	(0.21)**
global public good	-0.84
	(0.19)***
global/domestic public good	-0.28
	(0.37)
pollution	-0.27
	(0.18)
species	-0.66
	(0.19)***
nuclear	-0.30
	(0.23)
habitat	-0.27
	(0.17)
constant	1.17
	(0.26)***
alpha	0.57
	(0.68)***
Observations	145
Log likelihood	-605.37
LR chi2(11)	147.54
Prob > chi2	0.00
Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%	

Table A.4: Results for Different Samples

	10 % least populous countries	10 % most populous countries	80 % in the middle	25 % least populous countries
obligations	-0.03	-0.34*	-0.10	-0.14
	(0.26)	(0.18)	(0.17)	(0.23)
monitoring	-0.03	0.23	0.01	0.09
	(0.27)	(0.18)	(0.17)	(0.23)
enforcement	-0.02	-0.05	0.00	0.02
	(0.26)	(0.18)	(0.16)	(0.22)
majority	0.49	0.47**	0.32	0.49
	(0.35)	(0.23)	(0.22)	(0.30)
unanimity	-0.02	-0.05	-0.06	-0.13
	(0.37)	(0.26)	(0.23)	(0.31)
assistance, all	0.64*	0.61***	0.58***	0.48
	(0.36)	(0.24)	(0.22)	(0.30)
assistance, developing	2.18***	1.49***	1.66***	1.88***
	(0.37)	(0.25)	(0.23)	(0.31)
dispute, delegated	0.80***	0.62***	0.84***	0.87***
	(0.30)	(0.19)	(0.18)	(0.25)
dispute, ad hoc	0.90**	0.60**	0.57**	0.57*
	(0.42)	(0.28)	(0.25)	(0.34)
dispute, elaborated	-0.22	-0.30	-0.26	-0.27
	(0.36)	(0.24)	(0.22)	(0.31)
own secretariat	-1.16***	-0.57**	-0.60**	-0.75**
	(0.41)	(0.26)	(0.25)	(0.36)
existing secretariat	-0.53	-0.50**	-0.30	-0.27
	(0.36)	(0.23)	(0.23)	(0.32)
meetings	-0.64**	-0.34	-0.25	-0.56**
	(0.31)	(0.22)	(0.21)	(0.28)
global public goods	-0.73**	-0.70***	-0.74***	-0.81***
	(0.30)	(0.20)	(0.18)	(0.25)
global/domestic public goods	-0.50	-1.04***	-0.57*	-0.55
	(0.50)	(0.34)	(0.31)	(0.43)
pollution	-0.17	0.09	-0.12	-0.09
	(0.29)	(0.19)	(0.18)	(0.25)
species	-0.70**	-0.01	-0.51***	-0.80***
	(0.30)	(0.19)	(0.18)	(0.25)
nuclear	-0.45	0.05	-0.20	-0.41
	(0.34)	(0.23)	(0.22)	(0.29)
habitat	-0.61**	-0.42**	-0.38**	-0.38*
	(0.28)	(0.19)	(0.17)	(0.23)
constant	-1.37***	-1.34***	0.65***	-0.55*
	(0.36)	(0.25)	(0.24)	(0.32)
alpha	1.32	0.60	0.75	1.17
Observations	212	212	212	212
Log likelihood	-376.0	-469.0	-832.7	-547.5
LR chi2(11)	89.5	114.2	158.0	119.7
Prob > chi2	0	0	0	0
Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1				

Table A.5: Results for Different Samples

	10 % poorest countries	10 % richest countries	80 % in the middle	25 % poorest countries	Democracies	Autocracies
obligations	0.08	-0.16	-0.13	-0.00	-0.13	-0.01
	(0.37)	(0.22)	(0.17)	(0.35)	(0.19)	(0.27)
monitoring	0.74*	-0.05	0.01	0.59	0.01	0.44
	(0.40)	(0.22)	(0.17)	(0.36)	(0.19)	(0.27)
enforcement	-0.42	0.11	-0.00	-0.47	0.06	-0.34
	(0.37)	(0.21)	(0.16)	(0.36)	(0.18)	(0.26)
majority	0.65	0.18	0.40*	0.60	0.32	0.63*
	(0.46)	(0.28)	(0.22)	(0.45)	(0.24)	(0.34)
unanimity	-1.27**	0.35	-0.11	-1.54***	0.15	-0.72**
	(0.50)	(0.31)	(0.23)	(0.46)	(0.26)	(0.35)
assistance, all	1.13**	0.40	0.64***	0.85*	0.56**	0.87**
	(0.50)	(0.28)	(0.22)	(0.48)	(0.24)	(0.34)
assistance, developing	2.61***	1.21***	1.74***	2.44***	1.55***	2.27***
	(0.47)	(0.30)	(0.23)	(0.46)	(0.25)	(0.34)
dispute, delegated	0.92**	0.69***	0.81***	0.92**	0.72***	0.89***
	(0.42)	(0.23)	(0.18)	(0.39)	(0.20)	(0.28)
dispute, ad hoc	0.56	0.58*	0.61**	0.98	0.46*	1.05***
	(0.65)	(0.31)	(0.25)	(0.61)	(0.27)	(0.40)
dispute, elaborated	-1.67***	0.06	-0.28	-0.94*	-0.17	-0.60*
	(0.58)	(0.29)	(0.22)	(0.48)	(0.24)	(0.34)
own secretariat	-0.90	-0.61**	-0.64**	-0.85	-0.64**	-0.62
	(0.55)	(0.31)	(0.26)	(0.52)	(0.28)	(0.41)
existing secretariat	-0.73	-0.34	-0.34	-0.79*	-0.33	-0.56
	(0.48)	(0.27)	(0.23)	(0.47)	(0.25)	(0.37)
meetings	-1.19***	-0.16	-0.28	-0.83**	-0.20	-0.81**
	(0.42)	(0.27)	(0.21)	(0.40)	(0.23)	(0.32)
global public goods	-1.11***	-0.58**	-0.78***	-1.29***	-0.68***	-0.98***
	(0.40)	(0.23)	(0.18)	(0.38)	(0.20)	(0.28)
global/domestic public goods	-0.51	-0.66	-0.69**	-0.80	-0.57*	-1.01**
	(0.70)	(0.41)	(0.31)	(0.64)	(0.34)	(0.47)
pollution	-0.02	-0.18	-0.08	-0.14	-0.19	0.21
	(0.37)	(0.23)	(0.18)	(0.36)	(0.20)	(0.27)
species	-0.26	-0.40*	-0.47***	-0.30	-0.48**	-0.27
	(0.42)	(0.23)	(0.18)	(0.41)	(0.19)	(0.29)
nuclear	-0.03	-0.14	-0.18	0.01	-0.20	-0.03
	(0.45)	(0.27)	(0.22)	(0.46)	(0.24)	(0.35)
habitat	-0.32	-0.52**	-0.37**	-0.38	-0.39**	-0.54**
	(0.40)	(0.22)	(0.17)	(0.37)	(0.18)	(0.26)
Constant	-1.95***	-0.70**	0.60**	-0.75	0.60**	-0.56
	(0.54)	(0.31)	(0.24)	(0.51)	(0.27)	(0.36)
alpha	2.110	1.079	0.745	2.504	0.898	1.597
Observations	212	212	212	212	212	212
Log likelihood	-282.5	-578.0	-812.6	-414.5	-830.0	-566.2
LR chi2(11)	96.77	60.28	166.4	101.8	116.9	125.5
Prob > chi2	0	3.50e-06	0	0	0	0
Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1						

Table A.6: Correlation Between Ratifications in Different Subsamples

	all countries	10% least populous countries	10% most populous countries	80% in the middle	25% least populous countries	10% poorest countries	10% richest countries	80% in the middle	25% poorest countries	Democ-racies	Autocracies
All countries	1.00										
10% least populous countries	0.93	1.00									
10% most populous countries	0.91	0.81	1.00								
80% in the middle	0.996	0.91	0.90	1.00							
25% least populous countries	0.97	0.97	0.84	0.96	1.00						
10% poorest countries	0.90	0.83	0.77	0.90	0.91	1.00					
10% richest countries	0.82	0.76	0.79	0.82	0.75	0.57	1.00				
80% in the middle	0.996	0.92	0.92	0.99	0.97	0.89	0.79	1.00			
25% poorest countries	0.92	0.84	0.78	0.91	0.92	0.99	0.59	0.91	1.00		
Democracies	0.98	0.90	0.91	0.98	0.94	0.83	0.89	0.98	0.85	1.00	
Autocracies	0.95	0.90	0.86	0.95	0.96	0.95	0.65	0.95	0.96	0.88	1.00

Table A.7 Binary Correlations

	number of ratifications	obligations	monitoring	enforcement	majority	unanimity	assistance, all	assistance, developing	dispute, delegated	dispute, ad hoc
number of ratifications	1.00									
obligations	-0.14	1.00								
monitoring	0.02	0.36	1.00							
enforcement	0.03	0.30	0.33	1.00						
majority	0.13	-0.08	0.16	0.07	1.00					
unanimity	-0.2	0.23	0.07	0.04	-0.63	1.00				
assistance, all	0.17	-0.10	0.09	0.03	0.16	-0.05	1.00			
assistance, developing	0.30	0.08	0.22	0.18	0.26	-0.12	-0.13	1.00		
dispute, delegated	0.18	0.10	0.09	0.16	0.07	0.06	-0.08	0.27	1.00	
dispute, ad hoc	-0.07	0.01	0.10	-0.07	-0.09	0.23	0.08	-0.12	-0.25	1.00
dispute, elaborated	-0.16	0.05	0.11	0.08	0.30	-0.25	0.03	0.10	-0.35	-0.16
own secretariat	-0.09	0.01	0.11	0.03	0.24	0.03	-0.01	0.08	0.12	0.02
existing secretariat	-0.06	0.22	0.28	0.18	0.08	0.06	0.11	0.10	-0.04	0.13
meetings	-0.15	0.30	0.36	0.21	0.33	0.15	0.02	0.16	0.11	0.17
global public good	-0.11	-0.07	0.01	-0.15	0.06	0.13	0.00	0.08	0.06	0.08
global/domestic public good	-0.057	0.08	-0.04	0.02	0.04	-0.17	-0.10	0.01	0.06	-0.09
pollution	-0.06	0.10	0.17	0.14	-0.10	0.25	0.09	0.11	-0.10	0.14
species	-0.17	-0.03	0.04	-0.09	0.06	-0.01	-0.16	0.07	-0.03	-0.04
nuclear	0.08	-0.02	-0.10	0.05	-0.06	-0.08	-0.10	-0.06	0.13	-0.04
habitat	-0.10	0.02	0.15	0.08	0.01	0.02	-0.08	0.16	-0.03	0.05

	dispute, elaborated	own secretariat	existing secretariat	meeting	global public good	global/domestic public good	pollution	species	nuclear	habitat
number of ratifications										
obligations										
monitoring										
enforcement										
majority										
unanimity										
assistance, all										
assistance, developing										
dispute, delegated										
dispute, ad hoc										
dispute, elaborated	1.00									
own secretariat	-0.12	1.00								
existing secretariat	0.17	-0.57	1.00							
meetings	0.04	0.31	0.25	1.00						
global public good	-0.10	0.14	-0.08	0.06	1.00					
global/domestic public good	0.16	-0.10	0.02	-0.04	-0.42	1.00				
pollution	0.19	-0.29	0.36	0.09	0.24	-0.10	1.00			
species	0.05	0.24	-0.19	0.07	0.06	0.07	-0.38	1.00		
nuclear	-0.11	-0.17	-0.07	-0.25	-0.16	0.10	-0.06	-0.26	1.00	
habitat	0.22	0.07	-0.027	0.02	-0.10	-0.01	0.06	0.16	-0.05	1.00