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Globalization, Political Regimes and International Environmental Commitment

Thomas Bernauer
Anna Kalbhenn
Vally Koubi
Gabriele Ruoff

Abstract

In this paper we are interested in the relationship between globalization, political institutions (notably, democracy) and international environmental commitments. This relationship has been the subject of a particularly intensive debate and the existing literature offers a wide range of partly competing claims with respect to the driving forces of international environmental cooperation. While some authors argue that democracy and globalization tend to promote international efforts to mitigate or resolve environmental problems others have challenged these propositions theoretically and empirically. We argue that existing studies suffer from three weaknesses. First, they are based on very small samples of multilateral environmental treaties in respect to which commitment is coded (usually in terms of treaty ratification) and are cross-sectional. Second, they examine the effects of globalization and political institutions on international environmental policy separately and ignore potential joint effects. Third, they ignore interdependency (diffusion) effects - i.e., they do not account for the possibility that international commitment of one country is likely to depend on what other countries and specific types or groups of other countries do (network effects). Based on a new panel dataset that includes the commitments of 180 countries with regard to international environmental treaties from 1902 to 2005 we study whether and how international economic and political integration, and domestic political institutions jointly affect international environmental commitments. We also study interdependency (network) effects on our dependent variable. Our preliminary results show that the net effect of democracy on environmental cooperation is rather diffuse and so is the effect of economic integration (trade openness).

Keywords: Globalization, democracy, international cooperation/commitments, environment.
1. Introduction
The relationships between globalization and the environment and to a lesser degree between democracy and the environment remain unresolved issues. Many environmental problems such as the destruction of the ozone layer or the depletion of fish stock although are caused by individual, national economic behaviour, they are not limited to national boundaries but they rather affect the global society as a whole.

Public goods and the tragedy of the commons (Olson and Hardin).
International cooperation to overcome the problem of the free rider.
Define outputs and outcomes.

In contrast to the voluminous literature on the impact of globalization and political system on environmental outcomes, the literature on their effects on the signing and ratification of international environmental treaties is scarce. This research has been built mainly on game theoretical models such as the Prisoners Dilemma and the game of chicken, and is largely limited to case studies and based on anecdotal evidence. We are not aware of any studies that try to quantitatively explain states’ willingness to ratify international environmental treaties on the global scale and over time.

The remainder of this paper is structured as follows: the subsequent section gives an overview of existing literature, followed by the delineation of our theoretical framework and derivation of empirically testable hypotheses in section 2. Section 3 is dedicated to the research design and discussion of some methodological questions. The empirical part is completed by the discussion of preliminary results. Finally, section 4 takes stock and suggests directions for further research.

2. Theoretical arguments and hypotheses
Our theoretical argument relies on the liberal approach to international institutions, stipulating that a country’s decision to ratify a treaty depends on a government’s cost-benefit calculation.

The explanatory factors outlined below are thus addressed in terms of their influence on governments’ incentives to ratify a certain treaty. We postulate that globalization (trade and IGO membership), democracy and diffusion processes affect the willingness of a government to ratify an international environmental treaty.

Globalization
Although in the literature globalization usually refers to economic interdependence and in particular to trade relations, we perceive globalization as involving both economic and political elements.

*Economic integration: Trade*

Trade affects the domestic economy and therefore also environmental behaviour. Although the impact of trade on the environment is theoretically ambiguous because of offsetting forces (the pollution haven hypothesis, the effects of trade on the scale of production and the positive effects of trade on income), Antweiler et al. (2001), Frankel and Rose (2002) establish that, at least for SO2 emissions and less so for Particulate Matter and NO2, the net effect of trade is to reduce pollution levels. Neumayer (2002a) relying mainly on arguments based on idealistic and self-interest grounds such as the “liberal peace” as well as reputation, coercion and signalling, argues that trade openness promotes multilateral environmental agreements (MEAs). However, his empirical findings provide only weak statistical evidence and he concludes that “...countries’ willingness to cooperate in MEAs depends on whether the MEA under consideration is likely to threaten or accommodate the interests of exporters” (Neumayer, 2002a: 831). We strongly believe that Neumayer’s empirical findings are more in line with a comparative advantage argument. An argument that although he makes in his article, he dismisses in favour of more idealistic ones.

According to standard trade theory (H-O), trade leads to more production of the good that is intensive in the factor that is abundant in the country. Consequently, if the comparative advantage derives from the distribution of the world endowments of the factors of production (the factor endowments theory), then the *developed* countries, which become dirtier with free trade due to their capital abundance, will not be willing to ratify an environmental agreement that hampers their comparative advantage in the production of the dirty good. If, on the other hand, the comparative advantage derives from policy related differences in tolerance of pollution (the pollution haven hypothesis), then the *less* developed countries, which are expected to
become dirtier with international trade due to pollution haven effects, will refrain from ratifying an environmental agreement that hurts their comparative advantage which derives from laxer environmental regulation. Consequently, given that participation in international environmental treaties often implies incurring economic costs to achieve the postulated environmental objectives, self-interested states concerned about losses to their economic competitiveness will refrain from ratifying such treaties. The unwillingness of the USA to ratify the Kyoto Protocol is a prime example of this case. We expect the relationship between trade openness and ratification of an international environmental treaty to be a negative one.

**H1(a):** The more open to international trade a country is, the lower the probability that this country ratifies an environmental treaty.

*Political integration: Membership in IOs*

Rational choice institutionalism poses that under conditions of interdependence, uncertainty, and high transaction costs, states form international organizations (IOs) in order to facilitate cooperation. That is, IOs by increasing information and decreasing transaction costs and uncertainty facilitate the implementation of international regulations and reduce the risk of opportunism (free-riding behavior) (Haas, Keohane and Levy, 1993; Mitchell, 1994). IOs by steering states to move away from pursuing relative gains and towards positive-sum outcomes, help them to overcome collective action problems and promote their shared interests (Young 1994). In addition, IOs can resolve many complex technical problems that individual competing states could not deal with effectively (Mitrany, 1966; Haas, 1964). Consequently, membership in IOs signals a government’s willingness to cooperate and to introduce rules and regulations that benefit not only the participants but often also non-participants. Given that solving international environmental problems is a matter of cooperation among states, it is

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1 Abbott and Snidal (2000) and Simmons (2000) similarly see international treaties as functional solutions to efficiency problems.
reasonable to assume that IO membership affect positively the willingness of a state to participate in a MEA. Although rational states choose to participate in a MEA only when they estimate that the benefits accrued to them by implementing the particular treaty are higher than unilateral efforts, failure to ratify the treaty could lead to reciprocal actions by other states that would undermine the collective effort. As Axelrod (1984) had argued reciprocity encourages the emergence of cooperation. Moreover, signing an environmental treaty and then failing to ratify it entails “audience costs” in terms of credibility loss (reputation) that may have future repercussions on the foreign policies of the defecting state (Simmons, 2000). We expect membership in IOs increase the probability that a state will ratify an international environmental treaty.

**H1(b):** The higher the number of IGOs a country is participating in, the higher the probability that this country ratifies an environmental treaty.

**Democracy**

Fearon (1994), Gaubatz (1996), Leeds (1999), Martin (2000), Mansfied et al (2002) argue that democratic states are more likely to make credible international policy commitments than their autocratic counterparts because their strong but inflexible institutions, the accountability of the leaders to the electoral, domestic audience costs, transparency, etc. We argue that political systems can influence international environmental commitments through either their institutional characteristics (median voter versus elites) and/or civil liberties, audience cost and transparency.

**Institutional characteristics**

The impact of democratic institutional characteristics on the ratification of international environmental treaties is theoretically ambiguous. On the one hand many authors (Congleton 1992; Olson, 1993; McGuire and Olson, 1996; Niskanen, 1997; Lake and Baum, 2001; Bueno de Mesquita et al, 2003) have argued that non-democratic regimes are likely to under-provide
public goods, including environmental quality. The logic is as follows. Non-democratic regimes are typically ruled by small elites that use the resources of their respective country to create personal wealth and to redistribute income from their populations towards themselves. If the costs of stricter environmental policies enacted by international environmental treaty(ies) are born disproportionately by the elites (as it would for example be the case with restrictions on polluting industrial activities) while the benefits are uniformly dispersed throughout the population, then these elites would have little incentive to ratify such treaties.

In contrast, in democracies the median voter, who decides on public policy, faces a lower cost from environmental policies relative to the economic and political elite. This makes the ratification of environmental treaties more likely in democratic regimes.

Congelton (1992) also argues that a shorter time horizon of the policy maker leads to less stringent environmental regulations because many forms of environmental degradation develop slowly and over long periods of time (e.g. climate change, biodiversity, air and water pollution). Given that authoritarian rules tend to have a shorter time horizon\(^2\), Congelton concludes that democracies enact stricter environmental regulations than non-democracies. Quite the reverse, one can argue that elected governments may have shorter planning horizons than non-elected governments because of political myopia. Since the social costs of current economic behavior and political choices often materialize over the long term and burden future generations and future politicians, democratic leaders may refrain from ratifying international environmental treaties more often that their autocratic counterparts who do not face frequent (re-) election and can take more costly decisions (stricter environmental policies) with longer term benefits without fear of been punished by myopic voters. Consequently, democracies might be less willing to ratify international treaties.

\(^2\) Bueno de Merquita et al (2003) empirically show that autocrats survive in office more than democrats (p.581)
**H2(a):** The higher the level of democracy, the higher (lower) the probability that a country ratifies an environmental treaty.

**Civil Liberties**

Grossman and Kruger (1995) argue that the relationship between income levels and environmental quality (air pollution) is not an automatic one but rather it seems to exist through an induced policy-response. That is, governments take into account citizens demands for better environmental quality and in return implement stricter regulations that improve the environment. Payne (1995), subsequently, examines the mechanisms that induce policy-response and argues that democratic political systems unlike authoritarian ones provide civil liberties such as freedom of speech, press and association, which ensure political accountability and consequently secure a stronger emergence of public voice\(^3\) and a higher degree of government response to environmental interests of the citizens.\(^4\) High levels of civil liberties imply that the citizens, by being well informed by independent mass media about government policies and by being able to express freely their opinions and organize alternative political views, are better able to impose “high audience costs” on their leaders for defecting on their promises (Slantchev, 2006). As Fearon (1994) and Martin (2000) argue once democratic leaders have committed themselves to a particular policy are less likely to renege because the “domestic audience costs” of defection are very high. That is, with re-election weighing heavily on their minds, they will sign only the international environmental treaties that they can ratify. Conversely, in non-democratic systems, where civil liberties are suppressed and the “domestic audience costs” are low, leaders often choose to break their promises since defection is cost-

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\(^3\) Environmental movements have gained influence mainly by means of freedom speech, press and association.

\(^4\) Neumayer (2002b) tests the arguments posited by Payne and finds that democracies because of their high levels of civil liberties show stronger environmental commitments than non-democracies.
less. Moreover, the high levels of transparency that characterized democratic political systems further induce leaders to make only credible commitments (Gaubatz, 1996).

**H2(b):** The higher the level of civil liberties, the higher the probability that a country ratifies an environmental treaty.

**Diffusion**

Diffusion processes have recently attracted considerable attention. Policy diffusion is usually defined as a process in which a choice made by one decision-maker influences the choices made by others, and is in turn influenced by them. So far the diffusion literature has concentrated mainly on the mechanisms by which policy diffusion occurs and points to diverse mechanisms ranging from Bayesian learning to rational competition to common norms, emulation and coercion. Most studies take several of these mechanisms into account and assume that each mechanism suffices to increase the probability of policy diffusion, and that the effect of each mechanism adds to that of the others. For example, Elkins et al (2006) find that coercion and competition play a role in the diffusion of Bilateral Trade Agreements; Simmons and Elkins (2004) find that both competition and learning matter for economic liberalization; Henisz et al pose that coercion, common norms and competition significantly contribute to diffusion of market-oriented reforms; and Meyer et al (1997) find that both developing and developed countries sign human rights treaties to show their commitment to global norms.

Although all the above mentioned diffusion mechanisms may play a role in inducing states to ratify international environmental treaties, we believe that most of them are highly correlated and thus captured by other factors that we deem to be important in this paper. For example, the competition and coercion mechanisms are closely related to our trade partners argument, and the emulation and common norms to membership in international environ-

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mental NGOs and region. Consequently, we argue that the most relevant to our analysis diffusion mechanism is learning. Learning is defined as the acquisition of new relevant information that permits the updating of beliefs about the effects of a new policy (Simmons and Elkins, 2004; Meseguer 2006). For example, Meseguer (2006) shows that states are more inclined to enact economic reforms such as privatization and liberalization of trade if they have observed that these policies have been successful in other countries. Moreover, as Schelling (1978) notes most governments are highly sensitive to the number of other countries that have adopted a particular policy. As such, we might observe a “threshold” effect, that is if a certain number of countries has already ratified a certain treaty, other countries might be short of justification why they themselves are not ratifying it. Hence

**H3(a):** The higher the number of countries that has already ratified a certain treaty, the higher the probability that other countries also ratify the treaty.

In addition, cautious political leaders might wait for other countries to ratify a certain treaty and await respective consequences until they dare ratifying themselves. We therefore expect “older” treaties to be more prone to ratification:

**H3(b):** The longer a treaty has been open for ratification, the higher the probability that it will be ratified.

**Control variables**

**Economy**

The large body of theoretical and empirical literature that focuses on economic determinants of environmental quality has led to the identification of an important empirical pattern, the so-called the environmental Kuznets curve (Selden and Song, 1994; Grossman and Kruger, 1995). That is, pollution first deteriorates and then improves as income per capita increases. The standard interpretation of this finding is that environmental quality is a luxury good in the
initial stages of economic development. Poor countries facing a trade-off between protecting the environment and improving material living standards opt for the latter. Once significant gains have been made in living standards, the opportunity cost of stricter environmental policies becomes (relatively) smaller and voters are prepared to accept lower economic or personal income growth (the two may not be identical) in order to enjoy less pollution (the environment becomes a normal good). Therefore, our prediction is that a nation’s willingness to participate in international environmental treaties will be positive correlated with its national per capital income.

**H4:** The higher a country’s gdp per capita, the higher the probability that this country ratifies an environmental treaty.

**Environmental quality**

Nations’ willingness to participate in international environmental treaties may also reflect the degree to which environmental degradation impinges upon national welfare. Sprinz and Vaanhatoranta (1994), for example, argue that “the worse the state of the environment, the greater the incentives to reduce the ecological vulnerability of the state”. Conversely, nations experiencing high levels of domestic environmental regulation will demonstrate greater willingness to take on international environmental commitments since the costs of compliance will be on average lower for those countries. Unfortunately it is quite difficult to obtain environmental regulation data for different countries and for a long time period. Thus we use SO2 emissions as proxy for the stringency of domestic environmental regulation. Lower levels of SO2 emissions should imply stricter environmental laws.

**H5:** The higher a country’s level of domestic environmental regulation, the higher the probability that this country ratifies an environmental treaty.
Finally, we include in our analysis several factors that have been found in the literature to affect the willingness of a country to participate in international environmental commitments.

**Trade partners:** High levels of trade make states economically interdependent. This implies that countries may ratify an environmental treaty not only in order to reap the benefits of increasing trade relations but also countries could use trade relations to coerce their trade partners-by threatening to disrupt trade flows-to ratify an international environmental agreement. Beron et al (2003), however, show that power relations based on trade interdependence play only a limited role in the willingness of the states to ratify the Montreal Protocol on Substances that Deplete the Ozone Layer.

**Membership in international environmental NGOs:** Meyer et al (1997) argue that international environmentalist pressure on a country positively affects its willingness to ratify environmental treaties. Roberts et al’s (2004) analysis of 22 international environmental treaties shows that national membership in international environmental NGOs is closely correlated with environmental treaty ratification.

**Population:** population is a standard control variable in models that examine environmental issues. While its impact on environmental quality is quite straightforward, more densely populated countries have significantly higher energy and production needs and hence are expected to have higher pollution levels, its impact on MEAs is not so clear. Population per se is unrelated to participation in MEAs. Population becomes relevant only and only if it is perceived as a proxy for a state characteristic, that is power. Neumayer (2002a,b) argues that powerful states are more likely to participate in MEAs “...in order to demonstrate their importance in world politics, of which the environment represents one part. In other words, important countries want to be seen as good citizens and leaders in world environmental affairs.” Although we also expect important and powerful states to participate more in MEAs, we argue that they do so because they are concerned with their own security and well-being and not

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6 Power status in the international level is highly correlated with population.
because “they want to be seen as good citizens”. Powerful states are more able and likely to employ coercive methods against countries that are perceived to have global environmental significance and consequently affect their welfare. For example, nowadays Brazil faces continuing pressures from major countries (USA, EU, etc) to protect the Amazon forest.

Region: variation in regional norms of state respect for the environment should also affect participation in international environmental commitments. Simmons and Elkins (2004) argue that states are influenced by the choices made by their “peers” defined in terms of common language, common religion and region. Thus, where norms of state respect for the environment are strong, we should expect to find high rates of ratification of international environmental treaties. (Control for EU membership)

3. Empirical analysis

We empirically test our hypotheses on a new panel dataset on 180 countries’ attitude (ratification yes/no) towards international environmental treaties from 1950 to 2005. The unit of analysis is the treaty-country dyad per year. Each treaty enters our dataset the moment it is open for ratification. For each year we then estimate the probability of a particular country ratifying a certain treaty as described in section 4.2. This approach allows us to include both country and treaty specific characteristics.

We proceed by first introducing the variables used in our analysis and then discussing the statistical method we use. The empirical part concludes with a discussion of some preliminary results.

3.1 Variables and Operationalization

**Dependent variable**

The dependent variable in our study is the ratification of an environmental treaty.

**Independent variables**

**Trade openness**

In this analysis we measure a country’s trade openness by *the ratio of the sum of exports and imports to GDP*. Source: Gleditsch (2002); Heston (2006)

**We also look at manufacturing trade (surplus vs deficit) – structure of trade**

**IGO membership**

Membership in IGOs. Pevehouse et al. (2004)

**Democracy: institutional features**

Our measure for the political system variable is an index capturing the extent of democratic participation in government, *Polity*, from the POLITY IV data set. It is a composite index that includes the following elements: presence of competitive political participation, guarantee of openness and competitiveness of executive recruitment, and existence of institutionalized constraints on the exercise of executive power. Polity ranges from –10 (mostly autocratic) to 10 (mostly democratic) (See Marshall and Jaggers (2002). With a view to the abovementioned theoretical arguments we expect the sign of the relationship between democratic political systems and environmental quality to be ambiguous.

**Democracy: civil liberties**

We use the *civil liberties* component of the Freedom House index. The Freedom House organization rates all countries of the world on dimensions of political and civil rights. The civil liberties part of the index measures constraints among other things on: association and

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7 We plan to conduct a network analysis that assess a country’s centrality in the international system (cf. Ward 2006), in this preliminary version we limit ourselves to assessing the number of IGOs a country is a member to.

8 The political rights dimension, which is very close to the POLITY IV measure of democracy, captures mainly the fairness and freedom of elections, that is, whether a government came to power by election or by gun; whether elections, if any, are free and fair; and whether an opposition exists and has the opportunity to take power with the consent of the electorate.
organizational rights (freedom of assembly, demonstration, political or quasi-political organizations including ad hoc issue groups, and free trade unions and farmers organizations); the rule of law and human rights (existence of an independent judiciary, and freedom from extreme government indifference and corruption); and personal autonomy and economic rights (secured property rights, personal social freedoms, and equality of opportunity including freedom from exploitation by or dependency on employers, union leaders or bureaucrats). Freedom House rates countries on a 1 to 7 scale. In countries with a rating of 1, law is unshaken and there is freedom of expression, assembly, and association. Increasing numbers indicate that laws and traditions impinge increasingly on such freedoms until, in states ranked as 7, citizens have no rights vis-à-vis the state and “…an overwhelming and justified fear of repression characterizes these societies” (Freedom in the World 1999-2000). Instead of working with the original variable, we have chosen to transform it so that a higher value of the new variable means a higher level of civil liberties (hence, 7 now represents the highest level of civil liberties). This is an innocuous change that does not affect anything and is done for reasons of consistency with the other variables (where higher means more) and in order to eliminate a possible source of confusion in the reading of the tables.

**Diffusion:** to test the diffusion argument and in particular H3(a), a variable measuring the number of states that have ratified the particular treaty is included in the analysis. As this number of states increases, the probability that the state ratifies a treaty also increases. Similarly, the older a treaty is, the higher the probability of its ratification.

**Economy**

In this analysis we measure a country’s wealth by Log(GDP/capita). Gleditsch (2002)

**Domestic environmental policy**

SO2 emissions Stern: [http://www.rpi.edu/~sternd/datasite.html](http://www.rpi.edu/~sternd/datasite.html)

**Trading partners**
NGOs membership

Population

Region: EU membership

3.2 Statistical Method

Our unit of analysis are country-treaty dyads over time. That is, for each year that a specific treaty is open to ratification, it is paired with all possible member countries, so that each observation is determined by a particular treaty, the country that may or may not have ratified it, and the year this action did or did not take place. Since we are dealing with a binary outcome variable (ratification yes, no) several panel logit models appear appropriate. In this preliminary analysis we rely on the binary-time-series-cross-sectional (BTSCS) approach described in Beck et al. (1998).

3.3 Results

Table 1 shows the result of a logit model using regression splines to account for temporal dependency of observations (for a detailed discussion, the reader is referred to Beck 1998).

Table 1: Estimation results BTSCS-logit

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>ratification</td>
<td></td>
</tr>
<tr>
<td>democracy, polity</td>
<td>-0.009</td>
<td>-0.007</td>
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<tr>
<td></td>
<td>(12.32)**</td>
<td>(7.99)**</td>
</tr>
<tr>
<td>log openness</td>
<td>-0.355</td>
<td>-0.354</td>
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<tr>
<td></td>
<td>(53.45)**</td>
<td>(53.12)**</td>
</tr>
<tr>
<td>polopen</td>
<td>-9,409.111</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.72)**</td>
<td></td>
</tr>
<tr>
<td>log gdp/ capita</td>
<td>0.612</td>
<td>0.558</td>
</tr>
<tr>
<td></td>
<td>(8.62)**</td>
<td>(7.71)**</td>
</tr>
<tr>
<td>log gdp/ capita squared</td>
<td>-0.019</td>
<td>-0.016</td>
</tr>
<tr>
<td></td>
<td>(4.51)**</td>
<td>(3.67)**</td>
</tr>
<tr>
<td>So2</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(9.99)**</td>
<td>(9.29)**</td>
</tr>
<tr>
<td>number of IGO-memberships</td>
<td>0.052</td>
<td>0.053</td>
</tr>
<tr>
<td></td>
<td>(153.19)**</td>
<td>(150.50)**</td>
</tr>
<tr>
<td>number of countries that have ratified</td>
<td>0.047</td>
<td>0.047</td>
</tr>
<tr>
<td></td>
<td>(249.18)**</td>
<td>(249.10)**</td>
</tr>
<tr>
<td>age of treaty</td>
<td>0.076</td>
<td>0.077</td>
</tr>
</tbody>
</table>
The results presented in Table 1 show that contrary to our theoretical expectation, democracy appears to have a negative effect on the probability that a country ratifies a certain treaty (H2). Although statistically significant, the negative effect of democracy is not very substantial. As such, holding all other variables at their mean, an increase in the polity scale from -10 (autocracy) to 10 (fully established democracy) only decreases the probability of a country ratifying a certain treaty by .0000241, which is virtually equal to zero. It should further be noted that we have used a rather crude measure of democracy (polity2 score) and ignore specific effects of democracy (differentiation of institutional vs. behavioural aspects, specific features, such as presidentialism, federalism). A more in-depth analysis of the effects of democracy on a country’s propensity to ratify a certain treaty is postponed to future research.

Further, the direction of the trade openness coefficient enters with the expected sign and is statistically significant (H1(a)) and supports the “race to the bottom” argument (cf. Revesz, 1992; Drezner 2001).

As expected, the number of IGOs a country is a participating in (H1(b)), the number of other countries that have already ratified the treaty (H4(a)), and the “age” of a treaty (H4(b)), the period of time a treaty has been open for ratification) have a positive effect on the probability of ratifying a treaty. This is a first indication, that diffusion might indeed take place with respect to the ratification of environmental treaties.
To get a better intuition of the estimated relationship between our independent variables and the probability of a country ratifying a certain treaty, we simulated predicted probabilities\(^9\) as displayed in the following figures.

![Graph showing the predicted effect of democracy on the probability of treaty ratification.](image)

**Figure 1:** predicted effect of democracy on the probability of treaty ratification holding all other variables at their mean

Interestingly, the effect of democracy appears to be so small that in figure 1 the relationship appears to be positive. This might be due to the variance introduced by the simulation routine (note the scale of the Y-variable, the change in the probability of ratifying a treaty given different levels of democracy is hardly sizeable).

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\(^9\) Simulation results were obtained using CLARIFY (Tomz et al. 2003, King et al. 2000)
The effect of the number of countries that have already ratified a treaty is depicted in figure 2. Again, this figure appears a little misleading at first sight. Whereas the rather small confidence interval reflects the high z-values, the relationship between the number of countries that have already ratified a treaty and the probability of further ratifications is counter-intuitive. Again, we need more refined analysis to interpret such results with more confidence.

We can further see that the joint effect of democracy and trade openness which we included in our model (last column in table 1) to find out whether democracies deal differently with the effects of globalization than other types of political regimes, has a substantial and statistically significant negative effect on the probability of treaty ratification. The negative influence of the joint effect of trade openness and democracy is in line with the individual effects of both variables.

Coming back to the hypotheses outlined in section 2, we can conclude that the empirical evidence gathered so far supports our country-specific and treaty specific hypotheses (diffusion effects).
The fact that most variables appear to have a rather small effect on the probability of treaty ratification might partly be due to the fact that in the current set-up (yearly treaty-country dyads), ratification is a rather rare event (see section 3.2). We will thus refine our analysis and use more appropriate estimation routines in a revised version of this paper.

4. Conclusion

The aim of this paper was to shed light on the relationship between globalization, political institutions (notably, democracy) and international environmental policy. Whereas due to data limitation and some methodological shortcomings, results remain indicative, our preliminary analysis supports the arguments we advanced.
### Appendix: Independent variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Liberties</td>
<td>Civil Liberties</td>
<td>Freedom House</td>
</tr>
<tr>
<td>Credibility /Transparency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade openness</td>
<td>Sum of exports and imports divided by GDP</td>
<td>Gleditsch (2002); Heston (2006)</td>
</tr>
<tr>
<td>IGO membership</td>
<td>Membership in IGOs</td>
<td>Pevehouse et al. (2004)</td>
</tr>
<tr>
<td>Domestic environmental policy</td>
<td>SO2 emissions</td>
<td>Stern: <a href="http://www.rpi.edu/~sternd/datasite.html">http://www.rpi.edu/~sternd/datasite.html</a></td>
</tr>
</tbody>
</table>
References


Haas, Ernst (1964) Beyond the Nation-state


