

# **A Political Economy of Positions in Climate Change Negotiations:**

## **Economic, Structural, Domestic, and Strategic Explanations<sup>1</sup>**

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After the disappointing outcome of the Copenhagen climate summit, it still remains to be explained why the participating states chose irreconcilable negotiation positions that reflected very diverse domestic interests in spite of a publicly displayed wish for cooperation. While environmental studies have intensely investigated national climate policies and their determinants over the last few decades, little attention has been paid to the bargaining positions the same governments assume in climate negotiations. We argue that their bargaining positions reflect structural, economic, and domestic factors, but less so strategic factors. A country's vulnerability to climate change, its power and its democratic status are among the best predictors of its choice of negotiation position; its international interconnectedness, on the other hand, does not seem to have an influence. By comparing two negotiation issues – reducing emissions and financing climate mitigation –

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we can show that democracies choose rather different negotiation positions. When it comes to compensation mechanisms, democracies do not commit to substantial emission reduction targets due to pressure from industry at home. They are, however, more prepared than other states to pay for projects that help to reduce emissions. By understanding the choice of negotiation positions we can thus explain why the more or less cooperative bargaining positions adopted by states led to a breakdown of the Copenhagen negotiations. We investigated this question using a novel dataset on the UNFCCC negotiations, in which the positions of all participating governments were collected by hand-coding protocols from the negotiations as well as expert interviews with negotiators.

## **Introduction**

When the Copenhagen Summit of December 2009 was concluded with a disappointing and meager negotiation outcome that stood in strong contrast to the high hopes which preceded this important meeting, both policy analysts and journalists offered various explanations. Simplistic accounts blamed China for being too selfish, whereas more complex analyses pointed out that the interests of major players were basically too far apart to be reconciled. This clash of interests, manifested in irreconcilable negotiation positions, particularly between the US and China, is the prevalent explanation for the failure of the Copenhagen meeting (Dimitrov 2010). Understanding why states chose such negotiation positions is the motivation of this paper. More specifically, we investigate whether economic, structural, domestic and strategic considerations are responsible for the choice of negotiation positions by states, in the context of climate change negotiations.

So far, several studies have investigated the influencing factors on environmental policy or environmental output (Holzinger and Sommerer 2008; Neumayer 2002; Fredriksson and Millimet 2007; Bernauer and Koubi 2009) and have come to differing conclusions concerning the impact of economic and domestic factors. Whereas most of these studies have environmental output variables as their subject of analysis (e.g. carbon dioxide emissions or the number of environmental treaties signed), we focus on the choice of ex

ante bargaining positions in climate change negotiations<sup>3</sup> and the question of which factors explain the choice of these positions. Negotiation positions are an expression of a state's environmental foreign policy and constitute a more direct measure of a state's environmental policy than environmental output variables. Thus, these positions are highly suited to an investigation of the various factors influencing a state's foreign environmental policy. So far, there has been little research on the choice of negotiation positions since the data are rather difficult to gather. Having undertaken an intensive analysis of relevant documents and interviews, we now have at our disposal a newly collected dataset which allows us to carry out such research.

Negotiation positions can be more or less "cooperative" in the sense of facilitating the finding of a compromise at the negotiation table. Traditional negotiation analysis based on the prisoner's dilemma contends that a minimum of cooperation is necessary in order to start talks over a conflict (Kremenjuk 2002). The negotiations then take place between this starting point and the agreement, when the maximum of cooperation is reached. We consider a negotiation position as more conducive to cooperation when the position is close to the median position of all other negotiation positions on crucial bargaining issues. By investigating which factors predict a country assuming a negotiation position closer to the median of all positions at the beginning of a negotiation round, our study aims to contribute to the discussion on the determining factors of a state's foreign environmental policies and to find out whether they are driven by the same factors as national environmental policies, or whether international strategic considerations also influence the respective foreign policy decisions.

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<sup>3</sup> We use the terms 'bargaining' and 'negotiating' interchangeably.

In contrast to other studies which investigate environmental output or ratification procedures of environmental treaties, we analyze the negotiation positions of states with regard to two issue dimensions: CO<sub>2</sub> reduction, and financing mitigation efforts. Analyzing two negotiation issues highlights how different influencing factors are at work depending on the salience of an issue: in the sense of a compensation mechanism, we show that democracies do not necessarily assume more cooperative positions regarding the most sensitive and crucial topic of CO<sub>2</sub> reduction, however, they are more prepared to make up for this lack of cooperation by paying for climate mitigation projects.

In the first part of the paper we discuss theoretical explanations of a country's positions in the UNFCCC negotiations and derive corresponding hypotheses. Next, we outline our methodological approach and describe how data on negotiation positions was collected. We then present tests of the proposed hypotheses using Generalized Linear Models (GLM) and conclude by suggesting paths for future research.

### **The choice of a negotiation position in climate change negotiations**

We investigate various structural, domestic and strategic factors that potentially influence the choice of a more or less cooperative negotiation position. While we assume that a country is forced to choose a certain position on the grounds of its structural situation (vulnerability to climate change) and its economic situation, we acknowledge the necessity of integrating additional variables, such as domestic factors (a country's own environmental standards, democracy status, and domestic industry interests) and strategic aspects (a country's position in the international system) into an analysis of climate change negotiation positions.. Based on game-theoretical arguments pertaining to the free-rider problem that climate change is plagued with (Brennan 2009; Barrett and Stavins 2002), we expect states to choose a negotiation position which shifts the costs of reducing emissions to others.

However, we do not believe that the desire to shift costs towards others is the only factor that influences a country's choice. Negotiation analysis has traditionally distinguished between parties' underlying interests and the positions taken in negotiations (Sebenius 2002). In their attempt to explain international cooperation, Axelrod and Keohane (1985) point out that the payoff structure which defines the mutuality of interests is not entirely determined by objective factors of actors' perceptions of their interests. The connections between interests and positions are thus rarely simple. Nonetheless we seek to take a first step in shedding more light on the question of when structural and economic interests, and when domestic or strategic considerations explain a country's position on a negotiation issue.

We assume that the original negotiation position of a country encompasses its actual economic, structural, domestic, and strategic interests and its original willingness to contribute to the negotiation outcome or to cooperate. This idea is based on studies in the spatial bargaining literature of the international relations literature which points out that actors might be motivated to strategically misrepresent their interest and their true willingness to cooperate, due to their desire to reach a resolution that is to their advantage (Fearon 1995). In the setting of already established organizations and negotiation rounds, governments know that their negotiation position at the start of negotiations influences the likelihood of reaching an agreement. The factors influencing such a negotiation position are at the core of this article.

In the climate change negotiations under consideration countries failed to achieve common positions. Dimitrov (2010) and Bodansky (2010) both describe the stalemate in Copenhagen and how negotiators reiterated their already well-known positions in meeting after meeting, instead of moving closer to a common position. Winkler and Beaumont

(2010) describe the tension between problem solving and competition in international negotiations from a theoretical point of view, and conclude that the balance between the two in Copenhagen was lost in favor of competition, which is why countries stuck to their initial positions. Our analysis of cooperative negotiation positions concerns the initial positions, and not how cooperative countries behaved in terms of adjusting their positions to facilitate reaching an agreement. Since such adjustments did not occur in Copenhagen, we find it justified to assume that the initial negotiation positions are a good indicator for the willingness to cooperate at the outset of the summit. Even before the COP15 started, the negotiating states were well aware of each other's positions, since several preparatory meetings were held before the Copenhagen conference. Thus, the choice of a certain negotiation position can be considered as a state's informed decision to contribute more or less to international cooperation in the field of climate change.

In what follows we derive hypotheses regarding the choice of an initial negotiation position, focusing on certain country characteristics that we expect to induce states to play a less egoistic game by adopting a position closer to the median position on a certain negotiation issue.

As an objective factor influencing a country's negotiation position, we first consider vulnerability to the impacts of climate change. When analyzing international negotiations on acid rain and stratospheric ozone, Sprinz and Vaahtoranta (1994) found that countries consider, *inter alia*, their ecological vulnerability when choosing policies and positions on global environmental issues. Countries strongly affected by climate change are more dependent on an international agreement that addresses and tackles this particular issue. Thus, we expect these countries to be more willing to cooperate and more interested in finding a compromise during the negotiations than their less vulnerable counterparts.

***Hypothesis 1: Governments from countries that are more vulnerable to the impact of climate change are expected to choose more cooperative negotiation positions.***

Power in the international system allows a country to influence the outcome of (Morgenthau 1967) and to maximize its gains from international negotiations (Krasner 1991). Grundig (2006) shows that power-based explanations must indeed be considered when explaining international cooperation, particularly in the climate change case. When power in climate change negotiations is defined as the ability to affect global emissions, then both economic power and overall emission levels determine how important, and thus powerful, a state is.

Similarly, under current UNFCCC rules, the bigger the economic power of a state, the more it is expected to reduce emissions domestically as well as to contribute to international funds for the support of poorer countries. For developing countries the story is similar: they are increasingly under pressure to show responsibility and to define their own emission reduction targets. Thus, we expect increased power levels to induce countries to choose less cooperative negotiation positions.

***Hypothesis 2: The more powerful countries are, the less they are expected to assume cooperative bargaining positions in international climate change negotiations.***

Climate science predicts that climate change will cause substantial costs for the general public. Therefore, we expect the selectorate, defined by Bueno de Mesquita et al. (2003) as the fraction of society that is allowed to choose its leaders, to increasingly favor policies that tackle climate change the more inclusive the composition of the selectorate is. In the case of an inclusive selectorate, the benefits of mitigating climate change for the whole society are considered. Therefore, it can be argued that states with a more democratic form

of government are more likely to take positions that reflect an aim of maximizing general welfare (in our case: favor emission reductions), while less democratic states are more prone to favor particular interests. In full democracies, the median voter's position is expected to prevail (Melvin J. Hinich and Munger 1997).<sup>4</sup> Low participation and exit costs (associated with democratic forms of government) motivate democracies to provide more and better public goods than autocracies, in order not to lose the support of their citizens, e.g. in the form of taxes, votes or rents (Lake and Baum 2001). As an example of this democratic mechanism, Garrett and Lange (1986) show that more democratic states are less likely to protect industries from foreign competition if competition is to the advantage of the general public. Similarly, Lake and Baum (2001) show that democracies provide better quality public goods, e.g. in public health and education, than autocracies.

Previous research has also indicated that democracies show stronger environmental commitment – though not necessarily better environmental outcomes – than non-democracies (Neumayer 2002). Since voters in democracies are better informed and have the opportunity to express their concerns more freely, their chances of exerting pressure on politicians are much higher. In authoritarian states, on the other hand, the authorities can silence such interests more easily. This linkage was also identified by Fredriksson and Gaston (2000), who confirmed the positive effect of civil liberties on the probability of states signing environmental treaties (see also Bernauer et al. 2010). Given that environmental policy is one of the policy fields that features strong participation from a vibrant civil society,

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<sup>4</sup> The argument that the median voter prefers more cooperation (and thus environmental protection) can be disputed, as the strategy of free riding on the effort of others, which is often ascribed to states with regards to climate change, can equally well be applied to the individual level. In other words, when given the choice of paying for emitting greenhouse gases or not, rational choice theory suggests that a majority of people would opt for the latter option. However, people do not usually have the choice of whether to pay tax or not, and a single person's influence on the implementation of new laws is usually quite limited. Brennan (2009) shows that in such circumstances the payoffs for individuals are changed such that "doing the right thing" (i.e. supporting a policy that one would reject if deciding alone) generates a higher reward than outright rejection of the policy. Over the whole population, public opinion might thus be in favor of a policy which would likely be rejected by most individuals were they to decide alone.



engaged citizens and many NGOs, we expect public opinion to influence the respective governmental policies. Yet public opinion is not always, and not in all countries, in favor of environmental protection, particularly if and where it is costly. Furthermore, the attention voters pay to climate change varies. Harrison (2007), for example, showed that American and Canadian voters cared for the ratification of the Kyoto protocol, but were less concerned about environmental politics in general.

Nevertheless, we expect a higher democratic rating to be associated with a higher propensity of states opting for international cooperation as a means of dealing with climate change. In other words, we expect democracies to favor less extreme negotiation positions, which increase the chances of the negotiations ending successfully.

***Hypothesis 3: Governments with higher democracy ratings are expected to assume more cooperative negotiation positions.***

Irrespective of a country's democratic status, certain domestic groups are expected to have an influence on their government. The notion that domestic preferences matter in international negotiations is not new. Already fifty years ago, Schelling (1960) noted that governments can increase negotiation success if their win-sets are limited by domestic constraints, which he called the "paradox of weakness". If government A can credibly show that deviations from its preferred position are limited by the home audience, this alleged weakness might force government B to accept an outcome closer to the one preferred by A (Schultz 2001; Fearon 1997; Putnam 1988). According to this theory, when choosing positions in international negotiations, governments play two games – the international and the domestic one - with a single move, hence the associated term 'two-level games' (Kroll and Shogren 2008). Although McLean and Stone (2012) find evidence that the domestic level was not crucial for determining the ratification process of the Kyoto Protocol, we claim that

domestic interests in the climate change negotiations influence the bargaining behavior of states during the climate change negotiations.

Different lobby groups are able to influence governmental positions in international negotiations to varying degrees. We expect domestic groups to be more successful than others when they are better organized and have a higher spending capacity (Olson 1965). While there are a number of studies concluding that a variety of domestic interest groups impact on national negotiation behavior and positions on climate change, most authors focus on studying one particular pressure group, many being particularly interested in the role of the business lobby (see e.g. Bryner 2008; Newell and Patterson 1998). Giving his study a broader aim, Newell (2000) looked into the behavior of four different non-state actors (the mass media, environmental pressure groups, the fossil fuel lobby, and Working Group 1 of the IPCC) and showed that it is easier for these groups to forward their interests by influencing states' positions through lobbying at the national level than by intervening directly during international negotiations. Grundig (2009) notes that in providing (often useful) information to governments, lobby groups have an incentive to overstate the losses to their respective industry or to the environment. Similarly, Dolsak (2001) posits that larger carbon-intensive sectors bias countries towards less audacious environmental commitments. Focusing on the fossil fuel lobby due to the lack of available data on other lobby groups, we expect that a bigger fossil fuel sector biases countries toward less cooperative and less environmentally friendly positions.

**Hypothesis 4:** *Governments of countries with bigger fossil fuel industries are expected to choose less cooperative negotiation positions.*

Along with the impact of essential domestic economic stakeholders, we assume that governments with higher environmental standards assume more cooperative bargaining

positions in climate change negotiations. Higher environmental standards reflect previous attempts by governments to reduce pollution by regulation or the implementation of international environmental protection standards (Bernauer and Koubi 2009). Most governments will have improved their pollution records due to pressure from public opinion to protect the environment. Governments with higher domestic environmental standards will seek to impose their standards on others, thus raising their costs also, in order to avoid a competitive disadvantage (Vaubel 2006), and in order not to have to unilaterally pay the short-term costs of environmental protection. However, these governments also know that they cannot impose their high levels of environmental protection on less developed states, although they might wish to. In such circumstances, states should therefore choose more cooperative positions to facilitate an agreement which shifts at least some of the costs to their rivals. Therefore, we expect countries with higher environmental standards to also push for more regulation at the international level.

**Hypothesis 5:** *Governments with higher domestic environmental standards are expected to assume more cooperative negotiation positions.*

Besides the structural, i.e. economic and domestic, factors, we also consider a strategic factor which is expected to be particularly significant in international negotiations. Bernauer and Koubi (2009) found evidence that a more extensive membership in international organizations (IOs) also motivates states to provide public goods such as improved air quality in other policy areas not covered by the IOs. The main reason for this behavior is reciprocity. Countries working together in many international fora know each other well and may even have established some form of mutual trust. This, in turn, makes them more likely to cooperate in other fields, such as climate change. From a strategic point of view, it is better to be conciliatory in order to ensure good working relationships in future interactions in

similar or other policy areas, an approach associated by Axelrod (1984) with the shadow of the future. Axelrod and Keohane (1985) postulate that the reason why IO membership fosters cooperation is that it reinforces and institutionalizes reciprocity and delegitimizes defection. Thus, following the logic of liberal institutionalism, increased IO membership encourages governments to pursue relative gains instead of egoistically trying to maximize their own absolute gains, thereby facilitating positive-sum outcomes in international bargaining settings (see Bernauer et al. 2010; Young 1989). Hence, we expect countries with more extensive IO membership to be more likely to choose a cooperative position during climate change negotiations.

In contrast, one might also argue that vote trading across policy areas and over time in international organization is not very likely, since enforcement is a lot harder and since different domestic stakeholders are involved in such an exchange of favors (e.g. trade versus environmental protection) (McKibben and Western 2013). If this is the case, membership in other international organizations is unlikely to have a positive effect on a country's willingness to cooperate in climate change negotiations.

**Hypothesis 6:** *Increased IO membership is expected to encourage governments to choose more cooperative negotiation positions.*

### **Cooperative Bargaining Positions**

The dependent variables in this study are the negotiation positions chosen by states in the UNFCCC climate negotiations. Negotiation positions are influenced by various factors such as structural and economic interests, domestic stakeholders, and strategic considerations. The crucial factor from the point of view we take in this paper is how "cooperative" these positions are. A position is considered more cooperative the closer it is to the median of all negotiation positions on a particular negotiation issue. Ex ante proximity to the median of

negotiation positions facilitates reaching an agreement in the negotiations and thus fosters cooperation. In his analysis of forest regime negotiation, Humphreys (2001) demonstrates that these negotiations are still characterized by positional bargaining in which own gains are sought. The term “positional bargaining” also quite accurately describes how a government consciously chooses a position which reflects its preparedness to cooperate based on its preferences.

We assume that the most likely outcome is some form of midway position between all negotiation positions. The median is usually a means to estimate the outcome of political interactions under majority rule. The unweighted median position - originally derived from the median voter theorem (Hotelling 1929; Black 1948) – is a popular framework used in the political equilibrium, public policy (Congleton 1992) , and negotiation literature as a baseline predictor for an equilibrium position. Particularly when it is used as the baseline in negotiations, no bargaining, trading or switching of positions is assumed (Buono de Mesquita 2004). Since the exact process, and thus the outcome, of negotiations is hard to predict, we consider the median position as a useful ex ante approximation for the outcome expected by governments.

The use of the median position can be criticized due to it only being relevant in situations of majority rule. Moreover, Hinich (1977) argues that the inclusion of a probabilistic factor in the choice mechanism of an actor implies that not the median, rather the mean, results as the ideal point. Yet Kramer (1978) argues in favor of the robustness of the median voter, and provides empirical evidence for the stability of the median. Also Calvert (1985) demonstrates the robustness of the median when candidates are only probabilistically able to predict possible election outcomes. Similarly, newer studies confirm the robustness of the median (Mordeson et al. 2010). Also, in more complex decision-

making situations, such as unanimous voting, the median is considered to have an “informal justification” as an approximation for the outcome of the voting game (Achen 2006; Krehbiel 2010). In a study of the intergovernmental negotiations leading to the EU Convention, König and Slapin (2006) argue that an actor’s proximity to the median of all negotiation positions correlates positively with later bargaining success. Given this empirical result, they argue that the decision-making rule during these intergovernmental negotiations is more likely to have been consensus voting rather than the traditional unanimous voting (with consensus they mean more than majority voting and less than unanimity). It is plausible to assume a similar consideration for the UNFCCC negotiations, since governments had long realized how difficult reaching unanimity would be. Observers of later negotiation rounds after Copenhagen confirm this trend towards consensus voting. For instance, in the Cancun negotiation round the presiding Mexican Foreign Affairs ministers pointed out that consensus is the dominating mode of decision-making and not unanimity where each country has a right to veto (Park 2011).

Another condition which is necessary for the median voter theorem to hold is unidimensionality, since in multidimensional policy spaces there is no equilibrium if agreement must be reached at the same time (McKelvey 1976; Schofield 1978) . However, Calvert (1985) demonstrates the robustness of the multidimensional median voting model even when certain assumptions are not met. In our analysis we consider the two dimensions separately, and apply the median as an approximation for the expected outcome. We do not claim that an actual negotiation or bargaining process between governments has taken place across issues at that point; instead we are concerned with explaining ex ante negotiation positions. Only later do we draw a link between these two dimensions, highlighting how

richer, more democratic countries compensate for their lack of cooperation regarding the reduction dimension by adopting more moderate positions on the finance issue.

Moreover, using the median position allows comparability with other negotiation analyses, as many of them also used the median as an approximation for a likely negotiation outcome (Efird et al. 2000; Achen 2006; Thomson et al. 2006; Selck and Steunenberg 2004).

Crucial for our understanding of a cooperative negotiation position, is the distinction between Annex 1 and non-Annex 1 countries. Since the creation of the UNFCCC, the community of states is divided into Annex 1 countries (the developed and industrialized countries mainly responsible for climate damage), which are listed in the appendix of the organization's founding document, and non-Annex 1 countries (developing countries). This division, sometimes referred to as the "Kyoto Firewall" (Bodansky 2010), allows developing countries (non-Annex 1) to free-ride - this being their dominant strategy - (Brennan 2009; Barrett and Stavins 2002), without having to fear retaliation measures from Annex 1 countries. In the Kyoto Protocol, this division was reiterated, although this time with developed countries listed in the Annex B of the document. For the remainder of the paper, we stick to the more common terms Annex 1 and non-Annex 1 countries to refer to developed and developing countries.

The rationality behind the decision not to ask developing countries to take up binding emission reduction commitments was (and still is) the historic fact that the developed world is overwhelmingly responsible for the increased CO<sub>2</sub> content in the atmosphere (Srinivasan et al. 2008; den Elzen et al. 2005). However, the world has changed dramatically since 1997. For example, Chinese emissions have been growing considerably ever since, making China the biggest emitter of greenhouse gas emissions in the world today. Some Annex 1 countries, among others the US, have therefore called for an abolition of the Kyoto Protocol

and for a different treaty design that considers today's political reality. They fear that domestic firms subject to strong emission regulations might shift production, and therefore jobs, to developing countries where they face no emission reduction obligations. This so-called emission leakage, the argument goes, would not only harm developed economies, but also render an international climate change agreement inefficient (Blanford et al. 2008; Babiker 2005). In turn this would lower developed countries' eagerness to promote an ambitious international agreement. Non-Annex 1 countries, on the other hand, have an incentive to overstate their demands during the climate change negotiations, as under KP rules the resulting costs would have to be borne by Annex 1 parties. This difference between Annex 1 and non-Annex 1 countries, resulting from the treaty design, is crucial to understanding positioning behavior in climate change negotiations. Starting from this central premise, this paper sets out to analyze and understand countries' negotiation positions in the UNFCCC negotiations.

In general, we expect countries of the non-Annex 1 group to make significantly higher demands regarding the issues analyzed in this paper (emission reduction targets and mitigation finance) than the Annex 1 group is willing to offer. This disparity is indeed visible in the data, as can be seen in Figure 1 (described in more detail below). Annex 1 countries tend to adopt less generous positions regarding both emission reduction targets and mitigation finance than is demanded by non-Annex 1 countries.

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Figure 1 approximately here

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Cooperative positions thus take on the opposite meaning for each of the two groups of countries. While for Annex 1 countries increased cooperation means offering more and adopting positions further to the right on the issue scale depicted in Figure 1, non-Annex 1 countries have more cooperative negotiation positions when they make less dramatic demands and thus position themselves lower on the issue scale. This difference between Annex 1 and non-Annex 1 countries must therefore be included in all models proposed in this paper. However, in order to be able to propose single hypotheses for other explanatory factors, we rescale the dependent variables as is described below. This, however, impedes the formulation of a directional hypothesis for our Annex 1 variable.

### **Data on state preferences in negotiations**

Although international institutions have received increasing attention in the scholarly debate on global governance, knowledge of positioning behavior within these organizational frameworks remains very limited. Some highly important negotiation rounds such as the General Assembly of the United Nations (Dreher et al. 2008), and the Council of the EU (Tallberg 2008; Thomson et al. 2006) are relatively well investigated, although researchers mostly attempt to explain negotiation outcomes rather than negotiation positions.

Often, negotiation studies suffer from a lack of data due to the extreme secrecy that shrouds international negotiations (Gabel et al. 2002). A few studies have made use of final voting records (Hayes-Renshaw et al. 2006; Mattila 2009) to analyze voting patterns at the end of international negotiations. To gather information on negotiation positions at the beginning of EU Council deliberations, scholars have analyzed negotiation protocols (König 1997; Bueno de Mesquita and Stokman 1994; Hug and König 2001; Hopmann 2002) or directly interviewed negotiation participants (Thomson et al. 2006). Text analysis has the advantage of being easily traceable by other researchers and being relatively cheap (Sullivan

and Selck 2007). In contrast, interviews help to identify crucial negotiation issues and allow the researcher to obtain associated salience values, which are difficult to collect by means of text analysis.

These methods of identifying negotiation positions—document analysis and interviews—suffer from the fact that it remains unclear how strongly the identified positions reflect the actual preferences of actors, although most researchers tend to assume positions to reflect sincere preferences (e.g. for qualitative studies see (Hösli 2000; Dinan 1999; Moravcsik 1998), and for quantitative studies see (Bueno de Mesquita and Stokman 1994; König 1997; Thomson et al. 2006). While Achen (2006) considers it possible to measure sincere positions, Bueno de Mesquita (2004) believes that it is practically impossible to ascertain the real opinion of a negotiating party. He argues that especially in situations with incomplete information and a low probability of finding out the real preferences of negotiators, it is advantageous for diplomats to assume strategic positions. For this reason, we consider both strategic and domestic factors when assessing negotiation positions.

Data for the dependent variable, i.e. country positions on emission reduction targets and mitigation finance, were obtained by hand-coding all submissions made by states party to the UNFCCC negotiations over the two years prior to the Copenhagen negotiation round of 2009. Submissions present the view of negotiating parties in written form and are compiled into official UNFCCC documents that can be downloaded from the Convention's website. In total, the hand-coding effort took into account 43 official UNFCCC documents comprising of a total of over 1,600 pages of proposed legal text. To ensure inter-coder reliability, a codebook was designed and separately tested on 25 pages by three coders. Then, the codebook was adjusted to eliminate the discrepancies found in the first coding round and an additional 25 pages were tested. After re-checking the coding scheme using

the adjusted codebook, we found that the inter-coder reliability was very high (agreement in more than 80% of cases) and that the discrepancies among the three coders were reduced substantially.<sup>5</sup> The main aim of this coding process was to generate a dataset on the negotiation positions of all countries for six crucial negotiation issues.<sup>6</sup>

These issues were coded on a scale ranging from 0 to 100 (except for emission reduction targets for which the demanded percentage change was coded). As both submissions of individual countries and group submissions were coded, the following decisions were made regarding how best to combine these different sources of information: individual submissions of a country were given preference over group submissions and in cases where more than one individual country submission was made on a given issue during the coding period, the average was taken. If a country made no individual submissions, positions taken from group submissions were used as proxies. This decision can be justified on the grounds that if the group position in question did not accurately reflect a country's views, the delegation could have either opposed it during the group discussions or alternatively have formulated submissions of its own. As for the individual submissions, the average was taken when multiple group submissions on the same issue were submitted.

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<sup>5</sup> We coded multiple issues and also included a measure of issue salience in the coding scheme. The stated inter-coder reliability concerns the entire coding scheme. The coding of mitigation targets resulted in the biggest consensus among coders, since this simply involves registering numbers. However, we do not provide numbers for single issues since we did not find enough entries on the 50 pages used to refine the coding scheme to conduct reliability tests for single issues.

<sup>6</sup> The six issues are Annex 1 mitigation Targets (by 2020), Annex 1 Mitigation Targets (by 2050), Non-Annex 1 Mitigation Targets, Nationally Appropriate Mitigation Actions (NAMAs), Adaptation Funds, and Mitigation Funds. We only use two of these issues for two reasons. First, a factor analysis confirms that underlying our six issues are two main factors. The two issues concerning mitigation targets load heavily on the first factor, while the two finance variable (Mitigation and Adaptation Funds) have high loadings for the second factor. Since Adaptation Finance also has a relative high loading for the first factor, we chose Mitigation Funds as the second dependent variable. The second reason is that the factor analysis confirms what we learned about the negotiations as official observers during various negotiations rounds. Short-term mitigation targets and finance for mitigation were strongly contested and, in our opinion, were two of the most crucial issues before and during the climate change negotiations in Copenhagen. The factor analysis can be found in Table A1 in the web appendix for this paper.

We also conducted interviews with delegates from 56 countries before and after the negotiation round in Copenhagen. As part of each interview, we asked the negotiators to identify their countries' bargaining positions for the two dependent variables of this paper: aggregate emission reduction targets for Annex 1 countries and mitigation finance. Although we have a much smaller number of countries in this interview dataset, it allows us to test whether our hand-coded estimates of negotiation positions correlate with those named by the interviewees. We find the correlation coefficients to be sufficiently high, namely 0.92 for reduction targets and 0.69 for mitigation finance. We therefore confidently utilize the larger hand-coded dataset in the present study.

As mentioned, two issues serve as dependent variables in this paper. The variable "reduction targets" describes a country's negotiation position on the reduction targets to be achieved by 2020 by all Annex 1 countries in the form of an aggregate (measured in per cent of greenhouse gas reductions). The median demanded reduction target over all observations in the dataset is 42.5, yet Annex 1 countries on average seek much lower targets (31.1) than non-Annex 1 parties (42.2). This already shows that the division of negotiating parties into the Annex 1 and non-Annex 1 groups is one, if not the major, fault line in the climate change negotiations. The country aiming for the lowest Annex 1 reduction targets is Russia (25), while Bolivia has demanded the maximum observed value of 49.

The second dependent variable is "mitigation funds". Positions regarding this issue were coded on a scale ranging from 0 to 100, where 0 indicates that mitigation funds flowing from Annex 1 countries to developing countries should consist entirely of voluntary contributions, while 100 indicates that mitigation funds should be a mandatory payment of

at least 1% of developed countries' GDP each year; the median position is 66.7.<sup>7</sup>

Unsurprisingly, Annex 1 countries, with a mean of 61.8, are on average closer to favoring voluntary funding than non-Annex 1 countries, who have a mean of 76.2 (the overall mean is 72.8).

To test cooperative behavior for Annex 1 and non-Annex 1 countries in a relatively simple model, we recode the two dependent variables by applying the idea of the median voter theorem (Black 1948). That is to say, we consider the median of all negotiation positions to be the point where the win-set, and thus agreement, is most likely to be, and compute the absolute distance for all countries from that position. Thus, a larger value indicates a less cooperative negotiation position that is unlikely to be in the winset. Figure 2 shows the distribution of both recoded dependent variables.

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Figure 2 approximately here

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By construction, both variables are skewed to the left and values below zero are impossible. Testing our hypotheses using ordinary least squares (OLS) might consequently be misleading. Therefore, we employ generalized linear models (GLM) with a lognormal link, as these models consider the strictly positive structure of the dependent variables (e.g. Hardin and Hilbe 2007).

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<sup>7</sup> More precisely, the following coding rules were applied: only voluntary contributions (coded as 0); bi- or multilaterally agreed contributions, plus voluntary contributions (33); bi- or multilaterally agreed contributions plus negotiated contributions coming from market mechanisms, plus voluntary contributions (66); 0.1 to 0.5 percent of GDP as mandatory contributions (85); 0.5 to <1 percent of GDP (90); 1 to <2 percent of GDP (95); >2 percent of GDP (100).

## **Independent variables**

*Ecological vulnerability:* To measure vulnerability to the impacts of climate change we use the Environmental Vulnerability Index (EVI) developed by the South-Pacific Applied Geoscience Commission (SOPAC). The EVI measures 50 different indices, 13 of which are utilized to compile a sub-index capturing vulnerability to climate change impacts (Kaly et al. 2004). This sub-index is used in this paper to capture ecological vulnerability to climate change. Although the EVI might be problematic for various reasons (Barnett et al. 2008), the main criticism, namely that such a constructed index is unable to capture complex socio-ecological processes, equally applies to all alternative indices.

*Power:* Reflecting the strategic choice of positions as assumed by neo-realism, we include a variable measuring power in all models presented below. We measure power in two ways. First, we utilize a country's total GDP at purchasing power parity (the log thereof) to measure economic power. Second, we consider a country's total CO<sub>2</sub> emissions, since this directly influences the impact this country has on climate change.

*Democratic status:* A higher democratic rating, according to the theory presented above, is expected to be associated with more cooperative bargaining behavior. We operationalize democratic status using the Freedom House index. More specifically, we use the combined measure of the Civil Liberties and Freedom of the Press indices, which results in an index ranging from 1 (least democratic) to 13 (most democratic). In order to facilitate interpretation, we use a reversed form of the rating so that higher values indicate a higher democratic status. As an alternative measure, we also use the Polity IV index for democratic status.

*Emitter interests:* The franchise, or the level of influence the fossil fuel lobby asserts, is measured using the fraction of GDP stemming from CO<sub>2</sub> emitting industries. We use the

World Development Indicators (WDI) to summate the GDP generated by the oil, gas, and coal industries, and then divide the product by the total GDP to generate a proxy measuring the influence of polluting industries. As this generates a number in percentage-form, we can use nominal values for the calculations and do not have to rely on distorted purchasing power parity values.

*Domestic environmental quality:* We use the rather rough measure of SO<sub>2</sub> emissions per capita to capture environmental quality. Previous studies have suggested this measure as a means of operationalizing domestic environmental quality, since SO<sub>2</sub> emissions can be reduced by changing production techniques, and can thus be controlled relatively directly by governmental environmental policies (Bernauer et al. 2010; Bernauer and Koubi 2009). However, as SO<sub>2</sub> emissions tend to rise as countries grow richer and only begin to decline at varying degrees of development, we need to control for economic development in every model that includes SO<sub>2</sub> emissions. We admit that the choice of this variable is a trade-off between keeping as many observations as possible in the analysis and choosing a rather rough measure.<sup>8</sup> As in the case of our measure for democratic status above, we reverse the measure for domestic environmental quality so that higher values indicate higher environmental quality.

*IO membership:* Our data for membership in international organizations stems from the Correlates of War project. We only count a country as being a member of an IO if it has full membership status. The maximum count for membership is 125 for France, the minimum is 19 for Palau.

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<sup>8</sup> We tried alternative operationalizations of public opinion influence, such as a direct measure derived from our interviews or a measure for postmaterialism derived from the World Values Survey, but these caused the loss of two thirds of our cases. We therefore decided to use the SO<sub>2</sub> per capita measure despite its roughness.

*Annex 1:* As explained in detail above, one of the major problems of the suggested model is the existence of a so-called “Firewall” between Annex I and non-Annex I parties (see Bodansky 2010). This firewall allows developing countries to participate in the Kyoto Protocol without having to accept binding emission reduction targets and without having to contribute to the proposed mitigation funds. Such legally binding measures only apply to developed nations, i.e. the countries named in Annex I of the Kyoto Protocol. Although there are a number of reasons why such a division between the developed and the developing countries can no longer be upheld (Castro 2010), the developing countries have strongly resisted the idea of adopting binding targets themselves. Therefore, we expect some systematic behavior on the part of countries belonging to one or the other group. We account for this by including a dummy variable indicating whether a country is part of the Annex 1 group or not in all models proposed in this paper.

Table 1 provides summary statistics for the dependent and independent variables, and Table 2 provides correlation coefficients for all used variables (except the Annex 1 dummy) to ensure multicollinearity is not problematic.

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Table 1 approximately here

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Table 2 approximately here

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## Analysis

In Table 3 we list the results of our multivariate data analysis for both issue areas, i.e. emission reduction targets and mitigation finance. For each issue we present a full GLM model and a GLM model that excludes emitter interests, as this variable is insignificant in most models and causes the number of observations to drop substantially due to missing data. The substantive effects for the models are illustrated in Figures 3 and 4.

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Table 3 approximately here

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Figure 3 and 4 approximately here

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First, note that the difference between Annex 1 and non-Annex 1 countries is significant across all models presented in Table 3. However, there is also an astounding difference in the choice of positions of each group with regards to reduction targets and mitigation finance. In negotiating the former issue, the richer Annex 1 countries tend to be substantially less cooperative, as can be seen by the highly significant and positive coefficients – congruent with a move away from the median position – across the first two models. Model 2 predicts that non-Annex 1 countries are on average about 3.37 (the exponent of 1.21) times closer to the median position than developed countries. Setting all other predictors to

their mean, the expected distance from the median position for non-Annex 1 countries is 2.82 and for Annex 1 countries 8.92. Hence, the predicted difference between countries of the two groups is 6.10.

The results on mitigation finance indicate the reverse situation, i.e. here, Annex 1 countries are expected to be about 2.6 times closer to the most cooperative position than developing countries. Their expected distances from the median position are 4.93 and 12.79 respectively, and the difference between the groups is -7.85.

These results seem surprising at first. Why should the two country groups behave so differently regarding the two issue areas under investigation? We believe the reason behind this behavior is an attempt by the richer Annex 1 countries to offer compensation for their reluctance to reduce greenhouse gas emissions in volumes demanded by scientific bodies, in particular the Intergovernmental Panel on Climate Change.<sup>9</sup> Cutting down emissions is costly and fraught with uncertainty; hence, developed countries seem to prefer fixed (and therefore calculable) annual side-payments to non-Annex 1 countries to help them reduce emissions domestically. This compensation logic could possibly also be used in the later negotiation rounds as issue linkage, in the sense of a “within agreement linkage” (McKibben and Western 2013) - and not in the sense of a linkage across issue areas (Tollison and Willett 1979) - the industrialized countries behave uncooperatively in negotiating emission reduction targets, but compensate for this behavior by offering large payments to the developing countries.

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<sup>9</sup> The IPCC Fourth Assessment Report, Working Group III calls for greenhouse gas concentration levels in the atmosphere below 450 ppm (CO<sub>2</sub>-eq). However, even this scenario has an 80% chance of increasing global temperatures by more than 2°C (the target mentioned in the Copenhagen Accord). Höhne (2010) analyzed the Annex 1 emission pledges after Copenhagen (which are closely connected to their positions) and concludes that these would stack up to global warming of 3.5°C, while Rogelj et. al. (2010) conclude that what Annex 1 countries are offering is in no way sufficient to combat global warming.

Our interview partners frequently mentioned this compensation logic, even though we did not specifically ask them about links between the various issues. For example, a member of the delegation of Botswana pointed out that mandatory mitigation finance was necessary because “if you do not agree with them [the Annex I countries] on other issues such as reduction targets, they will hold back the [voluntary] funds”. And an Argentinian delegate insisted that mitigation finance could not come from market mechanisms in the future, because so far “the mitigation targets in Annex 1 countries are financed by market mechanisms, in particular the Clean Development Mechanism, and not the other way around”. Argentina also called for mandatory financial contributions from developed countries. Ireland, on the other hand, expressed concern about the high costs of mitigation in developing countries, and the obligation of Annex 1 countries to finance mitigation projects there. Therefore, the Irish delegation suggested focusing first and foremost on domestic mitigation targets before promising excessive mitigation finance to other countries. It instead proposed that mitigation projects in developing countries be financed mostly through contributions from market mechanisms. We believe that this result is important, as it shows how negotiation issues within the same negotiation framework can be played against each other.<sup>10</sup>

Next, we turn to discuss the hypotheses proposed above. Figures 3 and 4 show the substantive effects of the GLM models for reduction targets and mitigation finance respectively.

*Vulnerability:* The case of vulnerability to climate change impacts is an interesting one, as the effect of this predictor depends clearly on the issue area. As hypothesized, vulnerable

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<sup>10</sup> In the web appendix to this paper (part d) we test and discuss the connection between the two issues empirically. We indeed find the expected link that less cooperative positions regarding reduction targets lead to more cooperative positions on mitigation finance. The same is not true the other way around, mitigation finance positions have no effect on countries’ reduction target positions.

countries are more willing to cooperate and demand less in terms of mitigation finance. But when it comes to emission reduction targets, the size of the effect reduces substantially and the significance vanishes. The reason for this contrast is likely to be the salience of the two issues. While mitigation finance is clearly desirable, it is much less important for vulnerable countries than reduced emissions. They are not in a position to make concessions regarding reduction targets, as increasing temperatures, rising sea levels, or changing precipitation patterns threaten their very existence. Indeed, these countries should be expected to fight for a global deal that is able to prevent climate change. However, they also depend on the success of the negotiations, and obstructing the process by making unreasonable demands is therefore not in their interest. These two opposing forces are likely to be the reason why the overall effect of vulnerability on cooperative behavior is insignificant in the emission reduction case.

In the case of mitigation finance, however, the negative effect across all models demonstrates the willingness of vulnerable countries to compromise and to strike a deal. The top left panel of Figure 4 shows this effect graphically for Model 4. A one-point increase in vulnerability reduces the distance to the median position by about 23 percent. For example, keeping all other variables at their mean, at a vulnerability level of three, the expected distance from the most cooperative position is 11.20, but diminishes to 8.60 when the vulnerability level increases to four. This supports hypothesis 1 that a higher vulnerability level increases the chances that a state adopts a more cooperative position, at least with regards to issues that are not potentially disastrous for a country vulnerable to the impacts of climate change.

*Power:* Power, measured by total GDP, has the expected sign across all models presented in Table 3. For example, a move from the lowest power level in Model 2 to the

highest corresponds to a shift in the expected distance to the median position on reduction targets from 2.42 to 6.00, holding all other variables at their mean (see the illustration of this effect in Figure 3). The size of this shift corresponds approximately to a shift from the first quintile to the mean of the dependent variable. For mitigation finance, the situation is similar. Hence, hypothesis 2 is substantiated.

*Democracy:* The coefficients for democracy are very close to zero and not significant in the reduction targets case. For mitigation finance, on the other hand, the democracy variable shows the expected effects in both models in Table 3, i.e. as the level of democracy falls (indicated by an increase in the Freedom House index) countries become less cooperative. This effect for mitigation finance is illustrated in the lower right panel of Figure 4. As the Freedom House index increases by 1, the distance from the median position on mitigation finance increases by about 8 percent. Again, the question arises of why democracy has such a different effect on the two issues, and again a compensation mechanism is a likely explanation. While reduction targets raise costs for domestic industry, in view of which countries are likely to be disinclined to make concessions and to bargain cooperatively, it appears that democratic countries are instead compelled to compensate for their behavior by offering a more cooperative position on mitigation finance. Hypothesis 3 is therefore supported, conditional on the issue under consideration.<sup>11</sup>

*Domestic environmental quality:* The final substantive effect concerns the level of domestic environmental protection, measured by a country's SO<sub>2</sub> emissions per capita. This variable again exhibits significance and the expected sign for both issues, however, the

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<sup>11</sup> Being an Annex 1 country in almost all cases also means that they are also highly democratic (the exception is Russia). Hence, the effect of democracy is somewhat unclear: does it encourage cooperativeness, as we claim, or does it mostly a driver for the selection into the Annex 1 group? If so, then this might drive the significance levels of the Annex 1 dummy, at the cost of significance of the democracy variable (particularly for the reduction target models). To test whether this problem affects our models, we used selection models and found that the results for democracy are rather stable. The same is also true for most other variables in the model. For a discussion of the selection models, see the web appendix (part e).

effect is much larger in size for mitigation finance. An increase in SO<sub>2</sub> emissions by a value of 10 corresponds to a 10 percent shift away from the median negotiation position in the case of mitigation finance, but only a 2 percent shift in the case of reduction targets. This confirms our expectation that the worse the domestic environmental standards are, the less cooperative the positions of the concerned governments are. Overall, hypothesis 5 is therefore affirmed.

Hypotheses 4 and 6 (emitter interests and IO membership) must be rejected for both issue areas according to the models in Table 3. For reduction targets, even omitting all covariates except the Annex 1 dummy does not bring the coefficients to conventional significance. In the mitigation finance case, however, dropping the covariates produces significant results with the signs pointing in the expected directions for both variables (and the effect of the Annex 1 dummy increases dramatically). However, as adding only one or two variables to the model is sufficient for the significance to disappear, we believe there is not enough evidence in support of hypotheses 4 and 6. These findings confirm a rather sober assessment of cooperation in climate change negotiations by highlighting that internationally well-integrated governments are not more cooperative than the more isolated ones, since vote trading across different areas, as suggested by previous studies (Tollison and Willett 1979; Kemfert 2004), is extremely rare and suffers from enforcement problems (McKibben and Western 2013). The most important determining factors for cooperation in climate change negotiations are thus still structural factors, such as vulnerability and economic power. However, governments under domestic pressure, such as democracies, are not necessarily better in providing public goods by reducing emissions, and instead let themselves be pressured into paying, in the form of mitigation finance, for their lack of cooperation.

## Conclusion

Analyzing negotiation positions is fundamental for a better understanding of the bargaining behavior of states in international negotiations. The choice of these positions results from the conscious decisions made by governments, which consider both the interests of states and strategic considerations. In our data set “Negotiating Climate Change”, we have collected new data on the positions and bargaining strategies of the UNFCCC member states in order to further our understanding of international negotiations. Building on and extending existing research on negotiations in the EU or other international treaties, such as the Law of the Seabed negotiations (Bräuninger 2001), we show that in climate change negotiations, bargaining positions are influenced by economic, domestic, and strategic factors. Thus, through our initial analysis of the determinants of environmental negotiation positions, we enhance existing research on states’ ratification behavior with regard to environmental treaties or different environmental policy outputs with our initial analysis of the determinants of environmental negotiation positions.

The pressure to find consensus in the Copenhagen climate change negotiations was extremely high, since a great deal of public attention was given to the issue before the summit. In view of this, states tried hard to reach some consensus. This was very difficult however, since China and India stuck to their rather uncooperative positions (Bodansky 2010). Finding a cooperation agreement such as the “Copenhagen Accord” was only possible because key actors attributed different value to different issues. In other words, it was easier for developed countries to try to “pay off” developing countries by promising mitigation payments than to burden their domestic industries with serious reduction targets. In our analysis of these two crucial negotiation topics, we could thus show that power and structural factors are still central factors in explaining international negotiation positions.

However, the effect of democratic structures leads governments to choose more cooperative positions in less costly negotiating issues, i.e. compensation mechanisms<sup>12</sup>. Due to their increased accountability towards voters, governments might be more afraid of not being able to deliver the common good of environmental protection. Thus, recent democratization developments may also be good news for the fight against climate change. As a result, we obtain a more differentiated picture of the situation of democracies in climate change negotiations: they are constrained by the same factors as non-democracies, such as vulnerability to climate change, and they make use of the same strategic tools, such as economic power. However, due to domestic pressure they are at least forced to show willingness to cooperate on less crucial or costly issues, in our case by compensating their reluctance to reduce domestic emissions through contributions to a mitigation fund.

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<sup>12</sup> Again, see the web appendix (part d) for a more detailed discussion on how this compensation mechanism works.



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**Table 1:** Predictors of cooperative behavior for reduction targets and mitigation finance

	Reduction Targets		Mitigation Finance	
	Model 1	Model 2	Model 3	Model 4
<b>Ecological vulnerability</b>	-0.064 (0.061)	-0.062 (0.054)	-0.236* (0.118)	-0.265* (0.114)
<b>Power (GDP)</b>	0.082** (0.028)	0.086*** (0.025)	0.084† (0.048)	0.096* (0.046)
<b>Democratic status</b>	0.001 (0.019)	0.001 (0.01)	-0.073** (0.024)	-0.074*** (0.023)
<b>IO membership</b>	-0.003 (0.002)	-0.003 (0.002)	0.010 (0.007)	0.011† (0.007)
<b>Environmental quality</b>	-0.002* (0.001)	-0.002* (0.001)	-0.010* (0.004)	-0.010* (0.004)
<b>Emitter interests</b>	-0.002 (0.004)		0.003 (0.003)	
<b>Annex 1 dummy</b>	1.199*** (0.134)	1.217*** (0.119)	-1.243** (0.440)	-0.953** (0.373)
<b>Intercept</b>	-0.092 (0.695)	-0.206 (0.570)	2.939* (1.238)	2.626* (1.204)
<b>N</b>	110	134	111	134
<b>Pseude-R2</b>	0.76	0.77	0.42	0.40
<b>AIC</b>	509.81	593.21	839.38	1047.61
<b>BIC</b>	596.23	674.35	926.08	1128.96
<b>log L</b>	-222.91	-268.61	-387.69	-495.81

Standard errors in parentheses

†significant at  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

## **Web appendix**

### **Web Appendix for the paper “A Political Economy of Positions in Climate Change Negotiations: Economic, Structural, Domestic, and Strategic Explanations”**

In this Appendix we present additional analyses.

- a) We demonstrate by means of a factor analysis the choice of the dependent variables used in the paper.
- b) Next we discuss the results when we use the Polity IV dataset to capture democratic status instead of the Freedom House Index, and also why we opted for the latter.
- c) We use a different measure for IO membership, namely membership in International environmental organizations (EOs), to check whether this measure is better suitable to explain cooperative positioning in environmental negotiations.
- d) Summary statistics and correlation table for variables used in the paper.
- e) We provide an additional check for the suggested compensation logic as suggested in the conclusion.
- f) We present selection models to check the robustness of the hypothesized effects.
- g) We provide further robustness checks by controlling for outliers.

**a) Factor Analysis:**

In this section, we explain the choice of the dependent variables in the main paper. For the project, we collected two datasets, one derived from interviewing 56 country delegations. For the second dataset we hand-coded more than 1,500 pages of submitted text by countries to the UNFCCC. The two datasets are used for data triangulation and confirm that we capture the same information. For a more detailed description of the datasets see (Weiler 2012).

Only the hand-coded dataset is used for the present paper, since it contains almost all of the world’s countries. Six variables were coded, these are Annex 1 mitigation Targets (by 2020), Annex 1 Mitigation Targets (by 2050), Non-Annex 1 Mitigation Targets, Nationally Appropriate Mitigation Actions (NAMAs), Adaptation Funds, and Mitigation Funds (for a more detailed description see again Weiler, 2012). A Factor Analysis (shown in Appendix Table 1 below) reveals that underlying our six issues are two main factors. The two issues concerning mitigation targets load heavily on the first factor, while the two finance variables (Mitigation and Adaptation Funds) have high loadings for the second factor. Since Adaptation Finance also has a relative high loading for the first factor, we chose Mitigation Funds as the second dependent variable, while reduction targets by 2020 serve as the first dependent variable. This Factor Analysis also confirms our experience, gained through repeated visits of international climate change conferences, that these two issues were the most crucial topics in the run-up to the conference in Copenhagen.

**Appendix Table 1:** Factor analysis for all six originally coded issues. One factor represents reduction targets, the other financial issues

Variable	Factor Loadings	
	Factor1	Factor2
<b>Reduction Targets (2020)</b>	0.968	
<b>Reduction Targets (2050)</b>	0.817	0.246
<b>Non-Annex 1 Targets</b>	-0.979	-0.131
<b>Nationally Appropriate Mitigation Action</b>		-0.121
<b>Adaptation Finance</b>	0.522	0.838
<b>Mitigation Finance</b>	0.253	0.773
<b>SS Loadings</b>	2.903	1.392
<b>Proportion Variance Explained</b>	0.484	0.232
<b>Cumulative Variance Explained</b>	0.484	0.716

Test of the hypothesis that 2 factors are sufficient. The chi square statistic is 12.68 on 4 degrees of freedom. The p-value is 0.013



## b) Alternative measurement for democratic status:

We opted to use the Freedom House index to capture a country's democratic status because it also includes small island countries (most of them members of the AOSIS negotiation group), who are in our view important parties in the climate change negotiations. In this section, we use the more widely used Polity IV index as a check of the robustness of our results (see Appendix Table 2 below).

In general, the results of our original analysis are confirmed, although the significance levels tend to be lower when the Polity IV measure is used (which could be due to the lower number of observations). The only difference is that in Model 2 democratic status exhibits a positive and significant effect, which runs against the hypothesis that more democratic countries tend to behave more cooperatively. However, the effect is relatively small across the values the Polity IV indicator adopts. Hence, our conclusion that power is a major driver of cooperative behavior in the reduction targets case also stands when utilizing an alternative measure to capture democratic status.

**Appendix Table 2:** Predictors for cooperative behavior (using Polity IV instead of Freedom House)

	Reduction Targets		Mitigation Finance	
	Model 1	Model 2	Model 3	Model 4
<b>Ecological vulnerability</b>	-0.06 (0.06)	-0.06 (0.06)	-0.16 (0.12)	-0.18 <sup>†</sup> (0.11)
<b>Power (GDP)</b>	0.06* (0.03)	0.07* (0.03)	0.08 (0.05)	0.08* (0.04)
<b>Dem. status (Polity IV)</b>	0.03 (0.02)	0.04* (0.02)	-0.06* (0.02)	-0.06** (0.02)
<b>IO membership</b>	-0.003 (0.002)	-0.003 (0.002)	0.009 (0.007)	0.011 <sup>†</sup> (0.006)
<b>Environmental quality</b>	-0.002 <sup>†</sup> (0.001)	-0.002 <sup>†</sup> (0.001)	-0.01* (0.004)	-0.01** (0.004)
<b>Emitter interests</b>	-0.002 (0.003)		0.003 (0.00)	
<b>Annex 1 dummy</b>	1.11*** (0.13)	1.12*** (0.12)	-1.44** (0.45)	-1.52*** (0.43)
<b>Intercept</b>	0.12 (0.69)	-0.02 (0.59)	3.01* (1.16)	3.15** (1.04)
<b>N</b>	97	113	98	114
<b>AIC</b>	441.63	495.00	749.47	868.67
<b>BIC</b>	524.02	571.37	832.19	945.28
<b>log L</b>	-188.81	-219.50	-342.74	-406.33

Standard errors in parentheses

<sup>†</sup>significant at  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

### c) Using EOs instead of IOs to capture integration into the international system

Finally, it has been pointed out to us, that membership in IOs might not be relevant for the choice of cooperative negotiation positions in environmental negotiations, and that membership in Environmental Organizations might be the better explanatory variable. Although we believe that for our argument, that an increased involvement in the international sphere enhances a country's willing to cooperate since it institutionalizes reciprocity and delegitimizes defection the type of IO should not be relevant, in this section we test to what extend our models change when we substitute IOs with EOs in the models (see Appendix Table 3 below).

As we expected, the results are very similar as in the original analysis. In the mitigation finance case, EO membership even exhibits lower significance levels than IO membership (while somewhat strengthening the findings for power. For reduction targets, on the other hand, the environmental quality measure shows weaker results, while in this scenario EO membership indeed is significant and points into the expected direction. Yes as above, when replacing the Freedom House index with the Polity IV measure, since both environmental quality and EO membership only exhibit very small coefficients, the only substantial explanation for the choice of cooperative negotiation positions regarding CO2 reduction targets remains a country's political power.

**Appendix Table 3:** Predictors for cooperative behavior using Environmental Organization (Eos) instead of International Organizations

	Reduction Targets		Mitigation Finance	
	Model 1	Model 2	Model 3	Model 4
<b>Ecological vulnerability</b>	-0.03 (0.06)	-0.03 (0.06)	-0.32** (0.11)	-0.36*** (0.10)
<b>Power (GDP)</b>	0.12** (0.04)	0.12*** (0.03)	0.12* (0.05)	0.12** (0.04)
<b>Dem. status</b>	0.01 (0.02)	0.01 (0.02)	-0.07** (0.03)	-0.07** (0.02)
<b>EO membership</b>	-0.003† (0.001)	-0.003* (0.001)	0.00 (0.00)	0.005 (0.004)
<b>Environmental quality</b>	-0.002† (0.001)	-0.002† (0.001)	-0.08* (0.04)	-0.010** (0.003)
<b>Emitter interests</b>	-0.001 (0.003)		0.04 (0.003)	
<b>Annex 1 dummy</b>	1.25*** (0.13)	1.26*** (0.12)	-1.16* (0.50)	-1.43** (0.48)
<b>Intercept</b>	-1.21 (0.97)	-1.40† (0.82)	2.56† (1.31)	2.75* (1.22)
<b>N</b>	110	132	111	133
<b>AIC</b>	507.32	583.36	840.89	1004.90
<b>BIC</b>	593.73	664.08	927.60	1085.83
<b>log L</b>	-221.66	-263.68	-388.45	-474.45

Standard errors in parentheses

†significant at  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

#### d) Summary Statistics and Correlation Table

**Appendix Table 4:** Descriptive statistics of the dependent and independent variables

Variable name	Obs.	Mean	St. dev.	Min.	Max.
Reduction targets	138	4.65	4.39	0	17.50
Mitigation finance	146	11.83	13.35	0	66.67
Ecological vulnerability	146	3.39	0.77	1.67	5.50
Power (Emissions logged)	146	9.00	2.66	1.61	10.89
Power (GDP logged)	135	23.89	2.57	18.67	30.28
Democratic status	146	8.36	3.88	1	13
Franchise (oil, gas, coal)	114	5.61	16.81	0	72.91
IO membership	146	63.50	20.39	19	125
Domestic environmental quality (SO <sub>2</sub> emissions per capita)	146	157.37	28.24	0	175.85
Annex 1 dummy	146			0 (112)	1 (34)

**Appendix Table 5:** Correlation table for the dependent and independent variables

	Reduction targets	Mitigation finance	Vulnerability	Power (GDP logged)	Democratic status	IO membership	Environmental quality	Franchise	Annex 1 Dummy
Reduction targets	1.00								
Mitigation finance	-0.13	1.00							
Vulnerability	0.21	-0.36	1.00						
Power (GDP log)	0.60	0.20	0.06	1.00					
Democratic status	0.43	-0.45	0.36	0.10	1.00				
IO membership	0.48	0.13	-0.14	0.73	0.20	1.00			
Envir. quality	-0.40	-0.07	-0.11	-0.14	-0.15	0.03	1.00		
Franchise	-0.10	0.27	-0.09	0.10	-0.45	-0.18	-0.27	1.00	
Annex 1 Dummy	0.83	-0.25	0.27	0.54	0.51	0.47	-0.16	-0.18	1.00

### e) Additional check of the compensation mechanisms

In the paper, we propose that countries follow a compensation logic in the negotiations, i.e. they compensate for their lack of willingness to cooperate in one (crucial) issue area by adopting more cooperative positions on other, less salient issues. More specifically, we propose that hardliners on the issue reduction targets instead adopt a more generous position when it comes to mitigation finance. To test this link, we run the same models again as in the paper for both issues (Models 2 and 4 of Table 3 in the paper), but this time we also include the alternative dependent variables in the model to see how they affect each other. In other words, in the reduction targets model we include mitigation finance as a dependent variable, and in the mitigation finance model the reduction targets variable is added. Appendix Table 4 shows the results.

**Appendix Table 6:** Models including the alternative dependent variable as dependent variable

	<b>Reduction Targets Model</b>	<b>Mitigation Finance Model</b>
<b>Ecological vulnerability</b>	-0.060 (0.058)	-0.254* (0.100)
<b>Power (GDP)</b>	0.091*** (0.026)	0.109* (0.048)
<b>Democratic status</b>	0.020 (0.022)	-0.070** (0.021)
<b>IO membership</b>	-0.003 (0.002)	0.017** (0.006)
<b>Environmental quality</b>	-0.002* (0.001)	-0.015*** (0.004)
<b>Annex 1 Dummy</b>	1.107*** (0.152)	-1.392† (0.726)
<b>Mitigation Finance</b>	0.001 (0.003)	
<b>Reduction Targets</b>		-0.083* (0.034)
<b>Intercept</b>	-0.520 (0.611)	2.967* (1.191)
<b>N</b>	127	127
<b>AIC</b>	569.454	937.881
<b>BIC</b>	660.468	1028.642
<b>Log L</b>	-252.727	-436.940

Standard errors in parentheses

†significant at  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

As can be seen, the results of the hypothesized effects are largely unaffected. However, we also see the significant negative coefficient of reduction targets in the mitigation finance model. This means that less cooperative reduction target positions are associated with more cooperative mitigation finance positions. On the other hand, mitigation finance positions do not significantly affect the reduction targets model, as we expected (the coefficient is very close to zero and far away from conventional significance levels). We believe that this is strong additional evidence for the compensation logic we propose in the paper. In particularly rich Annex 1 countries, who shy away from too ambitious mitigation targets (as

shown by the models), use this compensation logic to appease non-Annex 1 countries who might otherwise reject any agreement.

## **f) Selection models**

In this section we briefly introduce selection models to check the robustness of the hypothesized effects and to show that they are not too heavily influenced by the correlation between the Annex 1 dummy and other dependent variables (in particular our democracy variable). For each of the two dependent variables, we calculated two Heckman selection models, one for Annex 1 countries and the other for non-Annex 1 countries. Thus, the dichotomy Annex 1 / non-Annex 1 variable serves as the dependent variable in the selection stage of the models in Appendix Table 5, yet it is inverted to run separate models for the two country groups. In addition, we also run Tobit-5 models with both groups in the same model (see Appendix Table 6). Since the selection of countries into the Annex 1 groups was mostly a function of their development status (Gupta 2010), we include GDP per capita and democratic status in the selection stage, in addition to IO membership and environmental quality. Thus, the models are identified. We do not include ecological vulnerability and total GDP, since we see no causal link how these variables could affect selection into the Annex 1 group (being a large country or in an unfortunate geographical position does not affect this selection).

We find that in the reduction targets case the results are identical to those in our original models. For both country groups power (measured as total GDP) is a strong predictor for less cooperative behavior. And in both cases the coefficient is relatively large compared to the other significant coefficient in the model: environmental quality. This latter variable is again significant for both country groups and thus validates the findings of the original models. Yet, as in our previous findings, power is the major driver for the rather uncooperative behavior countries exhibit in this issue area.

The models for mitigation finance also corroborate the findings reported in the paper. We see that power and a country's democratic status exhibit the expected effects for both country groups and thus lend further credibility to the respective hypotheses.

For vulnerability the effect is only significant for the Annex 1 case, therefore we believe that the Annex 1 countries are the main drivers of the effect in the pooled model. We are not surprised by this result. More vulnerable Annex 1 countries offer to do more domestically when being more cooperative. This is not the case for vulnerable non-Annex 1 countries. For them, being more cooperative means shifting towards the median position and away from demanding higher international mitigation targets. In doing so, they are stuck between a rock and a hard place. On the one hand, they need a global deal to curtail global warming and are thus driven towards more moderate positions. On the other hand, if they play a too cooperative game, this might lead to an outcome that does not even guarantee their survival, at least in the case of some island nations. Being caught in the middle of these two competing driving forces, the significance level of ecological vulnerability vanishes in the non-Annex 1 case.

**Appendix Table 7:** Selection Models for the two dependent variables (for both Annex 1 and non-Annex 1 countries)

	<i>Dependent variable:</i>			
	<b>Reduction Targets</b>		<b>Mitigation Finance</b>	
	Non-Annex 1 Model	Annex 1 Model	Non-Annex 1 Model	Annex 1 Model
<b>Ecological vuln.</b>	-0.280 (0.333)	-0.474 (0.341)	-1.317 (1.436)	-10.845*** (3.720)
<b>Power (GDP)</b>	0.571*** (0.169)	0.358** (0.177)	1.439** (0.719)	2.892* (1.674)
<b>Democratic stat.</b>	0.101 (0.081)	-0.051 (0.268)	-0.949*** (0.360)	-9.740** (4.766)
<b>IO membership</b>	-0.028 (0.023)	-0.013 (0.019)	0.219** (0.099)	-0.006 (0.164)
<b>Environmental q.</b>	-0.033* (0.019)	-0.022*** (0.006)	-0.227*** (0.086)	0.036 (0.065)
<b>Intercept</b>	-2.977 (4.888)	9.090 (7.231)	17.748 (22.197)	87.408 (98.897)
	<i>Dependent variable (selection stage):</i>			
	Non-Annex 1	Annex 1	Non-Annex 1	Annex 1
<b>GDP per capita (log)</b>	-1.484*** (0.326)	1.044*** (0.270)	-1.169*** (0.258)	1.419*** (0.435)
<b>Democratic stat.</b>	-0.085 (0.057)	0.180*** (0.055)	-0.163*** (0.053)	0.384*** (0.113)
<b>IO membership</b>	-0.024** (0.012)	0.027** (0.011)	-0.025** (0.011)	0.039** (0.016)
<b>Environmental q.</b>	0.013 (0.008)	-0.001 (0.005)	0.019* (0.010)	-0.005 (0.006)
<b>Intercept</b>	14.888*** (3.370)	-14.152*** (2.993)	14.806*** (2.673)	-21.204*** (4.944)
<b>Observations</b>	141	177	141	178
<b>Censored obs.</b>	40	145	40	145
<b>R2</b>	0.175	0.412	0.412	0.486
<b>Adjusted R2</b>	0.122	0.270	0.374	0.368
<b>ρ</b>	-0.828	-0.305	-0.702	0.174
<b>Inverse Mills Ratio</b>	-1.952** (0.899)	-0.284 (1.092)	-6.995* (3.995)	1.836 (10.191)

Standard errors in parentheses

Significant at \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

For environmental quality we see just the opposite, i.e. the effect of the pooled model is driven by non-Annex 1 countries. This, again, makes sense, since most Annex 1 countries have already very high environmental standards and are thus too similar to each other for the effect to be discernible. Finally, the effect of IO membership is rather erratic across all models tested for this paper. Hence, the conclusion that the respective hypothesis should be rejected stands despite the significant effect we find in the non-Annex 1 mitigation finance case of our selection models.

**Appendix Table 8:** Tobit-5 Models for the two dependent variables

	<i>Dependent variable:</i>	
	<b>Reduction Targets</b>	<b>Mitigation Finance</b>
Non-Annex 1 equation		
<b>Ecological vuln.</b>	-0.35 (0.34)	-1.34 (1.44)
<b>Power (GDP)</b>	0.55*** (0.17)	1.43** (0.70)
<b>Democratic stat.</b>	0.09 (0.08)	-0.76** (0.33)
<b>IO membership</b>	-0.03 (0.02)	0.23** (0.10)
<b>Environmental q.</b>	-0.02* (0.01)	-0.20** (0.09)
<b>Intercept</b>	-4.25 (4.98)	10.72 (22.27)
Annex 1 equation		
<b>Ecological vuln.</b>	-0.47 (0.32)	-10.77*** (4.14)
<b>Power (GDP)</b>	0.35** (0.17)	3.06* (1.67)
<b>Democratic stat.</b>	-0.03 (0.14)	-8.77** (3.02)
<b>IO membership</b>	-0.01 (0.01)	-0.01 (0.14)
<b>Environmental q.</b>	-0.02*** (0.005)	0.04 (0.07)
<b>Intercept</b>	8.79 (4.82)	17.748 (22.197)
Selection equation		
<b>GDP per capita (log)</b>	1.70*** (0.39)	1.78** (0.88)
<b>Democratic stat.</b>	0.11* (0.07)	0.46*** (0.14)
<b>IO membership</b>	0.02* (0.01)	-0.05 (0.04)
<b>Intercept</b>	-19.43*** (3.93)	-25.76** (11.32)
<b>Observations</b>	133	134
<b>Obs. Non-Annex 1</b>	101	101
<b>Obs. Annex 1</b>	32	33
<b>Log-lik.</b>	-292.15	-508.76
<b>q1</b>	0.42	0.99
<b>q2</b>	-0.27	-0.36

Standard errors in parentheses

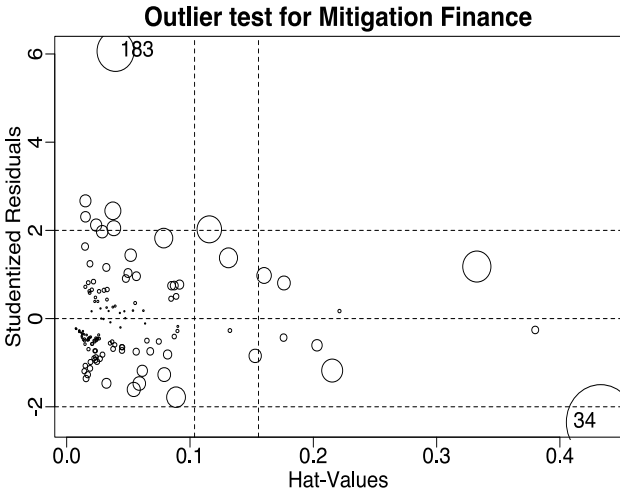
Significant at \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Overall, the selection models are a further indicator in favor of our choice of the median as the most cooperative position. Had we not rescaled the dependent variables, we would have to propose opposing hypotheses for the two country groups (e.g. more vulnerable Annex 1 countries offer more, and non-Annex 1 countries demand less). After transforming the



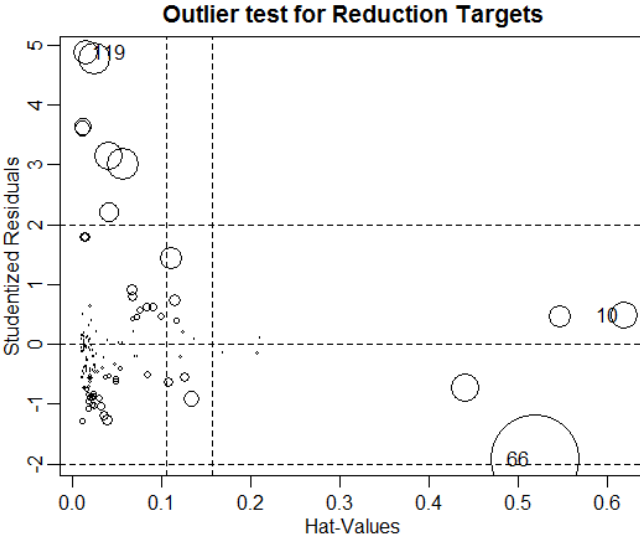
dependent variables, so that they reflect cooperativeness for both groups, we were able to propose combined hypotheses for both groups. The selection models thus also validate our assumption that the recoded dependent variables capture what we intended, since the significant effects confirm the same hypotheses as in the original regressions, and do so for both country groups in separate regression models.

For the main Mitigation Finance Model (Model 4 in the paper), we find the outlier structure as indicated in the following graph.



As can be seen, there are two potentially problematic outliers. The first is Turkey (number 183), which is not very surprising, since this is the country with the most extreme position by far. It is the only country with a position more than 60 units away from the median on this issue, while all other countries are below 40 (see also the right-hand panel of Figure 2 in the paper, Turkey can be seen there on the very right of the graph in its own bar). The other potentially influential outlier is China (number 34), which has a large hat value but also a relatively large studentized residual (the size of the circles are Cook’s Distances). We removed these two observations to check the robustness of the regression. As can be seen in the table below, the results do not change dramatically, if anything, they significance levels increase.

For the dependent variable Reduction Targets we follow the same procedure. Here is the outlier plot for Model 2 in the paper.



There are a couple of potentially influential outliers, in particular Gabon (number 66) with a large hat value and a relatively large residual. There are a few observations with large residuals, and we removed all observations with studentized values larger than 3 (although all of them have small hat-values) to check how this affects the results. Again, the results are robust, with the exception of membership in international organizations. The coefficient of this variable tends to be erratic across the models, hence our conclusion that the effect is not robust and this hypothesis should be rejected (as already stated in earlier version of the paper) stands. The results of regression without the potential outliers can be seen in the following table.

**Table 3: Regression results of models with potential outliers removed**

	<b>Reduction Targets Model</b>	<b>Mitigation Finance Model</b>
<b>Ecological vulnerability</b>	-0.062 (0.043)	-0.203* (0.096)
<b>Power (GDP)</b>	0.118*** (0.026)	0.125** (0.044)
<b>Democratic status</b>	0.013 (0.012)	-0.091*** (0.021)
<b>IO membership</b>	-0.005* (0.002)	0.013* (0.006)
<b>Environmental quality</b>	-0.002* (0.001)	-0.014*** (0.004)
<b>Annex 1 Dummy</b>	1.283*** (0.098)	-1.554*** (0.413)
<b>Intercept</b>	-1.168† (0.599)	2.499* (1.084)
<b>N</b>	130	133
<b>AIC</b>	505.694	993.144
<b>BIC</b>	585.985	1074.074
<b>Log L</b>	-224.847	-468.572