


Article

Committing to the Climate: A Global Study of Accountable Climate Targets

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Abstract: The Paris Agreement has been described by many as a historical event, a turning point in the United Nations' climate negotiations. Its success is often attributed to the intended nationally determined contributions (INDCs), in which countries have committed themselves to individually set targets in order to reduce emissions. However, it still remains to be agreed upon how to review and compare countries' efforts, as outlined in the INDCs (and at later stages in the nationally determined contributions—NDCs). In this paper we suggest (and construct) a simple quantitative measure which is transparent, ensures valid comparison over time, and which can be determined for a large share of countries; a comparable indicator of country commitments in terms of so called accountable climate targets (ACTs). This indicator is then combined with a global data set of political–institutional, economic and geographic variables to understand more about which factors may affect country commitments. The results from multivariate probability unit (probit) regressions show that egalitarian principles, as well as GDP per capita, tend to be positively associated with climate commitments, while a negative association is found for CO₂ emissions per capita.

Keywords: climate change; Paris Agreement; intended nationally determined contributions (INDC); nationally determined contributions (NDC); democracy; corruption; egalitarian principles; accountable climate targets; institutional quality

1. Introduction

In November 2016 the Paris Agreement, succeeding the Kyoto Protocol, entered into force [1–3]. The bottom-up approach of the Paris Agreement, using voluntary pledges by countries rather than top-down country or regional commitments, was quite different from the approach used earlier in the climate negotiating process, and was in sharp contrast to the process leading up to the (unsuccessful) COP-meeting in Copenhagen in 2009 [4]. The voluntary pledges, called intended nationally determined contributions (INDCs), removed an important obstacle in the negotiations for a post-Kyoto agreement—the discussion about burden sharing and internationally agreed emissions reductions. For most countries, the INDCs have now turned into their first NDCs (nationally determined contributions) [5]. There is, however, substantial variation in terms of the types of pledges that countries have made, and in this paper we employ a number of institutional, political, economic and geographic factors to explore this variation. Starting with political institutions, previous research has shown that democracies are more likely than non-democracies to sign and ratify multilateral environmental agreements [6,7], and that the democratic process impacts on the implementation of climate laws [8]. Similarly, countries with higher quality implementing institutions tend to show a stronger environmental performance [9].

In this paper, we take these findings as a starting point and investigate the impact of political institutions on country specific climate commitments.

Focusing first on the input side of the political system, we study the role of democracy for those countries' propensities to make climate commitments, arguing that electoral democracy institutionalizes accountability and a fair combat for power, increasing the likelihood of public goods provision [10–14].

In addition to the formal democratic institutions of electoral democracy, we focus on other aspects of political institutions of potential importance for a country's climate commitment, namely the extent to which political institutions promote equality [15]. We know that the most vulnerable in society also tend to be the ones who are most severely hit by global warming. Therefore, norms about the need to protect the rights and freedoms also of the most vulnerable in society might be highly relevant to climate commitments.

We also study how the characteristics of the implementing side of the political system are related to ACTs. More specifically we examine whether control of corruption, rule of law and quality of the bureaucracy make it more likely that countries make climate commitments. Furthermore, we include in the empirical analysis geographic and economic variables that could hinder or drive climate targets. Although climate change is something that affects all countries, some are more vulnerable than others, some have a greater ability to pay for both adaptation and mitigation in response to climate change, and some have stronger vested interests in fossil fuel resources.

To investigate these matters we introduce a new measure of climate commitments. A challenge with international treaties in general is the lack of effective mechanisms for ensuring compliance. While the Paris Agreement does not include enforcement mechanisms, the nationally determined contributions (NDCs), which is one of the corner stones of the Paris agreement (Article 4, paragraph 2), can still be said to contribute to accountability: First, the NDCs provide a possibility for both the global community and citizens to monitor and evaluate an individual country's action (or in-action) related to the commitments they have made. Secondly, the NDCs offer a framework for updating pledges over time through regular reviews (every fifth year, starting in 2020).

While the work with ensuring a sound review process of the NDCs (not least securing availability of data) is crucial for the success of the Paris Agreement, it is important that researchers and policy makers can follow up and analyze the commitments objectively even before the review process is in place. In this paper we therefore offer a simple complementary quantitative measure which is transparent, ensures valid comparison over time, and which can be determined for a large share of the countries (described in more detail in Section 2). Our measure (or indicator) does not capture individual countries' climate ambition per se (since this would require data not yet available for most countries), but rather it is an indicator of economy-wide climate commitments. We base our empirical analysis on the INDC data, which are the pledges that were submitted leading up to the COP-meeting in Paris in 2015 rather than the NDCs currently available. The main reason is that the submission of countries' first NDCs is an ongoing process (the NDCs are required to be submitted by 2020), and at the time of data collection more information was available by using the INDCs rather than the NDCs. However, it can be noted that for most countries the INDC is exactly the same as the first NDC. After ratifying the Paris Agreement, a country's INDC turns into their first NDC if the country has not actively chosen otherwise. We call our indicator an Accountable Climate Target (ACT), which implies that the emission reduction as outlined in the (I)NDC (we will use this way of writing throughout the paper when we refer to either the INDC or NDC), is a commitment that other countries can hold the country accountable for (and only that country).

Previous research that has utilized the INDC data in large-scale studies has focused, for example, on the expected impact of the INDCs in terms of implications for energy systems and the economy [16], or—using an inductive coding approach—on internal consistency of pledges within negotiating groups, (Tobin et al. 2018). One unpublished study [17] focuses on democracy and INDCs, but not in relation to other institutional factors or public opinion, as we do here. To our knowledge, these commitments

have not been systematically examined in relation to a broad set of political-institutional, economic and geographic factors, as we do in this paper.

The paper proceeds as follows: In the following section, we discuss the political factors that are hypothesized to be linked to having an ACT. We also discuss other potential correlates, such as economic development and climate vulnerability. In Section 2 we present the data and methodology. Results are presented in Section 3 and Section 4 concludes.

1.1. Political Institutions and Environmental Commitment

Measures to combat climate change can be regarded as a public good, since its goal—a stable climate—is both non-excludable and non-rivalrous. Moreover, unlike many other public goods, the benefits are not limited to the area in which the measures are implemented, but are instead global. Institutions—commonly referred to as the “rules of the game”—range from formal rules such as laws and regulations, to more informal norms of social behavior [18]. By shaping and constraining policy processes, political institutions can have profound impact on policy outcomes. In the following we will review the literature on how some specific political institutions can shape public good provision, and based on that, we shall form our hypotheses.

There is a long-standing debate in the literature as to which extent democratic institutions will lead to increased public good provision. Theoretically, the arguments for a positive effect of electoral democracy are very clear. With democratic institutions in place, leaders are held accountable to the electorate, and political elites have to compete with each other over the votes. This is assumed to create strong incentives among political leaders to deliver broadly demanded public goods [11,14]. While we conceptualize a stable climate as a public good, some important aspects, however, set (I)NDCs apart from public good provision as it is normally discussed in the literature. While studies on public good provision tend to assume that there is a strong and stable demand for public goods among citizens—the majority of voters are assumed to value such goods highly—we cannot assume that this is the case when it comes to measures to combat climate change. Even though climate stability should be reasonably valued by most people, the chain between individual countries’ emissions reductions and a stable climate is so long and filled with uncertainties, that the uncertain future gain may be heavily discounted, compared with the short-term costs in the eyes of voters. The fact that preventing climate change requires efforts from so many actors across the globe creates a huge collective action problem which might further limit citizen demand for action from their government.

Since we cannot make assumptions beforehand about citizen demand, the electoral mechanism should be studied in a way that allows for varying levels of public demand. We therefore hypothesize that there will be an effect of electoral democracy that is conditional on public demand for action. If public demand for climate action is low, we do not expect electoral democracy to increase the likelihood of having an ACT. However, *if public demand for climate action is high, we expect that electoral democracy will increase the likelihood of having an ACT.*

By now, it is well-known that climate change will have the most adverse effects upon the poorest. The effects of climate change will be unequally divided both between and within countries: Not only will the poorest countries be the hardest hit [19], but also within a rich country such as the US, it is predicted that poorer areas will be hit harder [20]. Moreover, disadvantaged groups will suffer disproportionately from the adverse effects of climate change, not only because of higher exposure, but also because it will be harder for them to cope with, as well as recover from, the damage caused by climate change [21].

With these inequalities in the expected effects of climate change as a backdrop, it could be expected that countries that have made a strong commitment to egalitarian principles are more willing to also commit to combatting climate change. States commit to egalitarian principles not only by guaranteeing equal protection of rights and freedoms across all groups in society, but also by striving for more equal distribution of resources and power within society [15,22]. In countries where the state has a strong commitment to norms regarding equality, state actors could be expected to regard the protection of the

most vulnerable from the effects of climate change as an important task for the national government. Notably, this could be the case even when those most likely to be affected by climate change live in other countries.

As Lumsdaine [23] has argued, values and principles that are important in domestic politics are likely to be favored by policy actors also when dealing with issues that are not restricted to the domestic sphere. He shows in his study that countries with strong domestic welfare programs—an important manifestation of egalitarian norms—were also more likely to be more generous in terms of foreign aid. *We therefore expect that a strong commitment to egalitarian principles will increase the likelihood of having an ACT.*

Turning to the implementing side of the political system, it has been shown that the quality of a country's implementing institutions has strong implications for public goods provision. Apart from a lack of rule-bound authority and low quality more generally, a common weakness in implementing institutions is corruption, conventionally defined as the abuse of public power for private gain [24–26]. Studies show that even though people may embrace the goals of a political reform, they are less likely to support it if they perceive the public authorities to be corrupt [27]. Simply, people do not trust corrupt and unreliable public authorities to be capable of implementing such reforms. Hence, in contexts where the quality of the implementing institutions is low, we expect less public and political support for rigorous climate targets. Furthermore, these contexts may be less resilient to the influence of special interests, such as fossil fuel companies, who are more likely to be successful in lobbying against climate policy and the provisions of public goods [28]. Even though the effects of corruption on the demand for interventionist policies are not always clear [29–31] it can be expected that when implementing institutions are of poor quality, actors will opt for a low-risk strategy, and will therefore be less willing to accept short-term costs for an uncertain future gain in terms of a stable climate. *We therefore expect that high institutional quality will increase the likelihood of having an ACT.*

1.2. Potential Impact of Geographic and Economic Factors

Although climate change is something that affects all countries around the world, some are more vulnerable to changes in temperature, sea level rise, and weather-related shocks such as droughts and heavy rainfall [32,33]. The effect of vulnerability on the willingness to contribute to reducing greenhouse gases is not obvious, however. A reasoning in favor of the hypothesis that an increased vulnerability to climate change translates into more accountable climate targets, is the assumption that countries act out of self-interest [34]. However, it could also be argued that the most vulnerable countries have to spend more resources on adaptation than on mitigation. This would have the opposite effect on targets in the (I)NDCs, making them less willing to have an ACT. Also, measuring vulnerability is quite complex, and depends on both the climate effects and exposure, which is determined by the ability to adapt, and the number of people affected. We therefore include a variable controlling for vulnerability, but do not hypothesize any sign of the association between vulnerability and having an ACT.

Further, countries vary greatly in terms of their economic capacity. Wealthier countries not only have a greater ability to cope with climate change effects, but also can take on a larger responsibility in terms of ACTs and more costly climate policies. How to share the responsibility and costs of mitigating climate change has been one of the major obstacles to successful climate negotiations. Countries tend to favor burden-sharing rules that minimize the costs to themselves, but any ability (or capacity) to pay is one principle for sharing the costs that countries could agree would be fair [35]. *We therefore expect that high income per capita will increase the likelihood of having an ACT.*

Finally, another potentially important factor in setting climate targets is if a country is a high emitter of green-house gases. For such countries, the transition to carbon neutrality will potentially be more cumbersome than for a country which emits less for reasons such as strong fossil fuel lobby groups, or investments and interests in existing energy and transport infrastructure. *We therefore expect that high CO₂ emissions levels per capita will decrease the likelihood of having an ACT.*

2. Materials and Methods

2.1. Main Variable in the Analysis: Country Climate Commitments

There have been several attempts to structure and categorize the intended nationally determined contributions (INDCs), and the nationally determined contributions (NDCs) (collectively, (I)NDCs). In our categorization, we distinguish between countries that have an economy-wide target for reducing their climate emissions, to which they can be held accountable (an accountable climate target (ACT)), and countries that do not have such a target. Countries are, according to Article 4.4 in the Paris Agreement, expected to undertake economy-wide absolute emission reduction targets. Even if this expectation differs between developed and developing countries, it is clear that it is an ambition for *all* countries over time. Developing country Parties should continue enhancing their mitigation efforts, and are encouraged to move over time towards economy-wide emission reduction or limitation targets in the light of different national circumstances. Corresponding to this expectation our indicator is, first, indicating if the (I)NDC has an emission reduction target for the whole economy of a country or not: To be categorized as having an ACT, the country's (I)NDC has to state an economy-wide target with one of the following three reference points: (i) Reduction target compared to the emissions in a comparison year in the past; (ii) reduction target compared to a business-as-usual (BAU) scenario; or (iii) reduction target in terms of reducing the CO₂ emissions per unit of GDP produced.

Second, we add a restriction that the commitment to reach such a reduction target should be made unconditional upon receiving financial support from third parties. The requirement of the reduction target to be made unconditional distinguishes our approach from the categorization of the (I)NDCs of for example [36] that follow a similar approach in the description of the (I)NDCs. We call our indicator an Accountable Climate Target (ACT), which implies that the emission reduction as outlined in the (I)NDC is a commitment for which other countries can hold the country accountable (and only that country). Hence, either a country has an ACT, or it does not.

Accountability includes both answerability and enforcement [37], and a limitation with our measure—as well as with international agreements—is that it does not include enforcement. An important aspect of answerability, however, is information about what the actor that is to be held to account in fact does, and how that corresponds to what the actor is supposed to do. In this sense, our measure captures an important aspect of accountability. Governments in countries with unconditional targets can be evaluated by other countries as well as by their constituency, without being able to blame others for any lack of action.

Our measure does not say anything about the quantity by which a country aims to reduce its emissions. Ideally, one would make the different scenarios comparable, and rank countries according to how ambitious their reduction targets are. Efforts along these lines have been made by various organizations [38], but normally only for a small number of countries. In addition, any ranking is highly subjective, since there is no agreement on which specific emissions reduction targets that can, or should, be expected from specific countries. The United Nations Framework Convention on Climate Change (UNFCCC) recognizes merely that countries “*should protect the climate system . . . on the basis of equity and in accordance with their common but differentiated responsibilities and capabilities*” [39]. Hence, an important advantage of the measure used in this study is that it is transparent and can be objectively verified. This is an important characteristic, since it facilitates comparisons of (I)NDCs both between studies and over time.

Having a specific and clearly defined reduction target for the whole economy can be seen as a lower bound for an accountable climate target. Even if the specified emissions reduction goal is relatively low, we argue that this is more in line with the intention of Article 4 in the Paris agreement, than just a general declaration of intent, which some countries present in their (I)NDCs. It can be noted that the United States was categorized as having an ACT despite the announcement of President Donald Trump on 1 June 2017, that the country would withdraw from the Paris Agreement. The reason

for not changing the coding of the climate target is that the practical consequences of this announcement are not yet foreseeable.

However, changing the coding for the United States to not having an ACT does not change the main results (The results are available from the authors upon request).

To classify the countries into the two categories (ACT vs no ACT), we collected data from two organizations that compiled information about the INDCs: Climate Policy Observer, and Center for Climate and Energy Solutions. For any cases where information on the websites was unclear, we based the categorization on the actual INDCs [5]. In this study we have not updated the INDCs to reflect the current status of the NDCs, since ratification and joining the Paris Agreement is an ongoing process. Hence, the number of countries for which NDC-data is available changes over time, and hence differs slightly from the INDC-data used in this study. It can also be noted that a large majority of countries did not make any changes to their INDCs when joining the Paris Agreement (hence the INDC is the same as the first NDC). Only a few countries have decided to submit a revised plan, and there are also a few countries that have only submitted the INDC (and not an NDC). Perhaps the most notable example that has not yet formally signed the Paris Agreement is Russia (Russia will hence still be included in our data set based on their INDC). So far, 184 Parties have ratified the Paris Agreement, and 181 countries have submitted NDCs. We suggest that a suitable time for reviewing country commitments using the ACT indicator is in 2020, since this is the deadline for all parties to submit their first NDCs. At this point the pledges can be compared to the INDCs as outlined in this study, and changes over time can be reviewed.

2.2. Correlates

In this study we focus on three important characteristics of political institutions: Electoral democracy, egalitarian principles, and quality of the implementing institutions. To capture *electoral democracy*, we use the variable Electoral Democracy Index from the Varieties of Democracy Institute, based on expert surveys. This index aims to capture to what extent ideal electoral democracy is achieved, and it does this by combining factors such as freedom of association, suffrage, clean elections, elected executive and freedom of expression [40,41]. The index ranges from zero to one, and increases with the level of electoral democracy. For *egalitarian principles*, we use the Equal Protection Index from the Varieties of Democracy Institute. This index estimates to what extent the egalitarian principle is achieved. More precisely this is achieved when “1 rights and freedoms of individuals are protected equally across all social groups; 2 resources are distributed equally across all social groups; and 3 access to power is equally distributed by gender, socioeconomic class and social group” [42]. It is based on expert survey responses to items capturing equal access to justice for men and women, social class equality in respect of civil liberties, social group equality with respect to civil liberties and percent of population with weaker civil liberties [41,42]. The index ranges from zero to one and increases with the extent to which the egalitarian principle is achieved.

When it comes to the implementing side of the political system we are interested in whether the quality of the implementing institutions has an impact on climate commitments. It might be that low *institutional quality* generates a low level of support for interventionist policies in general and increases the risk that special interests (i.e., the fossil fuel industry) will be successful in lobbying against climate action. We use the International Country Risk Guide from the PRS Group. This measure estimates investment risks in foreign countries and is based on expert analyses. The index contains several factors; we use a version based on evaluation of “corruption,” “law and order,” and “bureaucracy” in the country provided by the Quality of Government Institute [43]. The index ranges from zero to one, and high scores indicate that the country has well-functioning institutions.

The variable used to measure *climate vulnerability* is obtained from the Center for Global Development [33]. The dataset includes climate vulnerability indices that can be linked to the increase in the following risks: Extreme weather events, sea level rise and agricultural productivity loss. These

three indicators are constructed for 233 states. In our analysis, we use the average of the three indicators as our measure for a country's vulnerability to climate change.

The variable used to determine the *emission intensity* of a country is the CO₂ emissions per person. This data was obtained from the World Development Indicators provided online by the World Bank [44]. The emissions are measured in metric tons per person in 2011.

To control for the general wealth of a country, we use the GDP per capita 2014 in terms of purchasing power parity (PPP), provided by the World Bank.

Finally, in this study, we argue that for electoral democracy to have an effect on a country's (I)NDCs, there has to be strong support for *action* against climate change among the general public. We capture demand for measures against climate change with the Gallup World Poll conducted in 2007 and 2008, covering 119 countries. In the analysis, we estimate the interaction effect between electoral democracy and the share of the population of a country that is aware of climate change. These data have been used before to study climate change awareness [45]. Summary statistics of the data is presented in Table 1.

Table 1. Summary statistics.

Variable Name	Variable Description	No. obs.	Mean	Std. dev.	Min.	Max.
Accountable climate target (ACT)	1 if economy-wide, unconditional climate target reported in intended nationally determined contributions (INDCs), 0 otherwise	125	0.72		0	1
Electoral democracy index	Ranging from 0 to 1, where high scores indicate that the country has well-functioning electoral democracy	125	0.59	0.25	0.03	0.92
Equal protection index	Ranging from 0 to 1, where high scores indicate that the country grants high levels of equal protection rights to its population	125	0.66	0.20	0.15	0.96
Indicator of quality of government	Ranging from 0 to 1, where high scores indicate that the country has low levels of corruption and well-functioning political institutions ²³	125	0.54	0.21	0.14	0.98
Gross Domestic Product per capita	In US-Dollar and calculated in purchasing power parity (PPP)	125	16,042	20,869	367	109,047
CO ₂ emissions	Metric tons per capita in 2011	125	5.22	6.64	0.06	45
Climate vulnerability index	Ranging from −10 to 100; a higher score indicates higher climate vulnerability	125	17	18	−9.41	100
Awareness about climate change	Measured as the share of the population of a country that is aware of climate change	99	66.76	22.44	20.62	98.92

2.3. Method

To analyze whether any of the country characteristics (as outlined above) affect the probability of the dichotomous outcome variable to be equal to one, we estimate probability unit (probit) regressions (applying maximum likelihood estimation) using the statistical software STATA (version IC 14.2). Average marginal effects of the probit regressions are reported in Table 2. The marginal effects should be interpreted as the effect on the probability of a state having an ACT given a one-unit change in one of the explanatory variables.

3. Results

Our results presented in Table 2 show that there are indeed factors that correlate with the likelihood of a country having an ACT. The results are presented for eight regressions, where regression models 1–6 include 125 countries for which we have available data on all important covariates. In model 1, model 2 and model 3 we find that our three main political-institutional variables; electoral democracy, egalitarian principles and institutional quality, are all positively and significantly associated with having an ACT when being tested in bivariate models. However, when all of them are included in the same model (model 4) and in model 5, when we also introduce all our other covariates, it is only egalitarian principles that are still positively associated with having an ACT (The political

and institutional variables are strongly correlated (electoral democracy and egalitarian principles, $r(123) = 0.74$, $p < 0.01$; egalitarian principles and institutional quality $r(123) = 0.72$, $p < 0.01$; electoral democracy and institutional quality $r(123) = 0.59$, $p < 0.01$)).

In model 6 we test a model that only includes the variables that are significant in model 5, and in model 7 we test the model including egalitarian principles, GDP per capita and emission intensity upon a larger sample of countries (156), where we have data on these three variables, and find that egalitarian principles are significantly associated with having an ACT in all these models. An increase of the Equal Protection Index by 0.1 is associated with roughly a 4%–5% percentage points higher probability to have an ACT. Contrary to expectations, institutional quality is not significantly linked to having unconditional climate commitments when other variables are included in the analysis. Further, as hypothesized, emission intensity correlates negatively with having an ACT (significant at a 10% level in regression 5, when all variables are included and not significant in model 7 with the sample of 156 countries). In contrast, but also as hypothesized, a higher income per capita increases the probability of a country having an ACT. On average a country with approximately three times as high income per capita as another country has a 10 percentage points higher probability of having an ACT than the country with the lower income according to the coefficient in regression. In addition we also present the results for a subsample of 99 countries (model 8) for which we have available data on public awareness of climate change, however we do not find a positive significant relationship between neither electoral democracy on its own (model 5), nor in combination with the public awareness of climate change (model 8), on having an ACT. We have carried out a number of robustness tests and tested different models. One important thing is that the EU countries have a common commitment. We have therefore tested our models without including the EU countries, and an ordinary least squares with a dummy variable for EU country/non-EU countries, and we get the same results. All these models are available upon request

Table 2. Predicted probability of a state having an accountable climate target (ACT). Probability unit (probit) estimation average marginal effects.

	1	2	3	4	5	6	7	8
Electoral democracy index	0.57 *** [0.33,0.82]			0.13 [−0.27,0.52]	−0.02 [−0.46,0.42]			−0.48 [−1.70,0.73]
Egalitarian principles		0.86 *** [0.58,1.14]		0.53 * [0.02,1.05]	0.53 * [0.01,1.06]	0.55 ** [0.16,0.95]	0.42 * [0.03,0.82]	0.71 ** [0.18,1.24]
Institutional quality (ICRG)			0.90 *** [0.56,1.23]	0.41 † [−0.07,0.89]	0.17 [−0.48,0.81]			−0.10 [−0.90,0.69]
Log GDP per capita					0.09 † [−0.00,0.19]	0.10 ** [0.03,0.16]	0.10 ** [0.03,0.16]	0.11 † [−0.01,0.23]
CO ₂ emissions (metric tons per capita) in 2011					−0.01 † [−0.03,0.00]	−0.01 * [0.02,−0.00]	−0.01 [−0.02,0.00]	−0.01 † [−0.02,0.00]
Climate vulnerability index					0.00 [−0.00,0.01]			0.00 [−0.00,0.01]
Public climate awareness (Share of population)								−0.00 [−0.01,0.01]
Electoral democracy index*Public climate awareness (Share of population)								0.01 [−0.01,0.02]
Observations	125	125	125	125	125	125	156	99

Robust standard error in parentheses, † $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Summing up, a higher income per capita seems to correlate positively with having an ACT. However, neither climate vulnerability nor the institutional quality seems to play a role. Furthermore, we do not find a significant link between having an ACT and electoral democracy in the multivariate analysis, and the link between CO₂ emission intensity and having an ACT is unstable (not significant in the larger sample). In contrast, however, we do find that egalitarian principles in the form of equal protection of rights and freedoms increase the probability of having an ACT. While electoral democracy serves to protect the interests of the majority—or a large share—of the electorate, the democratic norms

about equal rights and freedoms protect the rights also of (often vulnerable) minorities, and it is these democratic norms that are correlated with ACTs.

4. Discussion

The Paris agreement has by many been described as a historical event, a turning point in the United Nation's climate negotiations. Finally, a new climate deal, substituting the Kyoto protocol, is in place [2]. However, in order to reach the United Nations Climate Convention target of a global temperature rise “well below” 2 °C [46], it is essential that states become even more ambitious in the future. To understand the potentials for such a development, we have first constructed a measure that indicates whether countries have economy wide climate targets to which they can be held accountable in their (I)NDCs. In a second step, we investigated whether certain political-institutional, geographic and economic factors are related to having such climate targets. A key finding in our study is that egalitarian principles are associated with a higher probability of having an ACT (accountable climate target). How do our results compare with the conclusions in previous literature? Neumayer [7] and Bättig and Bernauer [6] show that democracies exhibit greater international environmental commitment than non-democracies, not least in terms of climate change cooperation [6]. Notably, these papers use data on government activity up to 2000 [7] and 1990–2004 [6]. Our paper differs from these previous studies, not only by examining the relationships during an era that is different both in terms of the spread of electoral democracy in the world and in terms of the urgency of climate change action, but also by distinguishing the effect of electoral democracy from the related but yet distinct concept of egalitarian principles. While we do find a bivariate relationship between electoral democracy and climate commitment, in line with the results in these previous studies, it is not robust to the inclusion of other institutional variables in the analysis.

Povitkina [9], focuses on how control of corruption conditions the effect of democracy on environmental outcomes, not least on CO₂ emissions. In contrast to her study, the effect of the quality of the implementing institutions is not as clear in this paper. However, we study the direct effect rather than how implementing institutions condition the effect of democracy. Moreover, Povitkina's focus on outcomes—as compared to our focus on commitments—could explain why our results differ: The future results of these commitments may very well depend on the quality of the implementing institutions. Our results suggest that aspects of countries' institutional setup other than electoral democracy, and the quality of the implementing institutions deserve attention when studying climate commitment: Namely egalitarian principles, which in contexts other than environmental policy are increasingly highlighted as important for society (see for example [47]). Egalitarian principles are different from electoral democracy, in the sense that the norms of equality are less restricted than the electorate, which can be important for global public goods provision, through for example climate action. In a well-functioning electoral democracy, protection of the most vulnerable from the effects of climate change could still be seen as a task for the national government, even if those most affected live in other countries, and thus do not form part of the electorate.

Other factors that deserve attention in future research are those that more in detail capture countries' industrial and economic diversity, and how these factors are linked to countries' climate commitments.

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References

1. Höhne, N.; Kuramochi, T.; Warnecke, C.; Röser, F.; Fekete, H.; Hagemann, M.; Day, T.; Tewari, R.; Kurdziel, M.; Sterl, S.; et al. The Paris Agreement: Resolving the inconsistency between global goals and national contributions. *Clim. Policy* **2017**, *17*, 16–32. [CrossRef]
2. Kinley, R. Climate change after Paris: From turning point to transformation. *Clim. Policy* **2017**, *17*, 9–15. [CrossRef]
3. Viñuales, J.E.; Depledge, J.; Reiner, D.M.; Lees, E. Climate policy after the Paris 2015 climate conference. *Clim. Policy* **2017**, *17*, 1–8. [CrossRef]
4. Falkner, R. The Paris Agreement and the new logic of international climate politics. *Int. Aff.* **2016**, *92*, 1107–1125. [CrossRef]
5. United Nations, INDCs as Communicated by Parties in 2017. Currently, 182 NDCs Have Been Reported. Available online: <https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx> (accessed on 22 March 2019).
6. Bättig, M.B.; Bernauer, T. National Institutions and Global Public Goods: Are Democracies More Cooperative in Climate Change Policy? *Int. Organ.* **2009**, *63*, 281–308. [CrossRef]
7. Neumayer, E. Do democracies exhibit stronger international environmental commitment? A cross-country analysis. *J. Peace Res.* **2002**, *39*, 139–164. [CrossRef]
8. Fankhauser, S.; Gennaioli, C.; Collins, M. The political economy of passing climate change legislation: Evidence from a survey. *Glob. Environ. Change* **2015**, *35*, 52–61. [CrossRef]
9. Povitkina, M. *Necessary But Not Sustainable? The Limits of Democracy in Achieving Environmental Sustainability*; University of Gothenburg: Gothenburg, Sweden, 2018.
10. Lachapelle, E.; Paterson, M. Drivers of national climate policy. *Clim. Policy* **2013**, *13*, 547–571. [CrossRef]
11. Deacon, R. Dictatorship, Democracy, and the Provision of Public Goods. In UC Santa Barbara: Department of Economics, UCSB. 2003. Available online: <https://escholarship.org/uc/item/9h54w76c> (accessed on 22 March 2019).
12. Lake, D.A.; Baum, M.A. The invisible hand of democracy: Political control and the provision of public services. *Comp. Polit. Stud.* **2001**, *34*, 587–621. [CrossRef]
13. McGuire, M.C.; Olson, M. The economics of autocracy and majority rule: The invisible hand and the use of force. *J. Econ. Lit.* **1996**, *34*, 72–96.
14. De Mesquita, B.B.; Smith, A.; Morrow, J.D.; Siverson, R.M. *The Logic of Political Survival*; MIT Press: Cambridge, MA, USA, 2005.
15. Rawls, J. *Political Liberalism*; Columbia University Press: New York, NY, USA, 2005.
16. Vandyck, T.; Keramidas, K.; Saveyn, B.; Kitous, A.; Vrontisi, Z. A global stocktake of the Paris pledges: Implications for energy systems and economy. *Glob. Environ. Change* **2016**, *41*, 46–63. [CrossRef]
17. Johansson, J. Power and Public Goods to the People. A Cross-National Study on the Effect of Democracy on Climate Change Policy Output. Bachelor's Thesis, Uppsala University, Uppsala, Sweden, 2018.
18. North, D.C. *Institutions, Institutional Change, and Economic Performance*; Cambridge University Press: Cambridge, UK, 1990.
19. King, A.D.; Harrington, L.J. The Inequality of Climate Change from 1.5 °C to 2 °C of Global Warming. *Geophys. Res. Lett.* **2018**, *45*, 5030–5033. [CrossRef]
20. Hsiang, S.; Kopp, R.; Jina, A.; Rising, J.; Delgado, M.; Mohan, S.; Rasmussen, D.J.; Muir-Wood, R.; Wilson, P.; Oppenheimer, M.; et al. Estimating economic damage from climate change in the United States. *Science* **2017**, *356*, 1362–1369. [CrossRef]
21. Islam, N.; Winke, J. Climate Change and Social Inequality. In *DESA Working Paper No. 152. ST/ESA/2017/DWP/15*; United Nations: Department of Economic & Social Affairs: New York, NY, USA, 2017.
22. Beetham, D. *Democracy and Human Rights*; Polity Press: Cambridge, UK, 1999.
23. Lumsdaine, D.H. *Moral Vision in International Politics*; Princeton University Press: Princeton, NJ, USA, 1993.
24. Holmberg, S.; Rothstein, B.; Nasiritousi, N. Quality of Government: What You Get. *Annu. Rev. Polit. Sci.* **2009**, *16*, 135–161. [CrossRef]
25. Gupta, S.; Davoodi, H.; Tiongson, E. *Corruption and the Provision of the Health Care and Education Services*; International Monetary Fund: Washington, DC, USA, 2000.
26. Mauro, P. Corruption and Growth. *Q. J. Econ.* **1995**, *110*, 681–712. [CrossRef]

27. Svallfors, S. Government quality, egalitarianism, and attitudes to taxes and social spending: A European comparison. *Eur. Polit. Sci. Rev.* **2013**, *5*, 363–380. [CrossRef]
28. Fredriksson, P.G.; Vollebergh, H.R.J.; Dijkgraaf, E. Corruption and energy efficiency in OECD countries: Theory and evidence. *J. Environ. Econ. Manag.* **2004**, *47*, 207–231. [CrossRef]
29. Aghion, P.; Algan, Y.; Cahuc, P.; Schleifer, A. Regulation and Distrust. *Q. J. Econ.* **2010**, *125*, 1015–1049. [CrossRef]
30. Alesina, A.; Angeletos, G.-M. Fairness and Redistribution. *Am. Econ. Rev.* **2005**, *95*, 960–980. Available online: <http://www.jstor.org.ezproxy.ub.gu.se/stable/4132701> (accessed on 22 March 2019). [CrossRef]
31. Rothstein, B. Creating political legitimacy electoral democracy versus quality of Government. *Am. Behav. Sci.* **2009**, *53*, 311–330. [CrossRef]
32. Pachauri, R.K.; Meyer, L.; Plattner, G.-K.; Stocker, T. *IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*; IPCC: Paris, France, 2015.
33. Wheeler, D. Quantifying Vulnerability to Climate Change: Implications for Adaptation Assistance (January 24, 2011). In *Working Paper No. 240*; Center for Global Development: Washington, DC, USA, 2011.
34. Fredriksson, P.G.; Neumayer, E. Democracy and climate change policies: Is history important? *Ecol. Econ.* **2013**, *95*, 11–19. [CrossRef]
35. Carlsson, F.; Kataria, M.; Krupnick, A.; Lampi, E.; Löfgren, Å.; Qin, P.; Sterner, T. A fair share: Burden-sharing preferences in the United States and China. *Resource Energy Econ.* **2013**, *35*, 1–17. [CrossRef]
36. Tobin, P.; Schmidt, N.M.; Tosun, J.; Burns, C. Mapping states' Paris climate pledges: Analysing targets and groups at COP 21. *Glob. Environ. Change* **2018**, *48*, 11–21. [CrossRef]
37. Schedler, A. Conceptualizing accountability. In *The Self-Restraining State: Power and Accountability in New Democracies*; Schedler, A., Diamond, L., Plattner, M.F., Eds.; Lynne Rienner: Boulder, CO, USA, 1999; Volume 13, p. 17.
38. Available online: <https://climateactiontracker.org/countries/> (accessed on 22 March 2019).
39. United Nations Framework Convention on Climate Change. 1992. Available online: <https://unfccc.int/resource/docs/convkp/conveng.pdf> (accessed on 22 March 2019).
40. Teorell, J.; Coppedge, M.; Skaaning, S.-E.; Lindberg, S.I. *Measuring Electoral Democracy with V-Dem Data: Introducing a New Polyarchy Index*; Varieties of Democracy (V-Dem) Project; V-Dem Institute, University of Gothenburg: Gothenburg, Sweden, 2016.
41. Coppedge, M.; Gerring, J.; Lindberg, S.I.; Skaaning, S.E.; Teorell, J.; Altman, D.; Andersson, F.; Bernhard, M.; Fish, M.S.; Glynn, A.; et al. *V-Dem Codebook v6*; Varieties of Democracy (V-Dem) Project; V-Dem Institute, University of Gothenburg: Gothenburg, Sweden, 2016.
42. Sigman, R.; Lindberg, S.I. *The Index of Egalitarian Democracy and Its Components: V-Dem's Conceptualization and Measurement*; Varieties of Democracy (V-Dem) Project; V-Dem Institute, University of Gothenburg: Gothenburg, Sweden, 2015.
43. Teorell, J.; Dahlberg, S.; Holmberg, S.; Rothstein, B.; Hartmann, F.; Svensson, R. *The Quality of Government Standard Dataset, Version jan17*; The Quality of Government Institute, University of Gothenburg: Gothenburg, Sweden, 2017.
44. The World Bank. World Development Indicators. Available online: <http://datatopics.worldbank.org/world-development-indicators/> (accessed on 22 March 2019).
45. Lee, T.M.; Markowitz, E.M.; Howe, P.D.; Ko, C.-Y.; Leiserowitz, A.A. Predictors of public climate change awareness and risk perception around the world. *Nat. Clim. Change* **2015**, *5*, 1014. [CrossRef]
46. UNFCCC, Adoption of the Paris Agreement. In *Report No. FCCC/CP/2015/L.9/Rev.1*; UNFCCC: Bonn, Germany, 2015.
47. Stiglitz, J.E. *The Price of Inequality: How Today's Divided Society Endangers Our Future*; WW Norton & Company: New York, NY, USA, 2012.

