

The Elusive Governance of Climate Change: Nationally Determined Contributions as Commitments and Negotiating Positions

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Abstract

Since the Paris Agreement of 2016, the international community's main approach to addressing climate change is for states to determine their own commitments in a pledge and review system. Parties to the Paris Agreement formulate Nationally Determined Contributions (NDCs), which are documents that give details of their national policies and plans. They are free to formulate and present national policies as they choose, and as a result, there is substantial variation in the content and form of NDCs. This study presents a new framework for assessing and comparing the political meanings of these documents. The framework builds on two distinct ways in which NDCs can be understood. NDCs may be commitments to the international community and domestic actors. Alternatively, they may embody states' negotiating positions in an ongoing process of national and international interactions. The framework consists of a set of thematic categories to which each sentence of these documents can be allocated. The application of this framework enables us to compare the political content of states' NDCs systematically. The study demonstrates the validity of the framework by correlating its results with key characteristics of states. The findings also provide evidence for the two distinct perspectives on these documents.

Throughout the process put in place by the United Nations Framework Convention on Climate Change (UNFCCC), the international community has worked to design a response to the existential threat of climate change, a response that would be adopted and implemented widely enough to "prevent dangerous anthropogenic interference with the climate system" (United Nations 1992, Article 2). Policy

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makers have shifted away from the convention-protocol system, which attempted to impose legally binding obligations on states, to embrace a bottom-up approach in which states determine their own commitments (Keohane and Oppenheimer 2016). This system of soft governance is embodied in the Nationally Determined Contributions (NDCs) in the Paris Agreement of 2016 (United Nations 2015b). NDCs are now the international community's main approach to coordinating a global response to climate change. The UNFCCC process is also significant for the effects it has on a network of other multilateral, regional, and bilateral institutions and policies that deal with climate change (Chasek et al. 2014).

This study develops our understanding of differences among NDCs as political documents. Official decisions and documentation governing the intent of the NDCs, and the precursor Intended Nationally Determined Contributions (INDCs), lead us to expect significant variation in their content. The Lima Call for Climate Action directed states to submit INDCs that detailed their "contribution towards achieving the objective of the Convention as set out in its Article 2," while inviting discussion of each state's "undertakings in adaption" and allowing for developing states' submissions to reflect their "special circumstances" (United Nations 2015a, 3, 9, 12). The Paris Agreement (United Nations 2015b) imposes some additional uniformity on NDCs by stipulating that all Parties "shall pursue domestic mitigation measures" (Article 4.2) and "shall account" for their "emissions and removals" using established methodologies (Article 4.13), but it emphatically allows for submissions with very different emphases by recognizing the relevance of "common but differentiated responsibilities" (Article 4.3) and including references to adaptation as well as "sustainable development and poverty eradication" (Article 6.8). It is these sources of variation that we aim to describe and understand.¹

Our study makes two related contributions. First, we draw on scholarship about national and international governance to identify distinct ways of conceiving of NDCs in terms of the functions they perform for the governments that author them, which we call the commitment and negotiation perspectives. NDCs may be thought of as commitments to the international community and to domestic actors. According to this commitment perspective, NDCs are mainly concerned with the collective-action issues relating to climate change. Alternatively, they may embody states' negotiating positions in an ongoing process of national and international negotiations. According to this negotiation perspective, NDCs are mainly concerned with distinctive national interests of the Parties, which were also expressed by the Parties at the twenty-first Conference of the Parties (COP21).

Second, we formulate and apply a new framework for analyzing NDCs. The framework is inspired by a range of studies that involve human coding of

1. A Party's INDC is converted to its NDC when it submits an instrument of ratification of the Paris Agreement, unless the Party decides to submit a revision (United Nations 2015c, III.22). Most of the Parties did not change their NDCs, and those that did made only minor changes (Ge and Levin 2018). In this study, we examine the revised NDC if the Party submitted a revision.

political texts. The framework consists of a set of thematic categories that capture the universe of discourse on the global governance of climate change. This allows us to compare systematically the emphases that different Parties place on the broad themes of mitigation and adaptation, as well as more detailed themes. We examine the extent to which different NDCs emphasize overarching themes, such as the differentiation of responsibilities between developed and developing countries, as well as more detailed themes, such as the specification of national targets.

The study adds to an emerging body of research that examines NDCs. Many analyses of NDCs focus on their technical aspects to compare the specific mitigation targets they contain (e.g. Climate Action Tracker 2019; Robiou du Pont and Meinshausen 2018; World Resources Institute 2016). Tørstad et al. (2020) seek to explain differences in the ambition levels of countries' mitigation targets based on domestic political institutions. Winkler et al. (2018) compare how Parties explain the equity of their commitments. Tobin et al. (2018) examine the distinct ways in which Parties present their mitigation commitments and also identify which NDCs include adaptation commitments and mention gender issues. Jernnäs and Linnér (2019) describe the distinct narratives contained in NDCs. The present study also examines NDCs as political documents, but our approach differs from previous research in that we develop and apply a framework that distinguishes between NDCs based on the relative emphases they place on distinct themes. This involves a more granulated categorization of each sentence of each NDC. For instance, beyond identifying whether each NDC addresses adaptation, as do Tobin et al. (2018), we quantify both the amount of emphasis on adaptation and the distinct themes in which adaptation is discussed.

Another innovation in relation to existing studies is that, based on the negotiation perspective, we examine how different thematic emphases in NDCs relate to states' negotiating positions on specific issues that were controversial during the COP21 from which the Paris Agreement emerged. To do this, we focus on the NDCs of Parties whose negotiating positions were identified in a previous study (Sprinz et al. 2016) and also make our selection of NDCs based on that study. The findings demonstrate that the contents of NDCs are linked to Parties' negotiating positions at the COP21.

The next section of the article discusses the commitment and negotiation perspectives. We then describe the thematic framework itself, discuss how we apply it, and demonstrate its validity. The validation consists of correlating the observed thematic emphases in NDCs with key characteristics of the authoring states that we expect to be relevant to the content of their climate change policies. We also explore patterns in differential thematic emphases through factor analysis and compare the observed patterns with observations from previously published comparisons of NDCs, which provide more aggregated classifications than ours. The article then turns to a section that assesses the expectations regarding differences in thematic emphases that were derived from the theoretical perspectives and, finally, draws conclusions.

Two Perspectives on NDCs

The Commitment Perspective

Commitment problems are ubiquitous and exist when there is uncertainty that actors will fulfill the promises they make (Bendor et al. 2001, 242; Gilardi 2002; Keefer and Stasavage 2003; Kydland and Prescott 1977; Melumad and Mookherjee 1989; Rogoff 1985). This certainly applies to the Paris Agreement, which has no mechanisms for compelling states to follow through on their proposed contributions. There are no sanctions for failure to plan or implement sufficiently ambitious reductions of greenhouse gasses or adequate domestic policy measures. The relative ease with which the United States is able to withdraw from the Paris Agreement is illustrative.

The commitment perspective embodies the publicly endorsed view of NDCs as reflected in the official documentation. The Paris Agreement commits Parties to the aim of “holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels” (United Nations 2015b, Article 2a). It requires states to submit NDCs that specify their voluntary contributions to this reduction in greenhouse gas emissions (Article 4). This voluntary scheme appeared to be the only way forward following the unsuccessful attempt at the Copenhagen COP15 in 2009 to develop the binding commitment approach of the Kyoto Protocol (Dimitrov 2010). Voluntary commitments rely on the assumption that “respectable governments prefer to keep [their] commitments” (Schelling 2002, 5). In line with managerialist arguments about achieving “acceptable compliance” (Chayes and Chayes 1993), the voluntary system was supplemented by rules requiring that NDCs be communicated in clear, transparent terms using methodologies approved by the COP (United Nations 2015b, Article 4.8) and that the NDCs be revised every five years (Article 4.9) with a higher level of ambition each time (Article 4.3). However, many of the rules needed to ensure acceptable compliance are incomplete and have been under negotiation in subsequent COPs, which means that serious commitment problems remain.

Research on commitment in policy making distinguishes between two types of commitment problems (Thomson and Torenvlied 2011, 144), both of which apply to NDCs. First, preference-based commitment problems occur when policy makers promise to adopt policies with which they disagree at the time at which they commit, in other words, when there are differences between policy makers’ policy preferences and the policies they promise to adopt. At first sight, this type of commitment problem may seem irrelevant to NDCs, because national governments would only make voluntary commitments to policies that align with their preferences. Against this argument, however, climate change governance involves a classic public goods problem, in that each state’s individual contribution to mitigating climate change is insufficient to address the problem, but collectively, a large enough group of states’ contributions is likely to have an effect (Barrett 2003; Keohane and Oppenheimer 2016). This implies that states have underlying

incentives to free ride, to continue to emit while others bear the costs of cutting emissions. According to this line of reasoning, although NDCs are voluntary and formulated by the states themselves, there are likely to be differences between states' preferences and their commitments to cut emissions, regardless of how voluntary or modest in scale those commitments are.

This public goods argument applies to states' commitments regarding mitigation but less so to adaptation measures. Adaptation measures that involve investments to protect a state's territory and inhabitants from the adverse effects of climate change have fewer externalities beyond the state. Early-warning systems and coastline protection may have some positive externalities that protect neighboring states, but the benefits will accrue mainly to the state that makes these investments. The benefits of adaptation measures also depend less on other states' actions than do mitigation measures. Moreover, there was little external pressure on states during the UNFCCC process to add adaptation provisions to their NDCs. Consequently, the commitment perspective does not expect NDCs to include extensive provisions on adaptation.

The second type of commitment problem is the uncertainty-based commitment problem. This occurs when there is uncertainty regarding the future preferences of the actors who commit, either due to changes to the composition of those actors or the costs and benefits associated with the actions to which actors commit. Clearly, some governments' policy preferences change over time. In democratic systems, the governments that formulate the NDCs may be replaced by governments that are less environmentally conscious, the transition from the Obama to Trump administrations in the United States being a case in point. Our comparative research on European countries found significant effects of the partisan composition of national governments on their environmental policies (Leinaweaver and Thomson 2016). Authoritarian regimes are also prone to shifts in policy preferences over time as ruling coalitions change.

The commitment perspective leads to the following expectations regarding the contents of NDCs:

1. NDCs focus mainly on mitigation, rather than adaptation, because there are significant externalities and commitment problems involved in mitigation measures that do not arise in relation to adaptation measures.
2. NDCs focus mainly on domestic policies, including details on domestic policy aims and actions, rather than on general principles and/or international arrangements, because domestic policies involve significant commitment problems that do not arise in relation to general principles and international arrangements.

The Negotiation Perspective

According to the negotiation perspective, states' NDCs are understood in relation to the negotiating positions with which they entered the twenty-first Conference of

the Parties at which the Paris Agreement was forged. Prior to COP21, the Parties submitted their INDCs. Upon becoming a Party to the Agreement, a Party's INDCs became its NDC, or could be replaced by a new one if the Party chose to do so (United Nations 2015c, III.22). Because most of the Parties did not change their NDCs and those that did made only minor changes (Ge and Levin 2018), the content of states' NDCs were formulated at the time at which they were preparing for the COP21 negotiations, which makes it likely that their negotiating positions and NDCs were shaped by the same processes. Our argument is not that the COP21 shaped the contents of Parties' NDCs but rather that Parties' NDCs reflect the same interests that informed their COP21 negotiating positions.

The negotiation perspective recognizes that the global governance of climate change is distinct from principal-agent problems in other contexts, because the national governments that formulate agreements are both policy makers and implementers. This distinct arrangement has been observed in other international policy-making fora (Thomson and Torenvlied 2011, 146). Therefore, NDCs are not instructions to independent implementation agents but expressions of national governments' policies, the same national governments that negotiate in UNFCCC conferences.

While the Paris Agreement is an important milestone, it is one milestone in a longer series of multilateral negotiations. Research on previous rounds of negotiations has found a considerable degree of continuity in the issues raised over time (Genovese 2014; Michaelowa and Michaelowa 2012; Sprinz et al. 2016; Stokman et al. 2013; Weiler 2012). It is therefore plausible that states formulate their NDCs with a view to strengthening their positions in current and future rounds. The Conferences of the Parties that followed the Paris Agreement continued to address some of the same issues that were discussed in Paris, notably, the development of procedures for assessing states' progress on mitigating climate change and accounting procedures for measuring financial support from developed countries.

From the negotiation perspective, traces of previous and current rounds of negotiations may be found in the content of NDCs. While the Paris Agreement in many respects represents an important departure from the top-down approach taken in the Kyoto Protocol, Kyoto is likely to have left its mark on states' NDCs. In the Kyoto Protocol, developed and relatively wealthy developing countries (so-called Annex B countries) agreed to modest reductions in or limits to the increase of greenhouse gas emissions. Less developed countries (non-Annex B countries) made no such commitments, which it was argued was in line with the principle of differentiated responsibilities. Differentiated responsibilities, as articulated in the Kyoto Protocol, means that countries that are responsible for climate change should bear the costs. The divide between developed and developing countries was also one of the root causes of the breakdown in talks at the Copenhagen Summit of 2009 (Dimitrov 2010). Although the Copenhagen Summit did not lead to a comprehensive agreement, the nonbinding Copenhagen Accord arguably laid the basis for the pledge and review system that became the cornerstone of the Paris Agreement.

A range of issues have featured prominently in recent global climate change governance. If NDCs are indeed expressions of previous and ongoing negotiating positions, we would expect them to refer to many of these issues. The differentiation of responsibilities between developed and developing countries is one of the most prominent and recurring issues. Differentiation was reflected in the higher expectations placed on developed than developing countries with respect to their emission targets. In addition, the issue of differentiation was reflected in the transfer of funds and technologies for addressing climate change from developed to developing countries. Other issues included the legal form of the agreement; the strength of provisions for international measurement, reporting, and verification (MRV); the level of ambition in aims; and the obligation on states to progressively increase the ambition of their aims. States have also disagreed on the extent to which the agreement should include provisions for adapting to climate change as well as for mitigating climate change. The negotiation perspective leads to the following third and fourth expectations:

3. NDCs devote large amounts of attention to general principles and international themes, because these are the main focus of international negotiations in the UNFCCC. These are distinct from domestic policies, which are supposed to be the main focus of NDCs according to the Paris Agreement. This is simply the opposite of the second expectation, which is derived from the commitment perspective.
4. States' positions on issues that were raised during the COP21 negotiations are strongly related to the contents of their NDCs. For instance, states that took positions in favor of adaptation being featured prominently in the Paris Agreement devote relatively large amounts of attention to this theme in their NDCs. States that argued for clear differentiation of responsibilities between developed and developing countries emphasize this theme in their NDCs, and states that called for well-developed MRV processes during the COP21 negotiations emphasize these themes prominently in their NDCs.

The commitment and negotiation perspectives are not mutually exclusive, because any given NDC may contain traces of both. They are nonetheless distinct perspectives that direct our attention to different aspects of the NDCs. They also inform the development of our thematic coding framework and the interpretation of the findings from its application.

The Thematic Framework: Development, Application, and Validation

We developed a theme-based framework and applied it to twenty-six NDCs from a broad range of developed and developing countries (Table 1).² These twenty-six

2. These twenty-six NDCs include the NDC of the United States and the INDC of Russia. The United States is an important actor in climate change negotiations and at the time of writing remains a Party to the Paris Agreement, despite the Trump administration's intention to withdraw. Russia submitted an INDC and at the time of writing is considering the ratification decision. In both cases, the documents submitted by these states provide useful variation that allows us to explore the commitment and negotiation perspectives.

Table 1

Actors Identified in the COP21 Negotiation Study Compared to the Selected NDCs for This Pilot Study

<i>Actors Identified in COP21 Negotiation Study (Sprinz et al. 2016)</i>	<i>NDCs Included in the Present Study</i>
African Group	Nigeria, South Africa
Association of Independent Latin American and Caribbean States (AILAC)	Chile, Colombia
Bolivarian Alliance for the Peoples of Our America (ALBA)	Bolivia, Venezuela
Alliance of Small Island States (AOSIS)	Maldives, Nauru, Tuvalu
Arab countries	Algeria, Saudi Arabia
Bangladesh/least developed countries (LDCs)	Bangladesh, Malawi
Brazil	Brazil
China	China
Environmental Integrity Group (EIG)	Mexico, Switzerland
European Union	EU
India	India
Umbrella group (minus Japan, Russia, and United States)	Australia, Canada, New Zealand
Japan	Japan
Russia	Russia
United States	United States
	Indonesia

NDCs were selected to match the Parties or groups of Parties identified as the main actors in Sprinz et al.'s (2016) study of the COP21 negotiations. Focusing our analysis on these twenty-six NDCs is necessary to test the negotiation perspective. By matching our selection of NDCs with the COP21 negotiation study, we can examine the extent to which the contents of the NDCs correspond to states' negotiating positions in Paris. Sprinz et al. (2016) identified the fifteen main actors involved in the negotiations leading to the Paris Agreement, which consisted of individual states and groups of states.³ Our selected twenty-six NDCs match the

3. Some of the main actors identified by Sprinz et al. (2016) were negotiating groups rather than individual states. To select individual NDCs, we identified the two states that participated most frequently on behalf of these groups in the Lima, Paris, and Marrakech conferences according to the *Earth Negotiation Bulletin* summaries. Indonesia was initially identified as a relevant stakeholder by Sprinz et al. (2016), but it was subsequently dropped from their analysis because it was not considered sufficiently influential or clear in its negotiating positions.

fifteen individual states or groups of states identified by Sprinz et al. (2016). Table 1 identifies the NDCs that we examine in this study linked to the actors identified in the COP21 negotiation study.

Since the present study builds on that of Sprinz et al. (2016), we summarize their approach to building the COP21 negotiation data set. Their data set identifies the negotiating positions of each of the fifteen countries or groups of countries referred to in Table 1 on the thirteen main controversial issues that were discussed during the negotiations leading to the Paris Agreement. The researchers followed an established procedure for applying the spatial model of politics to negotiations on specific controversies, which has been applied to thousands of specific policy issues in previous research (e.g. Bueno de Mesquita and Stokman 1994; Stokman et al. 2013; Thomson 2011). The procedure involves semistructured interviews with key informants to describe the specific controversial issues and actors' positions on those issues. Sprinz et al.'s (2016) COP21 data set was developed through semistructured interviews with practitioners who participated in the Paris negotiations. Lengthy semistructured interviews were held with a team of four practitioners from the European Commission's DG Climate Action, including one of the European Union's (EU) main negotiators, and on separate occasions two climate change experts from the Oslo Climate Institute Cicero. These experts made extensive references to preparatory documentation submitted by national governments when making their estimates of actors' policy positions. Semistructured interviews were also held with members of the Brazilian and Chinese negotiating teams, a close observer of this and many previous COPs from the *Earth Negotiation Bulletin*, and a representative of the business community. Written responses were also obtained from policy makers in the Dutch Ministry of Infrastructure and Environment and the UK government. The specification of the key controversial issues was validated with an online survey of forty climate change experts held by Cicero. The COP21 negotiation data set identified thirteen controversial issues in total. The issues are represented as policy scales, each of which ranges from 0 to 100. Each actor is placed on the policy scales by the key informants to represent its policy stances. With a few exceptions, all of the actors have positions on all of the issues. This information was collected before the Paris conference began.

We now turn to our thematic coding of the NDCs. Our coding involves categorizing each sentence of each document into predefined themes. The units of analysis in our thematic coding consist mainly of natural sentences. While some previous human-coding exercises identified quasi-sentences, research on the reliability of these frameworks concluded that the distinction between quasi-sentences and sentences adds little additional information and is a source of unreliability (Däubler et al. 2012). Some of the NDCs contain lists of statements in the form of bullet points or tables, whereby those statements are not grammatically complete sentences (China's NDC is an example). Where these statements contain distinct messages, we code these as separate sentences. There is considerable variation in the length and style of the NDCs. They include

short and technical documents, such as those of the United States and the EU, which focus mainly on the overall targets of these states and how performance will be measured. They also include long documents, such as the NDCs of China and India, which include not only targets but also extensive qualitative discussion of the thinking behind their domestic policies and commentary on the UNFCCC process itself.

Each sentence (or unit of text) was assigned to one of twenty-five thematic categories, which enables us to measure the amount and proportion of emphasis each state places on each theme. This approach is based on two major research projects in the study of domestic politics. The first is the Comparative Manifesto Project, which developed a fifty-seven-category thematic coding framework for categorizing sentences and quasi-sentences in national parties' election manifestos (Budge et al. 1987; Klingemann et al. 2006). The second is the Comparative Agendas Project, which developed a coding framework consisting of 21 major topics and 220 subtopics, based on the landmark research by Jones and Baumgartner (2005) on the development of policy agendas in US politics. The main difference between our study and these two projects is that we are only concerned with the themes raised in climate change policy, while they cover the universe of political discourse at the national level. Most of our categories are directional in terms of policy orientation, which is why we use the term *theme* rather than *topic*.

The themes we formulated for our framework were derived from previous research that examined discourse in relation to the UNFCCC in recent years:

- The aforementioned study by Sprinz et al. (2016), which focused on the negotiations leading to the Paris Treaty. The authors identified thirteen main negotiation issues based on interviews with key informants, including participants and expert observers.
- The CAIT Paris Contributions data set of the World Resources Institute (2016). This data set provides a summary of each of the INDCs in forty-eight fields. The WRI reports that this framework is based "on the Lima Decision, the Open Book List of Information for INDCs, the GHG Protocol Mitigation Goal Standard and the GHG Protocol Policy Action Standard."
- A project by Michaelowa and Michaelowa (2012) and Weiler (2012). This project examined UNFCCC negotiations in the period 2007–2010, using a combination of coding specialist media reports (*Earth Negotiation Bulletin*), countries' written submissions to the UNFCCC, and interviews with participants. This study identified eight negotiation issues, which are incorporated into our list of themes.
- Genovese's (2014) study of documentation submitted by states to the UNFCCC in the pre-Kyoto Protocol enforcement (2001–2004) and post-Kyoto Protocol (2008–2011) meetings. Her coding of the 2008–2011 period identified twenty-four issues on which states took distinct negotiation positions.

The twenty-five themes in our framework fall into three groups: group 1 themes are about general principles and modalities, group 2 themes are about international institutions and policies, and group 3 themes are about domestic institutions and policies. Table 2 summarizes the themes and the thirteen controversial issues identified in Sprinz et al.'s (2016) COP21 negotiation study.

In addition to classifying each unit of text into one of the themes, we tagged each sentence to identify whether or not it included a reference to "adaptation." This enables us to identify the percentage of all sentences in each NDC that address adaptation (as distinct from "mitigation"). Two of the themes, "13. Loss and damage compensation internationally" and "21. Adaptation infrastructure," are intrinsically about adaptation. Many of the other themes can be about adaptation or mitigation. We initially tried to identify whether sentences referred to "mitigation," but too many sentences contained no specific references to mitigation but appeared to be implicitly about mitigation from the context.

The two authors coded each of the 4,361 sentences (or other units of text) in the 26 NDCs into one of the 25 categories. They agreed on 3,430 sentences (79%). On the remaining 931 sentences, they reached an agreement on the appropriate category through discussion. This resulted in an agreement on the first author's coding for 402 sentences, the second author's coding for 421 sentences, and in a different category for the remaining 108 sentences. This is a comparable level of intercoder reliability to that found in similar human-coding exercises (e.g. Thomson et al. 2017, 533).

Before assessing the NDCs from the commitment and negotiation perspectives, we demonstrate the validity of the framework in two ways. First, NDCs' thematic emphases are correlated with characteristics of author states in ways that are expected. Second, some of the same patterns in thematic emphases were also found in previous analyses of NDCs by Tobin et al. (2018) and Jernnäs and Linnér (2019). The following analysis identifies these patterns partly with a factor analysis of thematic emphases, on the basis of which we map Parties' NDCs. Notwithstanding the similarities between our results and those of previous studies, our analyses also reveal new aspects of NDCs that were not previously identified.

In the first step of the validity test, we ran Spearman rank-order correlations between the emphases placed on the themes in the NDCs and key characteristics of states (Figure 1).⁴ We examine four key characteristics of states: first, Annex B, where the difference between developed states in Annex B of the Kyoto Protocol are coded as 1 and non-Annex B states are coded as 0; second, CO₂ pc, or CO₂ emissions per capita, which takes higher values for states that emit more carbon dioxide adjusted for population (World Bank's WDI data for 2014); third, EPI, which is the Yale Environmental Performance Index formulated at the Yale Center for Environmental Law and Policy (Wendling et al.

4. Nonparametric Spearman-rank correlation is an appropriate test, because it does not assume the observations are independent, which is clearly the case for our observed thematic emphases. For the same reason, this test is appropriate for the analyses later in our article, in which we examine the association between thematic emphases and Parties' negotiating positions at COP21.

Table 2

Controversial Issues Identified in the COP21 Negotiation Study Compared to the Themes Defined in Our Theme Framework

<i>Issues Identified in COP21 Negotiation Study (Sprinz et al. 2016)</i>	<i>NDC Thematic Categories</i>
Differentiation	<i>Group 1 Themes (General Principles)</i>
MRV	1. Environment general
Legal form of mitigation obligations	2. Economic development
Legal form of adaptation provisions	3. Human rights and vulnerable groups
Institutions for adaptation	4. Subnational authorities and nonstate actors
Climate finance—volume	5. Anticapitalism
Climate finance—who pays?	<i>Group 2 Themes (International Institutions and Policies)</i>
Adaptation—reserved finance	6. International governance
Loss and damage compensation	7. State sovereignty
Progression principle in future obligations	8. Measurement, verification, and reporting (MRV)
Mitigation goal for 2050	9. Differentiation
Mitigation goal for 2100	10. International finance
Ex ante assessments of future NDCs	11. International technology transfer
	12. International market mechanisms
	13. Loss and damage compensation internationally
	<i>Group 3 Themes (Domestic Institutions and Policies)</i>
	14. Planning period targets
	15. Long-term targets
	16. Fossil fuels
	17. Nuclear energy
	18. Renewables
	19. Energy efficiency
	20. Protection of natural areas
	21. Adaptation infrastructure
	22. Domestic market mechanisms
	23. Other domestic policies
	24. Government institutions
	25. Other/unclassifiable sentences

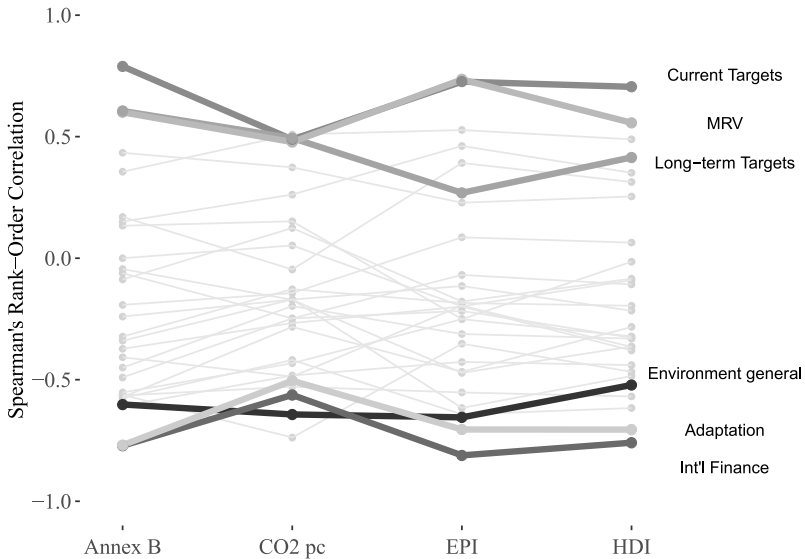


Figure 1

Correlations Between Thematic Emphases in NDCs and Four Key Characteristics of Authoring States

2018)—higher values indicate higher levels of sustainable development consisting of ecosystem vitality and environmental health; and fourth, UN HDI, which is the United Nations Human Development Index, on which higher values indicate higher levels of development. The first three measures relate to states' previous actions on climate change. The fourth measure relates to states' vulnerability to climate change.

Each of the four characteristics is positively correlated with three themes: current and long-term mitigation targets (themes 14 and 15 in Table 2) and MRV (theme 8). By all four measures, more developed states placed more emphasis on these themes. By contrast, each of the four characteristics is negatively correlated with the themes of general support for environmental protection (theme 1) and international finance (theme 10). More developed states placed less emphasis on these themes. In addition, the four characteristics of states are negatively correlated with the extent to which states' NDCs emphasize adaptation. NDCs of more developed states devote less attention to adaptation, as expected.

Figure 2 presents the results of a factor analysis of the contents of states' NDCs based on the themes they emphasize. The underlying factors identify

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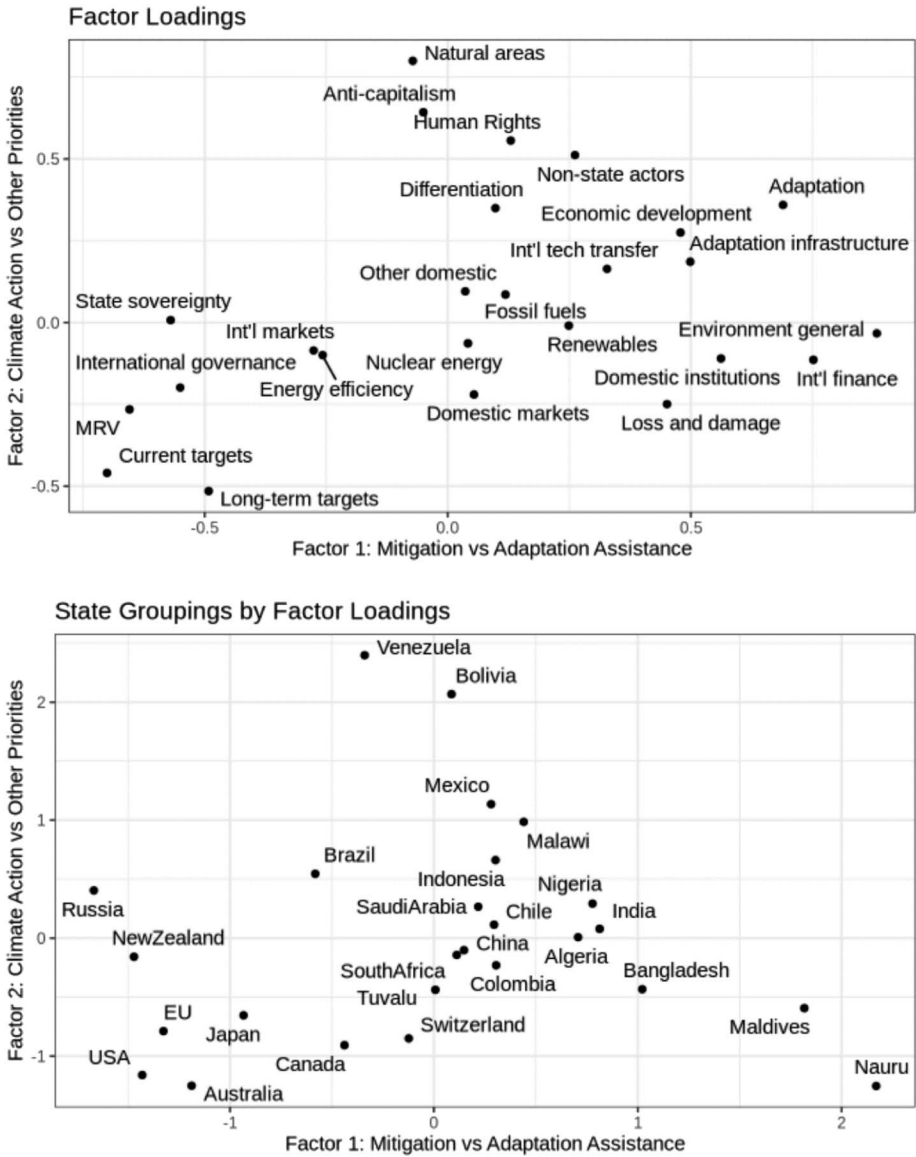


Figure 2 Factor Analysis of the Contents of States' NDCs Based on Theme Emphasis

Factor analysis is with varimax rotation. The first factor accounts for 20% of the variance, second factor for 11%.

structure in the similarities and differences among NDCs. The top of Figure 2 depicts the factor loadings of each of the themes on the first and second factors, which help us to interpret the meaning of these factors (and that together account for 31% of the variance). On the first factor, we find positive loadings for

themes that refer to adaptation (adaptation infrastructure and loss and damage provisions). By contrast, on the first factor, there are negative loadings for themes that relate to mitigation targets in the current planning period and in the long term and mechanisms to monitor progress toward these targets. We therefore interpret this first dimension as the distinction between NDCs that emphasize mitigation and those that emphasize adaptation. The second factor loads positively on some themes that were not at the core of the COP21 agenda or content of the Paris Agreement: themes relating to anticapitalism, the protection of natural areas, and human rights. This second factor loads negatively on themes that were central to the COP21 agenda and the content of the Paris Agreement: in particular, current and long-term targets and MRV. It also loads negatively on loss and damage, which was discussed at the COP but received little attention in the Paris Agreement. We therefore interpret this dimension as the distinction between NDCs that emphasize climate action and those that shift the conversation to other priorities.

The bottom panel of Figure 2 depicts the location of Parties' NDCs based on their thematic emphases and the factor scores. The developed states have relatively similar NDCs; the United States, Australia, the EU, Japan, New Zealand, Canada, and Switzerland are clustered together to the bottom left. There is greater variation among the NDCs of the developing states. Venezuela and Bolivia are outliers, and their NDCs are noteworthy for their anticapitalist content. Bangladesh, Maldives, and Nauru are also outliers, and these countries are notable for being among both the poorest and most vulnerable to climate change.

There are several notable similarities between the patterns identified in the thematic emphases and those identified in previous research on NDCs, which attests to the validity of the coding framework. Tobin et al. (2018) categorize NDCs based on the format of their mitigation targets. One category consists of NDCs that preset the mitigation targets as absolute reductions compared to the baseline year. This category includes the ten Parties that are clustered together at the bottom left of Figure 2: Australia, Brazil, Canada, the EU, Japan, New Zealand, Russia, Switzerland, Tuvalu, and the United States. The most common category in Tobin et al.'s categorization consists of NDCs that contain a target relative to a business-as-usual scenario, which may be achieved while actually increasing emissions. The NDCs we examine that are placed in this category are those of Algeria, Bangladesh, Colombia, Indonesia, Malawi, Maldives, Nigeria, and Venezuela. All of these NDCs are to the right of the figure, indicating that they place greater emphasis on adaptation than on mitigation. The thematic emphases, therefore, are consistent with Tobin et al.'s classification but also reveal more nuanced distinctions among these documents.

Similarly, some of the observations made by Jernnäs and Linnér (2019) validate the patterns identified by thematic emphases. The authors identify eight "storylines" and identify whether or not each NDC includes that storyline. Some of the storylines, such as "the promise of decarbonization," which refers to the social and economic co-benefits of decarbonization, are contained in almost all

NDCs. These are therefore not relevant to distinguishing between the documents. One of the storylines that does not appear in all NDCs is that of “climate action as a threat to economic development.” Of the NDCs we examine, Jernnäs and Linnér (2019, Appendix A) identify this storyline in the NDCs of Algeria, Bangladesh, India, Saudi Arabia, and South Africa. These are also NDCs that devote relatively large amounts of emphasis to the theme of economic development. In addition, they identify the storyline of “system change, not climate change” in the NDCs of Bolivia, China, India, and Venezuela. In our thematic analyses, the NDCs of Bolivia and Venezuela in particular emphasize the theme of anticapitalism, which strongly defines the vertical dimension depicted in Figure 2. The comparisons between the thematic emphases and Jernnäs and Linnér’s (2019) storylines support the validity of the thematic framework, while indicating that the themes allow us to distinguish among the NDCs that feature the same storylines.

Analysis of NDCs from the Commitment and Negotiation Perspectives

The first expectation from the commitment perspective is that NDCs focus mainly on mitigation, rather than adaptation, because of the significant externalities and commitment problems arising in mitigation measures that are absent in adaptation policies. Figure 3 shows the percentage of each NDC that refers to adaptation. In line with the expectation, these percentages are low for the NDCs of developed states. The NDCs of five states (or groups of states in the case of the EU) devote no attention to adaptation. However, for developing states, there is a large amount of variation and generally greater emphasis on adaptation. More than half of the NDCs of four developing countries are devoted to adaptation: Venezuela, Maldives, Nauru, and Mexico. Tuvalu is exceptional in devoting only a few sentences to adaptation. Its NDC notes specifically that the Government of Tuvalu “considers that the focus of INDCs should primarily be mitigation” (Government of Tuvalu 2015, 2).

The second and third expectations can be examined together, since they are opposing. The second expectation, which is also derived from the commitment perspective, is that NDCs focus mainly on domestic policies, including detail on domestic policy aims and actions, because domestic policies involve significant commitment problems. From the commitment perspective, we would not expect NDCs to focus extensively on general principles and/or Parties’ preferred international arrangements, because these do not give rise to commitment problems on the part of the authoring Parties. By contrast, the third expectation, which is from the negotiation perspective, is that NDCs devote large amounts of attention to general principles and international themes, as distinct from domestic politics. This is because these are the main focus of international negotiations in the UNFCCC.

Figure 4 shows the percentages of NDCs devoted to domestic policies as distinct from general principles or international policies. This makes clear that NDCs

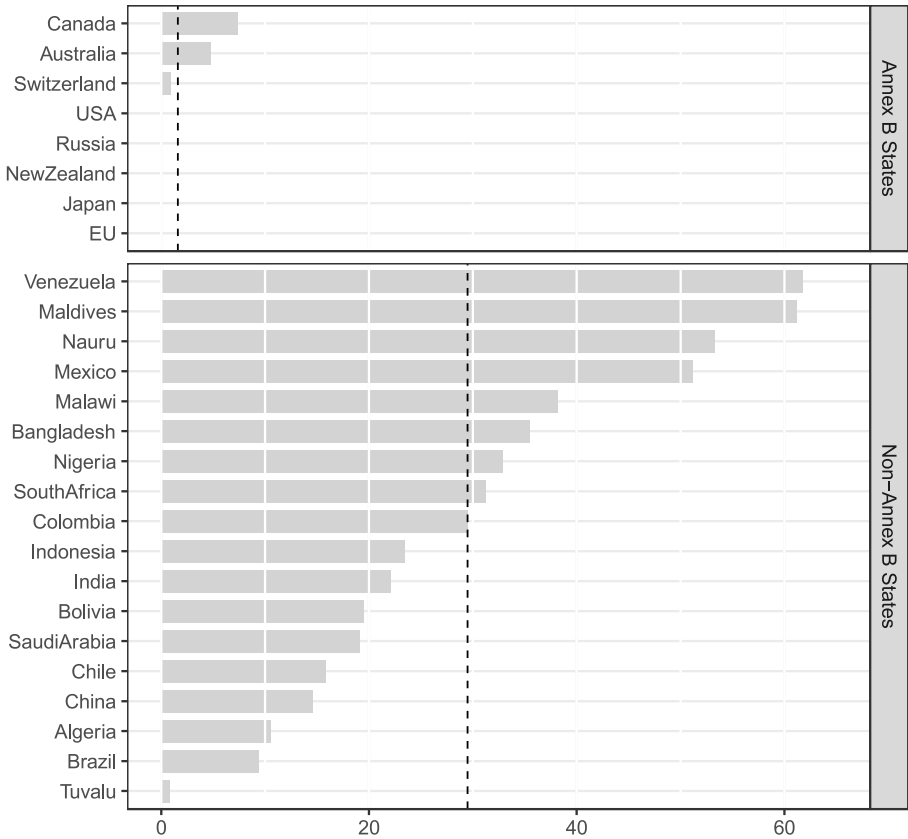


Figure 3
Emphases on Adaptation in NDCs

The dashed line is the average percentage in each group.

discuss a wide array of topics beyond simply listing domestic policies, which are supposed to be the main focus of NDCs according to the Paris Agreement and the commitment perspective. At the same time, Japan, Canada, and Russia devote three-quarters or more of their NDCs to domestic policies, which supports the commitment perspective. While more than half of the contents of most NDCs are devoted to domestic policy, there is considerable variation across the sample, and this applies to both developed and developing countries. The states at the bottom of Figure 4, those whose NDCs contain relatively low proportions of text devoted to domestic policies, include New Zealand, Brazil, Bolivia, and Nauru. New Zealand's relatively short NDC, for instance, includes references to international "Measurement, Verification and Reporting" (theme 8) and "international market mechanisms" (theme 12), as well as its domestic mitigation policies and

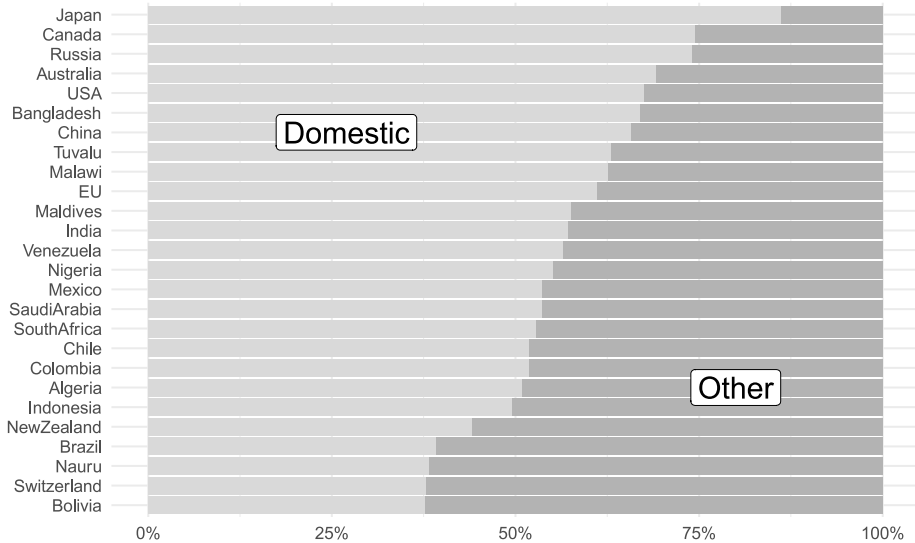


Figure 4
Emphases on Domestic Policies in NDCs

goals. There is no clear relationship between Parties' economic development and the extent to which their NDCs emphasize domestic policies.

The fourth expectation, which is also from the negotiation perspective, is that states' positions on issues that were raised during the COP21 negotiations are strongly related to the contents of their NDCs. Figures 5–8 examine this expectation by comparing states' negotiating positions in COP21, which were identified by Sprinz et al. (2016), with emphases on related themes in their NDCs. States' negotiating positions are represented as positions on policy scales, each of which ranges from 0 to 100. Each actor is placed on each policy scale to represent its policy stance. With a few exceptions, all of the actors have positions on all of the issues.

Figure 5 shows the modestly strong positive correlations between, on the *x*-axes, states' negotiation positions on the COP21 issues of ex ante assessments and MRV and, on the *y*-axes, states' NDC emphases of the MRV theme. The COP21 issue of ex ante assessments centered on the question of whether the Paris Agreement should include the possibility that states' climate policies could be subject to ex ante assessments by an international body. Parties that opposed the inclusion of strong ex ante assessments in the Paris Agreement were placed at or close to zero on the COP21 policy scale, while those that favored the inclusion of such provisions were placed at or close to position 100 on the policy scale. This issue is a natural ex ante complement to the issue of MRV, which concerns ex post monitoring of the implementation and effectiveness of national climate policies. States that were against ex ante assessment and MRV, such as China and

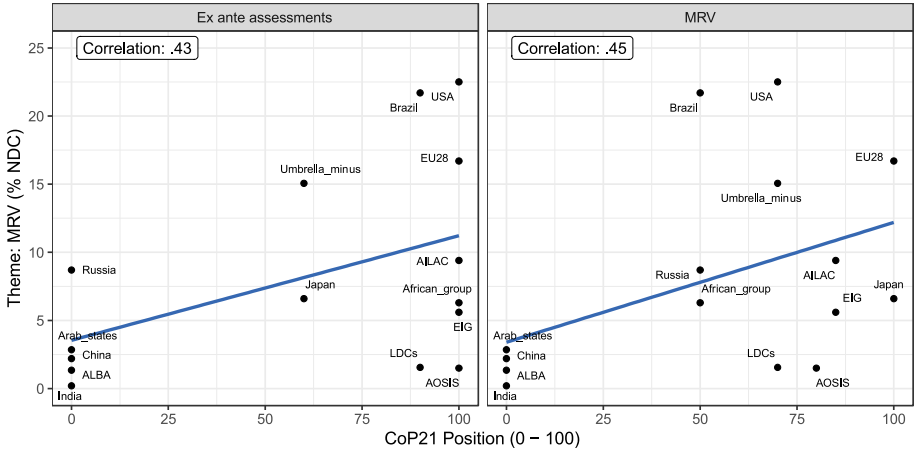


Figure 5 Correlations Between States’ COP21 Negotiating Stances on Ex Ante Assessments and MRV Issues (x-axes) and States’ NDC Emphases on the MRV Theme (y-axes)

See Table 1 for abbreviations.

India, also devoted very little attention to the theme of MRV in their NDCs. Among the supporters of ex ante assessment and MRV in COP21, there is much variation in the extent to which they emphasized MRV in their NDCs. Nevertheless, Brazil, the EU, and the United States all broadly favored strong provisions for ex ante assessments and MRV in the Paris Agreement. They also devoted relatively large proportions of their NDCs to the theme of MRV.

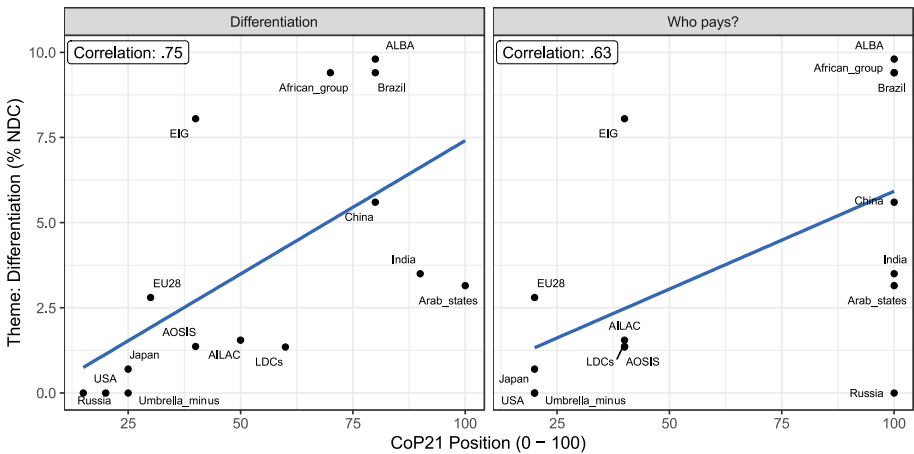


Figure 6 Correlations Between States’ COP21 Negotiating Stances on Differentiation Issues (x-axes) and States’ NDC Emphases on the Differentiation Theme (y-axes)

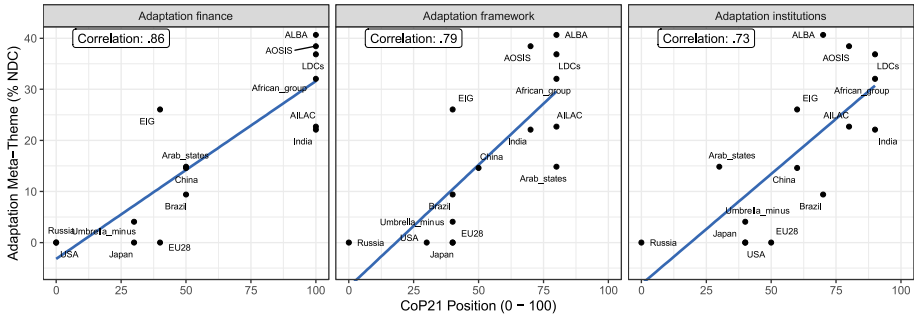


Figure 7
Correlations Between States’ COP21 Negotiating Stances on Adaptation Issues (x-axes) and States’ NDC Emphases on Adaptation (y-axes)

Figure 6 depicts strong correlations between COP21 negotiating positions concerning differentiation of responsibilities and NDC emphases of the same theme. The left panel refers to the COP21 issue of differentiation, which refers to the way in which the principle of common but differentiated responsibilities is referred to in the agreement. States that called for a clearer differentiation between developing and developed countries, with the burden of action falling most on the developed (located at or close to 100 on the policy scale), also wrote NDCs that emphasized the theme of differentiation more prominently. The right panel refers to the COP21 issue of which countries should contribute to climate finance. States closer to 100 on the policy scale for this issue wanted climate finance to be provided mainly or entirely by developed countries. States closer to zero on the policy scale wanted both developed and developing countries to contribute to climate finance.

Figure 7 shows that there are very strong correlations between states’ negotiating positions on adaptation issues at COP21 and the relative attention given to adaptation in their NDCs. Three main adaptation issues were raised at

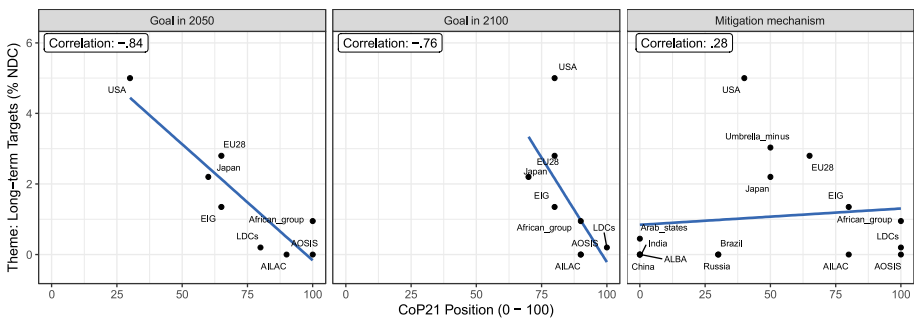


Figure 8
Correlations Between States’ COP21 Negotiating Stances on Global Long-Term Mitigation Issues (x-axes) and States’ NDC Emphases on Their Own Long-Term Targets (y-axes)

COP21: the funds to be reserved specifically for adaptation (finance); the legal framework for adaptation, specifically, the extent to which the agreement should contain specific and binding adaptation targets (framework); and the creation of institutions at the global level to oversee adaptation (institutions). States, such as Nauru and Bangladesh, that took strong stances on adaptation issues during the COP21 also devoted relatively large proportions of the NDCs to adaptation. The opposite is the case for the governments of the EU, Japan, Russia, and the United States: they wanted the Paris Agreement to focus on mitigation rather than adaptation. This is also reflected in the small proportions of their NDCs that mention adaptation.

We now turn to the correlations between Parties' positions on the COP21 issues concerning global long-term mitigation targets and their NDCs' emphasis on their own national mitigation targets (Figure 8). The COP21 issues concerned the question of whether there should be global targets for the international community and, if so, how ambitious these should be over the long term. In contrast, the NDC long-term mitigation theme refers to targets for the authoring states themselves. These are clearly quite different things. States that called for relatively high levels of ambition in terms of global targets for 2050 and 2100, such as AILAC, AOISIS, and LDCs, were mainly calling for ambitious targets to apply to developed countries. These developing states did not devote large proportions of their NDCs to describing their own targets. By contrast, the EU, the United States, and Japan favored a modest level of ambition in terms of global targets; but these states devoted a relatively large proportion of their NDCs to describing their own targets. It is also noteworthy that relatively few states took specific negotiating positions on the COP21 issues regarding targets. Brazil, China, India, and Russia, for instance, did not have clear positions on the issue of what the ambition level of global targets should be but were more concerned with other issues.

Overall, the strength of the association between Parties' negotiating positions at the COP21 and the contents of their NDCs is highly significant, as expected from the negotiation perspective. We have demonstrated this with the detailed comparisons of Parties' negotiating positions on each of the policy issues discussed at COP21 and the emphasis they place on relevant themes in their NDCs. We also pooled all of the observations in Figures 5–8 to identify the overall association. When doing so, we reversed the direction of the two policy scales referring to mitigation goals in Figure 8, because we are interested in the overall strength of the association rather than its direction; keeping the original direction would have obscured this in the pooled analysis. The overall association is reflected in a significant Spearman rank correlation, ρ , of 0.57 ($n = 146$; $p = 0.00$). It is noteworthy that this association is similarly strong for developing non-Annex B Parties ($\rho = 0.49$; $n = 90$; $p = 0.00$) as it is for developed Annex B Parties ($\rho = 0.54$; $n = 56$; $p = 0.00$). This is consistent with the earlier finding that the proportions of NDCs devoted to international provisions and general principles vary for both developing and developed Parties, indicating that the negotiation perspective applies equally to both.

Conclusions

This study developed a new framework for comparing NDCs, which are the basis of the Paris Agreement's pledge and review system (Keohane and Oppenheimer 2016). We described two perspectives on states' NDCs that informed this framework: the commitment perspective and the negotiation perspective. The commitment perspective views NDCs as a way of addressing the fundamental problem of credibly committing to take adequate action, which is a common problem in many policy areas (Bendor et al. 2001, 242; Gilardi 2002; Kydland and Prescott 1977; Melumad and Mookherjee 1989). From the commitment perspective, Parties use NDCs as signals to their international partners and domestic constituents that they intend to fulfill their promises. In line with this perspective, our findings indicate that at least some NDCs focus mainly on mitigation, where the main commitment problems lie, rather than on adaptation. Moreover, many NDCs focus on domestic policies and elaborate in considerable detail the aims and actions to be pursued at the domestic level. There is some evidence that the commitment perspective applies more to developed than developing states. As expected, the NDCs of developing states include more emphasis on adaptation, although we noted several exceptions. Compared to the NDCs of developed states, those of developing states include more emphasis on general principles and international arrangements, rather than on the domestic policies. The fact that the applicability of the commitment perspective varies suggests that these documents serve different functions for different states.

We also found evidence in support of the negotiation perspective, according to which NDCs are part of an ongoing process of multilateral negotiations. The implication of the negotiation perspective is that these documents reflect the same interests that inform states' negotiating positions at the COPs. This perspective implies that there are strong associations, not necessarily causal relationships, between the contents of NDCs and authoring Parties' negotiating positions. To test this, we linked our thematic coding of NDCs to a previous study of states' negotiating positions in COP21 (Sprinz et al. 2016). We found strong correlations between the contents of states' NDCs and their negotiating positions on many key issues in COP21. States that took strong positions on adaptation issues in COP21 also emphasized this broad theme in their NDCs. Our coding revealed substantial differences between developing and developed states in their NDCs' thematic emphases, and these differences are also reflected in differences between developing and developed states' policy positions in the COP21 negotiations. Unlike the commitment perspective, the negotiation perspective appears to apply equally to developing and developed states in that there are equally strong associations between the thematic emphases and negotiation positions for developing and developed states.

This study contributes to a growing body of research that examines the political discourse in NDCs, as distinct from their technical features (Jernnäs and Linnér 2019; Tobin et al. 2018; Winkler et al. 2018). Our thematic framework produces results that are consistent with these existing analyses, which attests to its validity,

but it also reveals additional significant and more refined differences among the NDCs. The application of the thematic framework enabled us to identify linkages between NDCs' contents and states' negotiating positions.

Further research on NDCs is warranted given the centrality of these documents to the pledge and review system established by the Paris Agreement, and the fact that they will be revised and updated in future iterations. The iterative revision of NDCs makes it important to establish a baseline, as we have attempted here, to track how they change over time. Future research could integrate the analysis of political discourse in NDCs with their levels of technical ambition (Tørstad et al. 2020). Theories of policy transfer may explain why some NDCs are similar or become more similar over successive iterations (e.g. Dolowitz and Marsh 2000; Haas 1992; Simmons and Elkins 2004). States that engage in intense communication and exchange with each other may have similar NDCs. Furthermore, there are likely to be conditions under which states learn from each other, including similarities in their key characteristics, such as economic development, environmental vulnerability, dependency on fossil fuels, regime type, and the extent to which their policy preferences were reflected in the Paris Agreement. The major disruption caused by the COVID-19 pandemic has also marked a shift in policy discourse, with some policy makers formulating plans for a green recovery. The revised NDCs will be among the critical signposts by which we can tell whether these plans are being implemented in the form of specific policy targets and actions with the aim of mitigating and adapting to climate change.

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