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Investigating the Determinants of International, National and Local Climate Policies

LAURI PETERSON

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Abstract
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Climate change is a global threat that requires policy action on all levels of governance. The 2015 Paris Agreement opened a new era of governance, entailing a shift away from the top-down approach embodied by the 1997 Kyoto Protocol. It relies instead mainly on voluntary climate pledges, which are meant to be ratcheted up through a process of assessment and review. This allows international organizations and country and local governments much more flexibility in deciding their own level of climate ambition, as well as their own methods for achieving it. I identify some significant variations in policy-making that are not explained by the "usual suspects" of material capacities and organizational capabilities. In keeping with the multi-level nature of modern climate governance, I examine the determinants of climate policies on the international, national, and local levels. I do so with the help of quantitative methods applied to survey results from high-income and middle-income countries, and to data on political institutions and physical vulnerability. With this dissertation, I contribute to the literature by identifying a number of key determinants of climate mitigation policy on different levels of climate governance. First, in a study of international climate finance, I ascertain that different organizational arrangements in the bureaucratic area determine the selection of developing countries, as well as the amount of funding allocated to them by developed countries. Second, in a comparison of domestic and international climate policies, I establish that countries which have adopted more ambitious climate policies domestically are also more likely to furnish greater amounts of international climate finance. Third, in a review of national climate policies, I show that extreme weather events do not impel governments to increase climate action in countries without strong democratic institutions. Fourth, in an examination of local climate policies, I find that it is public awareness of human-caused climate change – not partisanship – that matters most for the adoption of comprehensive climate plans among frontrunner cities. These results shed light on the multi-level challenge of climate change by identifying distinct determinants of climate policy on each level of governance. This dissertation adds nuance to our understanding of the determinants of policies for climate change mitigation by stressing the importance of domestic actors and institutions for effective climate action.

Keywords: political science, climate policy, environmental politics, quantitative research

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List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.

I Peterson, Lauri and Jakob Skovgaard. “Bureaucratic Politics and the Allocation of Climate Finance”. *World Development* 117 (May 1, 2019): 72–97.

II Peterson, Lauri. “Domestic and International Climate Policies: Complementarity or Disparity?” Conditional accept from *International Environmental Agreements: Politics, Law and Economics* (received September 11, 2021).

III Peterson, Lauri. “Silver Lining to Extreme Weather Events? Democracy and Climate Change Mitigation.” *Global Environmental Politics* 21, no. 1 (2021): 1-31.

IV Peterson, Lauri. "Comprehensive Climate Mitigation Policies in US Cities: A Quantitative Text Analysis Approach." Manuscript submitted for publication. Department of Government, Uppsala University.

Contents

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Abbreviations

CCPI	Climate Change Performance Index
CRED	Centre for Research on the Epidemiology of Disasters
CRS	Creditor Reporting System
DFM	Document-feature matrix
EM-DAT	The Emergency Events Database
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
LDA	Latent Dirichlet Allocation
OECD DAC	The Organisation for Economic Co-operation and Development's Development Assistance Committee
sLDA	Seeded Latent Dirichlet Allocation
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar

1 Introduction

Our planet finds itself in a difficult state. We have known since 1896, when Svante Arrhenius wrote about the greenhouse effect, that human-caused CO2 (carbon dioxide) emissions are sufficient to cause an increase in the Earth's surface temperature. However, it was not until the 1970s that "global warming" became an issue of public discussion. It took another ten to twenty years for it to become a central topic at the UN General Assembly, the 1988 Toronto Conference, the 1990 Second World Climate Conference, and within national politics. Modern climate science has reached the consensus that the Earth's climate is warming, and that human activity is the main cause thereof (Doran and Zimmerman 2009). According to reports of the Intergovernmental Panel on Climate Change (IPCC 2018), human-caused (anthropogenic) emissions of carbon dioxide and of other greenhouse gases (GHGs) will need to fall by about 45% by 2030 (from 2010 levels), and to reach "net zero" by 2050, if the increase in global temperature is to be limited to 1.5°C. Yet, despite the accumulation of scientific evidence and the resultant increase in public awareness over the 125 years since Arrhenius' discovery, achieving reductions in greenhouse gas (GHG) emissions has remained one of our most difficult policy challenges.

There has been some progress. At the 2015 climate conference in Paris, world leaders agreed to establish a new system of governance – one based more on bottom-up efforts (Keohane and Oppenheimer 2016). The Paris Agreement sets ambitious targets for limiting the rise of global average temperature to 1.5 °C; but unlike previous agreements, it relies primarily on voluntary pledges (UNFCCC 2015). In effect, the Paris Agreement has moved climate governance away from the top-down approach of legally binding commitments, championed by the Kyoto Protocol, towards "nationally determined contributions", whereby political actors decide for themselves. We live in a "post-Paris" period. This has made it more relevant to study the determinants of climate policies, because countries can now set

their own targets and choose their own methods for reducing GHG emissions.

What makes climate change unique is that it penetrates all levels of political life – from the local through the national and all the way up to the international level of governance. The multi-level character of climate change has led scholars to define it as one of the "wicked" problems that is very hard to solve (Incropera 2015; Sachs 2015). My aim in this thesis is to shed new light on the politics of climate change, by studying variations in climate change policy at the local, national, and international levels. While much previous literature has focused on international climate negotiations (Bagozzi 2015; Bulkeley 2010; Downie 2014; Sprinz and Weiss 2001), it is even more called-for in the post-Paris era to focus on multiple levels of climate-change mitigation. Elinor Ostrom takes such an approach, arguing that international negotiations do not determine all aspects of climate governance (Ostrom 2010). Rather, there is a general trend for climate governance to move towards "polycentricity": i.e., multiple centers of authority and various levels of governance (Jordan et al. 2018).

Since top-down commitments do not figure in this new climate regime, national and sub-national governments can themselves choose how to engage with climate change mitigation. Different political entities thus vary greatly in their approach to climate change, notwithstanding the conclusion of international accords like the Paris Agreement, or the establishment of local-level climate frameworks such as C40's Deadline 2020 Programme. This variation remains evident even after differences in material resources are taken into account (Lachapelle and Paterson 2013, Tobin 2017).

This brings us to the central question of this dissertation: what, namely, are the determinants of climate-change mitigation policy? If the most common structural indicators, whether economic or demographic, do not tell the whole story, what then about the other factors that determine variations in climate policy? This dissertation joins an established and thriving literature, which first arose in the early 2000s, on variations in the large-scale adoption of climate policies on the national (Schmidt and Fleig 2018) and sub-national levels (Hughes 2017). Previous studies on national-level policies have recognized the importance of political institutions in ratcheting up climate ambitions. Favorable features in this regard include democracy (Bättig and Bernauer 2009; Burnell 2012; Gates, Gleditsch, and Neumayer 2002),

proportional electoral systems (Schreurs and Tiberghien 2007), and membership in supra-national organizations (Tobin 2017). Furthermore, a burgeoning literature emphasizes the importance (for good or ill) of domestic actors, such as industrial lobbies and environmental organizations (Hughes and Urpelainen 2015; Madden 2014; Sprinz and Vaahtoranta 1994). Studies of sub-national climate policies follow similar trends, focusing on institutions (Sharp, Daley, and Lynch 2011), on the interests of private and civil-society actors (S. Hughes, Chu, and Mason 2018), and in many cases on voter partisanship as a causal explanation (Lee and Koski 2012; Gerber 2013).

Climate change is at core a global problem, requiring action on various levels of governance (Gupta 2007). Political entities across sub-national, national, and international levels of governance participate in the drafting and adoption of climate policies and laws. This is an aspect of climate governance on which few studies have managed to reflect. While the study of multi-level climate governance has recently become more common (Juhola 2010), the focus in prior literature on multi-level governance has primarily been on supranational-national relationships, such as between the EU and its member states (Jänicke and Quitzow 2017), and on national-local dynamics, such as between national governments and cities (Harker, Taylor, and Knight-Lenihan 2017). Many studies have also looked at the relationship between national/regional and local governance (Aall, Groven, and Lindseth 2007; Di Gregorio et al. 2019; Fuhr, Hickmann, and Kern 2018). Nevertheless, only a few studies have investigated the determinants of climate policy on all three levels (Atteridge et al. 2012). Hence, this dissertation explores the determinants of climate action on all three levels of governance: international, national, and sub-national.

My key contribution in this dissertation lies in my attempt to capture climate policy from the local through the national to the international level. I do this through four papers on climate policy. Regarding the first, it bears noting that academic studies on international climate policies have tended to emphasize the role of economic and structural determinants, such as a country's income and the carbon intensity of its economy, but discount the influence of internal governmental actors, such as bureaucracies. This is especially apparent in the case of international climate finance, where decisions to select recipient countries and to allocate funding are largely supervised by governmental organizations with particular interests. While researchers have studied this aspect by way of case studies (Pickering et al. 2015), my first

study here fills a research gap through its use of a comparative approach with new survey data and a large-n perspective.

As for my second study, it bears recalling that, although scholars tacitly admit the fundamental differences between domestic and international levels of climate governance – and acknowledge that actors may prefer one level of governance over the other (Ingold and Pflieger 2016; Kincaid and Roberts 2013) – few studies have delved into the strategies that actors may employ at both levels of governance. None, for instance, has yet tested the expectation, set out in the "regulatory politics" literature, that industrial lobbies will back international climate policies in order to "level the playing field" abroad when policies are already stringent at home (Kelemen 2010). I also aim to ascertain whether countries that are more responsible for climate change, or which are vulnerable to climate impacts, take increased action on both levels. My second study, then, analyzes the role of domestic factors in the climate actions that countries take on both domestic and international levels of policy-making.

Regarding my third study, it is notable that, while researchers have begun to study the uncertain influence of sudden shocks (such as extreme weather events) on national climate policies (Baumgartner et al. 2009; Buys et al. 2009; N. M. Schmidt and Fleig 2018), we do not know whether countries react differently to extreme weather events due to variation in their political institutions (such as whether they are democratic or not). The key question remains whether democracy is conducive to increasing climate ambition despite, or because of, climate-related disasters. In my third study, therefore, I investigate the impact of extreme weather events – storms, wildfires, extreme floods – on climate policy-making in democracies and non-democracies.

Where my fourth study is concerned, finally, it bears noting that local climate policies have received less attention, due to a lack of data on policy-making at that level. Except in a few notable cases (Reckien et al. 2018), studies have tended to focus on specific policy instruments and on individual cases, thereby failing to give us an overview of the state of local climate action. In my fourth study, therefore, I map out and analyze this variation in different policy issues. Moreover, studies of local-level policies have focused overwhelmingly on the role of partisanship, even though there is evidence that party ideology has started to play a smaller role as climate poli-

cies have become ubiquitous on the local level (Bedsworth and Hanak 2013). Moreover, "partisan attitudes hold a stronger sway for general climate policy than for specific actions" (Bedsworth and Hanak 2013, 673). In my fourth study, I investigate whether this core assumption holds, with the help of local-level data on climate action from the US.

The remainder of this introductory chapter is organized as follows. In the first section, I outline my research objectives and the relevance of my research agenda, and I contend there is a gap in the literature on why national and sub-national governments have varied greatly in their climate policies. I then describe the prior research in the second section, and I set out the key concepts of this dissertation. In the third section, I present my research design and my methods, and I discuss my main sources of data. In the fourth section, I provide a summary of the papers. In the fifth section, finally, I state the contributions and implications of this dissertation.

2 Research objectives

Gaining a deeper knowledge of climate change is of utmost importance for the future of the Earth. We already know that humans are causing irreversible damage to a highly complex climate system, and that the world is getting warmer. We also know we are already bearing the brunt of the adverse effects hereof, as extreme weather events increase in intensity and scale (NASEM 2016). When, if not now, should we discuss policies aimed at averting disaster? The Earth's carbon-dioxide concentration has risen to a higher level than at any point during the last 800,000 years, and half of the CO2 emitted since 1850 remains in the atmosphere. However, the strategies employed by different countries to tackle this "wicked problem" differ significantly, even after due account is taken of the usual suspects, such as population, economic growth, and the carbon-intensity of the economy. We have need, therefore, of an approach that takes into account the actors and political institutions which are relevant for climate action on multiple levels of governance.

The variation in countries' climate actions is intertwined with the age-old inquiry in political science on the determinants of policy change, which some scholars call the "never-ending puzzle" (Capano 2012). Change might even be explained as an inherent part of policy-making. As Hogwood and Peters (1983) note, "all policy is policy change" eventually, and new policies essentially amount to the annulment of previous policies. This observation is especially apt in the case of climate policy, the aim of which is the opposite of stability – i.e., a completely new low-emission development paradigm (Rosenbloom, Meadowcroft, and Cashore 2019). Climate change mitigation is a relatively new policy field, as compared for instance with defense or welfare policy, but it is expected to develop in accordance with similar theories devised for other policy areas (Schaffrin, Sewerin, and Seubert 2014). Early frontrunner policy change can best be described as cumulative incrementalism, where actors and institutions learn about innovation in incremental steps (Daugbjerg and Sønderskov 2012). Already now, in fact, existing national or sub-national climate governance can be investigated by means of

the punctuated equilibrium model (Baumgartner et al. 2009), or with the concept of path dependency (Hall 1993).

I find that, now more than ever, it is vital to follow up the implications of previous studies and to examine change in the area of climate policy. The question of policy change touches on fundamental questions about political science, and it forms an essential part of this dissertation. In order to study policy change, we need to understand its determinants on different levels of governance. Accordingly, the overall research objective of this dissertation is to study the determinants of climate change mitigation on international, national, and local levels of climate governance.

This dissertation may be said to fall within the field of comparative research on climate change mitigation (Harrison and Sundstrom 2007), which investigates the determinants of ambitious policies for climate change mitigation among both national and sub-national entities. Some previous studies have focused on institutions, such as democracy (Bättig and Bernauer 2009; Bernauer and Koubi 2009), varieties of capitalism (Mikler and Harrison 2012), and international climate frameworks (Roger, Hale, and Andonova 2017). Others have emphasized the crucial importance of the interests of social and economic actors (L. Hughes and Urpelainen 2015; Sprinz and Vaahtoranta 1994) and of the political partisanship of governments (Tobin 2017). Many studies on domestic and international climate policy test out a large number of determinants to see which ones matter the most (Halimanjaya 2015; Lachapelle and Paterson 2013). Earlier studies in the field have highlighted the importance of both institutions and actors, but there is a lot of ground to cover in the study of determinants. My aim in this dissertation is to contribute to the field by investigating overlooked determinants.

Finally, while much of the literature is still dominated by case studies (Bernauer 2013), my aim in this research project is to take a step back and to provide large-n evidence. The object is to investigate the determinants of climate change mitigation policy. I do this by studying how the interests of actors and institutions impact on climate policy on both national and sub-national levels of governance. My focus is primarily on the domestic determinants of climate policy. The four papers in this dissertation explore different aspects of climate policy-making, with each one tackling a different dimension of climate governance.

In essence, the four papers are brought together by the common aim of identifying the determinants of climate policy. The novelty of this dissertation lies in its attempt to address public policy-making on climate at three different levels of governance. While all of the papers focus firmly on domestic decision-making, they investigate the role of domestic determinants on different levels – international, national, and sub-national – of climate governance. The first paper investigates the intra-governmental determinants of international climate policy among developed countries. The second analyzes the differences between domestic and international climate policy, and the determinants thereof. The third discusses the significance of democracy and of sudden shocks on policy processes at the national policy level. The fourth paper, finally, descends to the sub-national level of climate governance, investigating the determinants of policy priorities in US cities while also accounting for factors at the level of the federal government. The multi-level approach of this dissertation affords a unique view of climate policy that transcends any single level of public governance.

The first paper investigates the role of domestic decision-making processes in international climate policy. The focus is on both selection and allocation decisions on climate finance which are made by government ministries. In particular, I seek to understand the influence of domestic bureaucracies on the financing of bilateral climate measures in developing countries.

While much of the literature takes for granted that domestic and international climate policies involve intrinsically different approaches (Chaudoin, Milner, and Pang 2015), studies rarely discuss country strategies for both levels explicitly. Paper II examines the relationship between the domestic and international climate ambitions of different nations. In particular, I investigate whether countries that make greater efforts to tackle climate change domestically also do so internationally, or *vice-versa*.

The third paper, which examines the national level of policy-making, contributes to the discussion on the role of sudden shocks. In particular, it studies the impact of extreme weather events on the climate policies of middle- to high-income countries, and investigates whether democracy matters for climate change mitigation after extreme weather events have occurred.

Unlike the previous three papers, the fourth zooms in on the sub-national level of climate governance – a level which is especially relevant given that three quarters of GHG emissions derive from cities (Gouldson et al. 2016).

Still, we lack knowledge about the type of policies that cities adopt, or about why some cities are more willing than others to take comprehensive climate action. In sum, Paper IV investigates the determinants of ambitious climate measures at the sub-national level.

I should clarify two things regarding the scope of the dissertation and the units of analysis it employs. First, the focus is on climate change mitigation. Climate change adaptation, by contrast, is beyond the scope of this dissertation. I find that adaptation, while an essential aspect of climate governance, is driven by motivations and institutional frameworks outside the focal point of this analysis. Second, this dissertation focuses on public climate policies. As such, programs and initiatives managed by private and other non-governmental actors fall outside the scope of this research project. Climate governance by private and non-state actors is an important aspect of the Paris Agreement (Bäckstrand et al. 2017), but including it would complicate the research design by conflating disparate units of analysis, leading to a lack of clarity in my research objectives.

3 Prior Research

This dissertation focuses on key theoretical discussions surrounding the determinants of climate policy. My analysis touches on democracy, public opinion, governmental organizations, domestic and international climate policies, and the impact of physical vulnerability to climate change. In order to cover these wide-ranging matters, I draw on a diverse set of literatures within political science. Hence, this dissertation is informed by disparate but interrelated areas of inquiry into such matters as public policy, collective action, comparative politics, and environmental and climate politics, as well as by theories of democracy, vulnerability, and bureaucratic politics.

I have divided this section of the chapter into six parts. Each discusses an aspect of the literature which is vital for the four papers. The main theories and concepts used in the papers are presented thereby. The first sub-section begins by expanding on the main dependent variable for several of the papers – climate change mitigation – after which it explores policy change and its theoretical implications. The following sub-sections discuss central concepts in this dissertation, including the impact of bureaucratic politics on international climate policy, the relationship between domestic and international climate policy, the relevance of democracy, the (expected) role of extreme weather events on domestic policy, and the dynamics of urban climate politics.

3.1 Climate Change Mitigation and Policy Change

Climate change mitigation can be defined as "human intervention to reduce emissions or enhance the sinks of greenhouse gases" (IPCC, 2018, Annex I). In general, it refers to efforts to reduce or prevent the emission of GHGs. Like any policy, mitigation can be pursued in many different forms and through many different instruments, including the classic assemblage of "carrots, sticks and sermons": tradeable permits, carbon taxes, and information campaigns (Bemelmans-Videc et al. 2011). Countries and subnational actors can reduce carbon emissions by supporting the production of renewable energy, increasing the energy efficiency of the economy, establishing forests in new areas (afforestation), and halting deforestation. Political actors can also promote low-emission transportation and sustainable

land-use practices. These are only some of the examples of climate change mitigation, which can take varied forms in different contexts.

A complementary concept here is climate ambition, which can be defined as "[…] stringent domestic and international efforts that aim to limit global warming to 1.5oC" (IPCC 2019). This is also the definition generally used in IPCC reports and at negotiations within the United Nations Framework Convention on Climate Change (UNFCCC). Ambition is a commonly used term in climate negotiations, where it is usually contrasted with inaction. Ambition is also the primary focus of the Paris Agreement, which calls for higher climate ambitions on the part of national governments. The same is true of many countries that use climate ambition as a "call to arms" for future action. As such, the term bears a strong normative connotation: it assumes that any action is of value if it counters anthropogenic climate change, which requires quick and decisive action. Several of the papers in this dissertation also mention climate ambition, in reference to various levels of policy-making in the pursuit of climate change mitigation. More specifically, climate ambition represents the primary dependent variable for Paper II and Paper III.

The idea that greater efforts to curb anthropogenic climate change can be expressed in terms of ambition is not necessarily new. Previous research has already established the relevance of climate ambition in relation to the climate policies of different countries. I employ the concept mainly in order to analyze the determinants of climate policies. Thus, I measure climate ambition along a vertical scale, with the most demanding low-emission policies at the top and business-as-usual policies at the bottom. Public actors engage with climate change mitigation on different levels; I examine the variation on the national and sub-national levels. Hence, this dissertation contributes to the literature by exploring variations in ambition at multiple levels of governance.

Climate change mitigation can also take place in the form of international climate-related assistance or climate finance. In 2008, at the Copenhagen climate negotiations (COP 15), developed countries promised USD 100 billion of "new and additional" climate finance per year to developing countries. This promise has been reiterated at subsequent climate talks, most notably as part of the Paris Agreement – Article 2.1c of which calls upon signatories to ensure "[…] finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development" (UNFCCC 2015). The Climate Policy Initiative (2020) estimates that, in reality, USD 1.6–3.8 trillion (or even more) will be needed in new climate investment if global warming is to be kept within a 1.5o scenario. This requires an enor-

mous effort by all developed and developing countries – a matter I examine in Papers I and II.

A study of the determinants of policies for climate change mitigation is necessarily closely linked with the study of policy change, which is an integral aspect of scholarship on public policy (Capano 2012). Classic works such as *The Science of Muddling Through* by Charles Lindblom (1959), David Easton's *Systems Analysis of Political Life* (1965), and Paul Sabatier's *Theories of the Policy Process* (1999) have set out convincing theories about the nature of policy change. The literature on punctuated equilibrium theory finds that policies remain generally stable, until they are "punctuated" by periods of quick change set off by elections (Walgrave et al. 2006), disasters (Nohrstedt et al. 2021), or economic crises (Falkner 2016). Thus, quick exogenous shocks can create a "window of opportunity" – a moment when the problem becomes immediate and clear in the public eye, allowing new solutions to be presented. This is only possible within a framework marked by political and institutional receptivity to such ideas (Kingdon 1984, 2003). Paper III deals with "windows of opportunity" created by extreme weather events and their role in democratic and autocratic contexts – an issue I discuss in further detail in the section on extreme weather events and physical vulnerability.

In this dissertation, I examine the determinants of policies on all levels of climate governance, from the international through the national to the local. Thus, I seek primarily to identify the factors which generate variation in climate policies on all levels of governance. In the next section I start at the top, with a look at public international climate financing by developed countries. A discussion then follows of climate policies on the domestic and subnational levels.

3.2 Bureaucratic Politics and International Climate Finance

Paper I investigates the role that bureaucratic politics plays in climate finance. The bureaucratic politics approach has a long history (Hilsman 1967; Huntington 1960; Neustadt 1970; Schilling, Hammond, and Snyder 1966; M. Weber, Parsons, and Henderson 1964). It became increasingly popular with the publication of Graham Allison's *Conceptual Models and the Cuban Missile Crisis*, as well as his *Essence of Decision: Explaining the Cuban Missile Crisis*, in 1969 and 1971 respectively. This approach focuses on the inner workings of public administrations, in an attempt to ascertain the role of domestic politics in the formulation of foreign policy. Its emphasis on the

importance of bureaucratic organizations has had an enduring impact on the analysis of foreign policy, which can be seen even today (Jones 2010). Allison challenges the core realist assumption that states behave as unitary actors. He points out that, while bureaucratic actors can act rationally, they "make governmental decisions not by a single rational choice, but rather by pulling and hauling." Hence, the implementation of policy mainly results from the workings of bureaucratic actors, who are not automatons simply serving the political needs of elected officials in a vacuum; instead they have their own interests and their own perspectives on key policy issues, based on their own background and role (Kaarbo 1998; Allison and Zelikow 1971). The emphasis on organizational interests has led to the oft-cited Mile's Law: "where you stand depends on where you sit" (G. Allison and Zelikow 1999, 371). Nevertheless, this initial work on bureaucratic politics was criticized from a positivist perspective – for example by Welch (1998) – for being largely unsuccessful in generating robust testable hypotheses. Subsequent studies, however, succeeded in setting out refutable hypotheses.

According to Halperin and Clapp (2006), bureaucratic organizations have two principal goals. First, they typically seek to increase their size and to enhance their influence over policy issues, thereby achieving a larger organizational budget and greater freedom (Müller 2003). Second, bureaucratic actors strive to defend their organizational interests based on their organizational essence: "the view held by the dominant group within the organization of what its missions and capabilities should be" (Halperin and Clapp 2006, 27). The ability of different ministries to influence policy depends on their level of involvement in the policy area in question (Halperin and Clapp 2006). Downie (2014), for example, points to the dependence of EU climate negotiations on the positions of key EU countries and their relevant ministries. Ministries may introduce their favorite objectives into policy areas where goals of that kind had previously figured less prominently (Downie 2014, Skovgaard 2016). Finance ministries, for instance, tend to act as "guardians of the purse" (Wildavsky 1989), while defense ministries are inclined to press for greater military spending and increased securitization (Halperin and Clapp 2006).

Ministries seek to influence the policy-making process in order to make it serve their own organizational interests. Wildawsky (1986) divides ministries into guardians of public revenue and advocates of greater spending, in accordance with their respective missions. Halperin and Clapp (2006) note that bureaucratic organizations tend to focus on fulfilling their particular mission statements and policy objectives. Drezner (2000) emphasizes the position of each agency in relation to the others as a determinant of policy output. He finds that insulated bureaucracies are more likely to keep their ideational mission than are agencies embedded within a more powerful

agency. Yet embedded agencies which manage to maintain their ideational mission are more likely, in reality, to influence overall national policy than their insulated counterparts are. The role of international bureaucracies in setting international rules and norms for climate policy-making has also been investigated, by among others Biermann et al. (2009).

The importance of bureaucratic politics is especially apparent in the case of new policy areas, such as international climate finance, where the responsibilities of different agencies overlap. International climate finance is closely related to foreign aid, as noted by Lancaster (2007), who finds that the mission of aid-giving ministries influences the choice of countries for foreign aid. Similar dynamics are at play in the area of climate financing, which closely reflects the bureaucratic goals of government ministries (Pickering et al. 2015). International climate financing is a vital element of international climate policy. It is decided by national government bodies, but guided by the rules and norms set out in international frameworks.

The commitment to provide public climate financing was officially made in 2009, with the signing of the Copenhagen Accord at the fifteenth Conference of Parties (COP) of the UNFCCC negotiations. Developed countries promised to furnish USD 100 billion of "new and additional" financial resources each year to developing countries – an undertaking that came to be known as "fast-start finance." These early commitments were complemented by the creation of the Green Climate Fund in 2010, and by continuous reaffirmations of the promise to provide USD 100 billion (Nakhooda et al. 2014). The bureaucratic politics approach is especially fruitful for investigating the allocation processes of international climate finance, which is highly dependent on ministerial decision-making.

Nevertheless, most research on variations in the allocation of international climate finance has been done primarily through the lens of economic and structural factors, such as country income (Halimanjaya 2015) or the fragmentation of international climate regimes (Pickering et al. 2017). Public climate financing has been provided largely through bilateral channels, since national governments tend to keep a close hand on allocation decisions. However, while it is governments which draw up the overall policy goals for climate finance, it is ministries that implement the policy and make decisions on the selection of recipients and the size of the funds allocated to them (Pickering et al. 2015). This is a significant aspect of policy implementation, because the choice of developing countries and the size of the funds furnished to them can have important repercussions for the future of GHG emissions. Investigating this question is an important goal of this dissertation. Accordingly, Paper I examines the involvement of ministries in international climate finance, on the basis of a bureaucratic politics approach.

Attempts to analyze bureaucratic factors in international climate finance have tended to give way to the study of intra-governmental dynamics, as in the case of Pickering et al. (2015), who focus primarily on variations in the extent of agency control and the level of cooperation over specific policy areas, in an effort to test hypotheses regarding the role of individual ministries in making policy on climate finance. Authors of this kind propose hypotheses on the substantive positions of each type of ministry (environment, development, foreign affairs, etc.) and their relative influence over the policy area in question. Each ministry seeks to make the policy-making process on climate change accord with its own organizational interests (Skovgaard 2017).

Paper I contributes to the literature on bureaucratic politics in two ways. First, it analyzes the role of bureaucracies on the basis of a time-series approach. It does so in response to recent studies, such as that by Welch (1998), who points out that most studies on bureaucratic politics focus on specific events. Such an approach is indeed common nowadays: researchers examine the role of bureaucrats at key moments, as when new initiatives are taken or new institutions created. Scholars have explored the influence of bureaucratic actors at particular times, but they have spent less energy studying the role of bureaucratic organizations over time. Second, Paper I contributes to the literature on bureaucratic politics by analyzing how ministries' responsibility and level of involvement shape both the selection of developing countries and the level of climate finance provided to them. In this thesis, then, I expand on the role of bureaucratic actors, and I show their role in a rarely investigated longer-term perspective.

Paper I also expands on prior theorizations of the substantive positions taken by various agencies on questions of climate finance. The issue of climate change has increased the influence of agencies which usually do not engage with international policy matters. Environment ministries, for example, have not otherwise tended to engage with foreign affairs. While Pickering et al. (2015) claim that aid ministries are more likely to support "pro-poor" policies, and to prefer financing adaptation to financing mitigation, I suggest in Paper I that new players, such as environment ministries, are able to exploit the new opportunity and to bend it to their needs. The prominence of climate change in international affairs has increased the importance of environment ministries in foreign relations. For example, many such ministries appoint delegations to international climate negotiations. Hence, my co-author Jakob Skovgaard and I argue, environment ministries are more likely to allocate climate finance to countries that are allies at the UNFCCC negotiations. We also hypothesize, mirroring Halperin and Clapp's (2006) focus on organiza-

tional essence, that development ministries – due to their pro-poor mission – are more likely to prefer low-income countries.

As Jones (2010) notes, a great many critiques have been leveled at the bureaucratic politics approach for ignoring the role of domestic interest groups and other actors in influencing foreign policy processes. In Paper II, I attempt to address these critiques by accounting for the influence of domestic politics in both domestic and international climate governance. In the next sub-section, I examine the role of political actors and institutions in both domestic and international dimensions of climate policy.

3.3 Domestic and International Climate Policy

Climate change mitigation can be divided into domestic and international dimensions, and governments continue to engage in both. The success of policy-making in both dimensions is conditional on the domestic politics of modern states. Paper II aims to contribute to the literature on public goods by ascertaining whether countries regard public goods such as climate change truly as a global problem, or instead as an issue that mainly needs domestic attention. In discussing the crucial split between domestic and international dimensions of climate policy, I must first consider what makes climate change an especially "wicked" problem (Sachs 2015). First, it is an extremely long-term and inter-generational problem, with many uncertainties. As Bättig and Bernauer (2009, 283) note, climate change is one of the "few policy challenges in the international system that corresponds very closely to the standard definition of a global public good and the tragedy of the commons."

Second, all industrialized countries emit GHG emissions, thereby contributing to a greater or lesser extent to anthropogenic climate change. Moreover, all countries are dependent on fossil fuels for energy. Technically speaking, it does not matter where GHG emissions come from, as they are all equal in their effects; the difference relates rather to the cost of reducing emissions, and to the historical responsibility of certain countries to make the sacrifices required. Climate change mitigation is a global issue, and GHG reductions are not dependent on geography as long as the global outcome is the same. The decision on whether to tackle emissions at home or abroad may depend on the price. According to the International Energy Agency (2017), it is cheaper to substitute for high-polluting technologies in developing countries to than upgrade current energy infrastructures. Many developed countries, however, bear responsibility for the GHGs emitted since the start of the industrial revolution. And historical responsibility matters here, because excess CO2 remains in the atmosphere for a long time; it continues

to exert a warming effect over a period possibly ranging from 300 to 1000 years (Zickfeld et al. 2013).

The theoretical and empirical work on domestic and international climate policy rests largely on the prior theorization of the provision of public goods and their international variant – global public goods – which provide global benefits not contained within political borders (Grasso 2004). Scholars regard climate change, or more precisely "the preservation of a stable climate", as a global public good, mainly for two reasons. First, public goods are non-excludable, meaning that nobody can be prevented from benefiting from or otherwise being affected by them: all can enjoy the benefits of a stable climate. The same applies to the downside: no one can be excluded from the "benefits" of global warming (Nordhaus 1999). Second, public goods are non-rivalrous: i.e., consuming them does not diminish the quantity available for others. In the particular case of climate change mitigation, the benefits from reducing GHG emissions in one country are theoretically the same for other countries too. This would seem to mean that domestic and international climate policy are equivalent.

Nevertheless, scholars tend to regard domestic and international climate policy as adversarial. The problem of free riders is one of the main reasons for this; after all, benefiting from climate change mitigation does not reduce the "quantity" of this good which is available to others (Bodansky 2012). This may lead to free-riding, whereby some of the parties to international negotiations receive "the benefits without contributing to the cost" (Nordhaus 2015). Developed countries transfer innovative technology and provide climate finance to developing countries in order to support global public goods; however, since lower GHG global emissions benefit everyone, the line between recipients and providers becomes blurred (Bagchi et al. 2019). Consequently, researchers have often defined the relationship between domestic and international climate policy in terms of a zero-sum game: countries emphasize either domestic or international efforts, but not both at the same time. Investigating whether this is really the case is one of the main objectives of Paper II.

Sprinz and Vaahtoranta (1994) suggest that preferences on environmental regulation are primarily driven by two self-interested motivations. First, governments aim to curb environmental degradation and to reduce general vulnerability to the negative effects of pollution. A general expectation here has it that interest in international climate negotiations and cooperation will increase as physical vulnerability to climate change worsens, especially among domestically ambitious countries. Second, countries seek to reduce environmental harm as long as the cost of doing so is relatively low. Countries may wish to combat climate change, but what they actually do about it

depends on how much they are willing and able to spend. Domestic interests on both domestic and international climate policy are shaped by a country's capacity to formulate strategies and to implement policies (Willems and Baumert 2003, 15). This reflects Fordham's (2011) proposition that "capabilities drive intentions." In essence, this means that materially wealthy countries, which to begin with are usually more ambitious domestically, tend to have a high level of international ambition – largely due to the excess resources they possess.

However, the relationship between domestic and international climate policy does not just depend on national interests or institutional capacity; it also reflects the interests of domestic pressure groups (Harrison 2010). This is in line with Putnam's (1988) logic of "two-level games," where the interests of domestic actors matter for the exercise of both domestic and international policy. The most important actors are the decision-makers without whom policies would not materialize at all. Policy-makers hail from both political and bureaucratic backgrounds, depending on the specific issue at hand and the level of decision-making in question. The general expectation is that domestic actors will prefer domestic climate action to international. This is exemplified by the finding of Chaudoin et al. (2014) that also religious groups tend to favor local climate mitigation over international efforts. In this dissertation, therefore, I aim to shed light on the role of domestic actors in shaping both national and foreign climate affairs.

Advocacy groups, such as environmental organizations or industrial lobby groups, vie for control over climate policy. Industrial interest groups are especially influential, since they command great resources, and the profitability of their activities is directly affected by any policy changes in connection with climate change. One of the groups most adversely affected by climate policies is the domestic fossil fuel industry, the profits of which depend on the mining of fossil fuels and the continuation of carbon-intensive development. Significant opposition by industrial interest groups can create significant hurdles for any climate effort (Christoff and Eckersley 2011). The influence of industrial pressure groups can impede climate ambition through two main channels.

First, industrial actors can affect climate policy and legislation by giving research grants, as well as by ensuring a heightened media presence for climate change deniers. Empirical studies have shown the role of the media in amplifying climate denialism around the world. Painter and Ashe (2012) show, as do Lopera and Moreno (2014), that media-led climate denialism is a significant factor in many nations; it is most concentrated, however, in a few Anglophone and Eastern European countries. Moreover, Vesa et al. (2020) find that oppositional industrial actors can be highly influential even

when they remain relatively unnoticed in the media landscape. Second, energy-intensive industrial groups influence legislatures and governments around the world by way of lobbying. This can take the form of donations to political parties, and also of offers to political actors – as repayment for cooperative behavior – of career paths in industry after they leave public office ("revolving doors"). This "hidden" opposition may not be as visible as political campaigning in the media, but it may be even more effective in achieving results.

Nevertheless, industry is not necessarily negative towards all types of climate action. Desombre (2000), Falkner (2007), and Kelemen and Vogel (2010) make a "regulatory politics" argument regarding the impact of domestic industrial groups on international policies. According to this view, industrial groups in developed countries are more likely to support international efforts to standardize environmental regulations if stringent restrictions already apply in their home country. Hence, once the level of domestic ambition becomes high enough, industrial actors may even tacitly uphold the internationalization of climate efforts, because it creates an even "playing field" with their rival companies abroad. Thus, these authors theorize, domestic stringency leads to an overall increase in the stringency of international environmental regulations.

The priority given to domestic or international climate policy can also be affected by trends in the public's perception of climate change. According to the post-materialist values hypothesis, changes in public opinion can be expected to influence both domestic and international policy. Inglehart (1977) argues that, as people get wealthier, they are "freed" from the immediate pressure of basic needs, which allows non-material values to become more prominent. He describes the common trend from material needs to post-material values as a shift from "survival" to "self-expression" (Inglehart 2007). People in low-income societies may initially care most about existential issues; as their incomes increase, however, environmental values eventually become more important to them. Wlezien and Soroka (2012) find that politicians in democratic countries are receptive to the public's political preferences, which may partially explain rising ambition levels in both domestic and international climate policy. According to such studies, climate policy is roughly in line with the attitudes of the median voter. Anderson et al. (2017), for example, find that an upward trend in environmental values has led to more ambitious renewable energy policies in European countries. Beiser-McGrath and Bernauer (2019) show with survey data that information on free-riding by other countries does not reduce public support for international climate agreements. Thus, we can expect an increase in wealth to lead to a greater emphasis on post-material values, which in turn should strengthen support for both domestic and international climate policies.

While the relevance of domestic politics for both domestic and international climate policies has been studied before, this research agenda has remained fragmentary, and scholars have not examined the fundamental trade-offs between domestic and international climate policies. Moreover, the domestic-international split has become especially important as a result of the Paris Agreement. The Agreement depends, namely, on voluntary pledges on domestic climate policy, which are reviewed and compared on an international level. Developed countries are given relatively free rein in deciding how to reduce their own GHG emissions. Furthermore, the accord has no legally binding figures on specific finance flows to developing countries, save for the lofty aspiration of USD 100 billion per year (Falkner 2016). The bottom-up nature of the Paris Agreement makes it ever more important to investigate the relationship between domestic and international climate policies. Few studies have investigated empirically whether a high level of domestic climate action leads to a high international ambition, or whether this relationship is predicated on industrial actors, physical vulnerability, responsibility, or economic capability.

My primary objective in Paper II is to explore the potential trade-offs between domestic and international climate policies, and to investigate whether countries prioritize one policy dimension over the other or emphasize both equally. My second major goal in Paper II is to study the impact of domestic politics on the balance between domestic and international climate policy. This relationship is mediated by several factors, including socio-economic conditions, physical vulnerability to climate change, the role of domestic industrial actors, and the question of which countries bear a particular historical responsibility for climate change and thus should pay a higher price in combating it. The importance of physical vulnerability to climate change will be discussed in sub-section 2.5. Now, however, I turn my attention to political institutions, and in particular to the institution of democracy, which figures centrally in all of the papers in this dissertation (especially Paper III)..

3.4 Political Institutions and Democracy

Institutions provide the basic framework for all aspects of policy-making. It is not surprising, therefore, that the study of institutions has remained a staple of political science since its inception. Institutions take center stage in Paper III, which focuses on their role in climate policy. Recent years, moreover, have seen the emergence of the social theory of institutionalism, which investigates how institutions enable but also constrain political action by the state and societal actors (Hall and Taylor 1996). The beginnings of the insti-

tutional approach can be traced back to Alexis von Tocqueville, with his classic *Democracy in America* from 1835. However, other classical authors – Montesquieu (1748) and Smith (1776), for example – also stressed the importance of well-functioning institutions for the effective provision of public goods. Among such institutions democracy, the rule of law, and a high-quality bureaucracy figure centrally.

Both domestic and international institutions are critical here, making it almost a "truism" among political scientists that institutions matter (Bättig and Bernauer 2009, 284). Scott (2013, 56) defines institutions as "regulative, normative, and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life." I would especially emphasize the last-mentioned aspect of institutions: the stability and meaning they provide for society. This is a key theme of this thesis, and one of the main reasons why a large number of studies on climate politics have focused on institutions. Political institutions are relatively immutable determinants of policy-making, with an influence that is noticeable over long periods. The enduring effect of institutions also helps make the comparative analysis of countries and regions worthwhile. In this dissertation, I focus on the role played by domestic institutions, since national decisions on climate change are ultimately driven by domestic considerations.

My investigation of the determinants of climate policy in this dissertation relates especially to a particular area of institutionalism, which is committed to finding "good" institutions for fair and effective governance. Studying the "quality of governance" entails exploring a number of economic, political, and social theories on the role of "good governance" in the provision of public goods (La Porta et al. 1999; Rothstein and Teorell 2008). We need, quite simply, to take political institutions into account – for they comprise the building blocks of good governance, and they provide crucial support for climate change mitigation. I aim to add to the literature on this question, by examining the role of political institutions that are associated with success in reducing GHG emissions. Particularly, I draw upon the conception of the quality of governance by Kaufmann et al. (2010) in order to investigate political institutions, which enhance state capacity to provide (global) public goods. The index provided by these authors consists of several indicators, which measure such matters as regulatory quality, government effectiveness, the rule of law, the absence of violence, the level of political stability, and the incidence of corruption (Kaufmann et al. 2010). Democratic accountability and the strength of the popular voice feature as well.

One of the key political institutions theorized to affect climate policy is democracy. The form of government in a given country tends to change very little, but there is significant variation among states in this regard. Moreover,

many aspects of governance overlap with the institution of democracy. In Paper III, I argue that democracy matters most for climate change mitigation at the level of countries. But what is meant by democracy? This is likely one of the most contested and ambiguous concepts in political science (Schmitter and Karl 1991). In a very basic sense, democracy can be defined as "rule by the people" (Coppedge et al. 2011, 248). Many scholars, such as Schmitter & Karl (1991) and Coppedge et al. (2011), acknowledge the great variation in democracies in terms of citizenship rights, economic liberalism, state control over the public realm, and political and economic competition. Democracy does not consist of a single set of institutions; rather, "[t]here are many types of democracy, and their diverse practices produce a similarly varied set of effects" (Schmitter and Karl 1991, 76).

Coppedge et al. (2011) set out several different definitions of democracy: electoral, liberal, majoritarian, participatory, deliberative, and egalitarian. The electoral definition is the most minimalist. In Paper III, I draw principally on the highly influential but minimalist definition of democracy proposed by Dahl (1977) – as the "rule of many," or "polyarchy" – in order to facilitate a comparative analysis of the most fundamental aspects of democratic governance. Dahl (1977) defines polyarchy as an "imperfect approximation" of the ideal of democracy. Its institutional arrangements establish the right to participate in politics, and they permit public opposition. Rather than conceiving of democracy as an idealized, permanent, and immutable institution, Dahl sees it as a process that is ever evolving. He pays special attention to equality in political resources, and stresses the importance of fair political processes (Dahl 1985). Democracy is legitimized through the principle of political equality, which requires equal access to public debate, to government office, and to the political process generally. A process is only truly democratic if it allows for equal votes and effective participation, as well as adequate and equal opportunities for participation and inclusion.

The concept of polyarchy informs the regime typologies provided by Polity, Freedom House, and Varieties of Democracy. These classify modern states as democracies, autocracies, and everything in between. I rely on the indices furnished by Varieties of Democracy, and in particular its Electoral Democracy Index (Alizada et al. 2021). This index aggregates values based on surveys with country experts on freedom of association, clean elections, freedom of expression, alternative sources of information, elected officials, and suffrage. Global indices of democracy may suffer from too strict a definition or from less than comprehensive coverage, but they are ultimately useful for identifying general levels of democracy and for spotting changes in regime type over time (Coppedge et al. 2011). In Paper III, I employ data from these sources in order to measure democracy.

Many scholars have explored the implications of democracy for the provision of public goods. Simply put, they ask: "Do democratic states work better than authoritarian ones?" (Charron and Lapuente 2010, 443). Many have concluded that the answer is yes, including in the case of climate mitigation policy. Bättig and Bernauer (2009, 286), for example, maintain that "[d]emocracy is arguably the most fundamental characteristic when comparing national political institutions globally"; and they conclude that democracies are more ambitious in their provision of public goods, such as climate change mitigation, than autocracies are. Similarly, McGuire and Olson (1996) and Olson (1993) note that non-democracies are less likely to provide an adequate supply of public goods, since autocrats have less incentive to distribute surplus income from public tax revenues to provide for public goods. Bueno de Mesquita et al. (2003) add that the provision of public goods, unlike that of private goods, depends on the size of the constituency for them – a constituency which decides who stays in power. Autocracies maintain a small and highly loyal elite that receives private benefits from the regime in power. In democracies the constituency is relatively large, but electorates provide rather weak support. Hence, democratic rulers need to provide ample public goods in order to secure re-election by a constantly wavering citizenry. Autocracies tend instead to rely on repressive means to secure compliance from the general public.

However, the helpful role played by democracy in the management of public goods, and by extension in climate policy, is not a simple or open-and-shut case. Dissenting voices can be heard here. Ross (2006), for example, contends that while democracies spend more on public goods, such as health, education, and social security, the benefits tend not to accrue principally to low-income groups. The failure of democracies to provide certain public goods effectively may be due to social polarization or a lack of information. The provision of public goods may also break down on account of corruption (Rothstein 2011). Povitkina (2018), for example, notes that highly corrupt democracies appear not to perform any better on climate policy than autocracies do.

Others note that not all autocracies are ineffective at providing public goods. Root (1996) cites Singapore as an example of an autocratic country that manages to provide public goods through an impartial and efficient bureaucracy. Similarly, a certain line of recent research contends that "environmental authoritarianism" may actually be beneficial for tackling GHG emissions. According to Beeson (2016, 5), the technocratic and authoritarian character of China's climate policy may actually help to overcome collective action problems, since the "ruling elite is not directly accountable to the general population, nor as potentially constrained in its actions." Thus, the relation-

ship between types of government and the provision of public goods may be more nuanced than it seems at first.

Where bottom-up pressures are concerned, democratic leaders can be reasonably expected to have a stronger incentive to respond to public demands. However, empirical studies have not demonstrated that voters in democracies are more environmentally minded than citizens in non-democracies. It is also often the case in democracies that short-term issues dominate the political debate, to the exclusion of long-term problems like climate change. Nevertheless, as Bättig and Bernauer (2009) point out, the median voter in democracies is wealthier and better educated than the median citizen in non-democracies, and in fact better educated than the median member of the elite in non-democracies. Wealthier and more educated people are better informed and more likely to approve the allocation of taxes for public goods. Voters in democracies are also freer to travel and to gain access to new information on environmental problems. Furthermore, elites in non-democracies tend to be less supportive of restrictive climate policies due to the high opportunity costs and low net personal benefits that such policies entail (for them). Small elites, namely, obtain most of the societal benefits in non-democracies, and extra-territorial public goods are less likely to furnish them with net benefits.

According to a significant portion of the literature, then, democracies are more likely to tackle climate change than non-democracies are. I propose to study this relationship in further detail, with the help of data from the Climate Change Performance Index (CCPI). However, even if democracies are more likely to tackle climate change, we do not know whether this disposition translates into a more ambitious climate policy at moments of crisis. In other words, if physical vulnerability to climate change is increasing in the world, are democracies better at responding to the risks involved? In Paper III, I seek to provide an answer to this question. I hope thereby to contribute to the existing scholarship on the role of democracy and the importance of crises – in the form of extreme weather events – in climate mitigation policy. In the following sub-section, I discuss the importance of physical vulnerability for policy change.

3.5 Physical Vulnerability and Extreme Weather Events

In order to understand vulnerability, I draw upon Kathleen Tierney's conceptualization in (2014) *The Social Roots of Risk*. In Paper III, I specifically explore the physical effects of climate change and the impact of extreme

weather events on policy. I make use of two interrelated terms in risk management: hazards and vulnerability. Hazards, according to Tierney (2014, 12) are "[…] the agent or means through which harms and losses might be realized"; vulnerability is the risk "[…] to things of value that are exposed to hazards." Hence, vulnerability depends on many different elements, such as geography, social capital, physical infrastructure, and the conditions of the ecosystem. It is especially dependent on geography, since not all places are equally affected by climate change. Flooding and droughts, for example, are more likely in certain parts of the world than in others. Furthermore, social vulnerability to climate change is not distributed equally around the world. Nevertheless, physical exposure to extreme weather events matters everywhere, and it is one of the main concepts of interest in this dissertation.

All of the papers in this dissertation take physical vulnerability into account, as in connection with infrastructure and geography, and they emphasize the importance of extreme weather events and their significance for climate policy. Repetto (2008) expects a higher adaptive capacity to climate change to result in less ambitious climate change mitigation, because climate-related disasters become a more prominent issue and greater attention is paid to preparing against short-term damage. In this view, policy-makers will give priority to the impacts of climate change over its causes. According to the opposite expectation, by contrast, countries will become more ambitious in climate change mitigation the more affected they are by climate-related disasters. Otherwise, namely, existential threats – extreme droughts, uncontrollable wildfires, rising sea levels – will intensify. Debaters on both sides are agreed, however, that national efforts to reduce environmental degradation and to enact positive climate policies are dependent on a combination of economic capacity and ecological vulnerability.

Communities around the world are faced with increased risks due to climate change. Climate change leads to higher average temperatures, but it can also cause extreme weather events and unusual climatic conditions, such as droughts, hurricanes, and extreme rainfall. Such concurrent events can take place on very different timescales: some may last just a few hours or days, such as sudden extreme rainfall; others, like Australia's "Angry Summer" in 2013, can last a whole season (Stott 2016). Extreme weather events often draw the attention of both journalists and policy-makers, leading to intense public debate about possible future courses of future. Among many policy-makers and academics, this has generated an expectation that climate-related disasters will open up "windows of opportunity" for meaningful policy change in climate governance (Johnson et al. 2005). For example, Christiana Figueres, the former Executive Secretary of the UNFCCC, claims that extreme weather events have a "silver lining," because they will spur further action (Vaughan and Vidal 2014). A similar expectation was expressed by

Marcia McNutt, President of the National Academy of Sciences, who wrote in *Science* that "climate change is amplifying the negative impacts of these events[, which] can spur more immediate action" (McNutt 2019, 411). Several studies, moreover, argue that extreme weather events increase the willingness of individuals to act (Demski et al. 2017; Rudman, McLean, and Bunzl 2013). But does this spur action at the level of policy-making?

In democratic societies marked by the rule of law, freedom of speech, and free and fair elections, climate-related disasters have a potential to promote policy change. Extreme weather events have been known to sway the views of electorates (Eriksson 2016). When a sufficiently extreme weather event takes place, it prompts the public to pay greater attention to climate change and its impacts on communities. This in turn gets reflected both in media discussions and in the larger political debate. Spence et al. (2011) and Weber (2013) observe that severe rains and flooding elicit increased public concern about global warming, at least in the short-term; Li et al. (2011) note that people report more worries about climate change when average temperatures are high. Drews and van den Bergh (2016) find that extreme weather events can lead to stronger support for climate policies, but that the effect is likely moderated by the ideology that individuals hold (Zanocco et al. 2018). Extreme weather events can put intense pressure on political actors to take action. Political decision-makers find themselves in an extremely difficult position in the aftermath of a climate-related disaster. If they are to retain popular support and secure re-election, they must respond in an earnest manner. Post-disaster periods may accordingly see the creation of fact-finding missions and scientific councils, as well as the re-focusing of the priorities of administrative structures, possibly leading to policy change and a reduction in physical vulnerability. In both Paper II and Paper III, I explore the role of physical vulnerability in climate policy-making.

3.6 Local Climate Politics

"All politics is local" is a phrase commonly attributed to Thomas P. "Tip" O'Neill, Jr., late Speaker of the US House of Representatives. This adage applies as well in the case of climate politics, where local motives and impacts play an important role. Although climate change is a global problem, local urban environments are responsible for a large majority of GHG emissions and for a high share of energy consumption (Moran et al. 2018). Thus, cities play a vital role not only as the cause but also as the answer to climate change. Bulkeley and Betsill (2005) note that local authorities are well-placed to lead the way in GHG emission reduction, because they exercise direct control over major emitters within their jurisdictions. City and regional (or US state) governments are known to be taking leading roles as climate

policy frontrunners even when there is notable inaction on the national level (Karapin 2018). Some of the most ambitious cities in the world are not just ambitious in comparison to other municipalities; they are also "pioneers in comparison to their respective national authorities" (Aall et al. 2007, 85). This became apparent during the presidency of Donald Trump, when a number of cities promised to continue making progress on the basis of the Paris Agreement, even though the US had decided to pull out from the treaty. As I did in connection with international and domestic levels of climate governance, I pose the following question: what determines the variation in climate policies between local governments?

The character of the discussion about the determinants of local climate policies depends largely on the type and focus of the policies under analysis. Cities are the proverbial place "where the rubber (climate action) meets the road (results)," due to the relative of policies and their impact. Climate policies can be broadly divided into two types: individual or sectoral approaches, which tackle a specific aspect of the climate challenge, such as transportation or water management; and comprehensive approaches, which integrate several policy areas into a broader strategy, climate action plan, or policy framework (Lee and Painter 2015; Reckien et al. 2018). Due to the high variability of the policies pursued on the local level of governance, and the proximity of policy outputs and outcomes found there, cities allow the researcher to conduct an in-depth study of climate policy-making. The variability in local climate approaches has in fact become even more intricate, due to policy mainstreaming and the integration of climate issues into policy areas (e.g., land-use planning) which did not previously have a climate aspect (Adelle and Russel 2013). Hence, it is vital to look at climate policies in context, by comparing the relationships between different policy areas and investigating each type of climate issue (e.g., e-mobility, housing, waste management).

It can be fruitful to study comprehensive approaches in context with sectoral policies, on the assumption that "there is no single policy solution or single sector that can be the one best way to deal with climate change" (Lee and Painter 2015, 566). Cities that have adopted comprehensive climate policies, such as climate plans, are still in a minority in the world, but their number is fast growing. This brings up the question of why some cities adopt comprehensive policies to tackle climate change, while others address specific issue areas. Comprehensive climate policies and ordinances, which cross several issue areas and set out concrete GHG emission targets, are generally considered more ambitious than specific projects in a particular policy area (Lee and Painter 2015, 571). My principal aim in Paper IV is twofold: to identify the determinants of comprehensive climate policies, and to review sectoral climate policies in context. By focusing on various sectoral approaches to

climate policy, while also comparing them with a more structured and comprehensive approach, I can investigate the landscape of local climate policy more thoroughly than has usually been done in previous studies (e.g., Bae and Feiock 2013; Krause 2013; Pitt 2010). Van der Heijden (2019), for example, notes that a large proportion of empirical publications on urban climate policy focus on a single city, a particular policy instrument, and a specific policy area.

A number of factors determine comprehensive local climate action. The literature on the development and implementation of local climate policies depicts an evolution similar to that portrayed in the literature on national and international climate policies. Similar actor coalitions and institutional frameworks play out on the local level as on the national. However, local actors are more directly impacted by both the positive and the negative consequences of local climate policy than actors on the national or international level are affected by climate policy at those levels, where the distinction between different strategies is hazier. Betsill (2001) shows that local actors are most interested in climate policies for their local co-benefits, such as economic innovation and a reduction in air pollution. Local voters may also feel they have greater influence over the direction of policy than voters at the level of a larger polity like the nation-state do.

Climate action plans are more common in larger cities, due to economies of scale and access to greater economic resources. Policy action is largely constrained by local interest groups, such as manufacturing and extractive industries. Researchers expect city governments to be strongly influenced by top-down pressures in the form of state policies and frameworks. Political institutions also shape the content of policies. Most American cities have either a mayor-council or a council-manager form of government. The council-manager system, the most popular one since the early 20th century, centralizes supervisory and administrative duties in the hands of the manager, while leaving all of the power in the hands of an elected representative body – the council (Desantis and Renner 2002). Scholars consider the role of both types of government to be important for climate policy, but the nature of their role remains ambiguous (Bae and Feiock 2013). Finally, local awareness of climate change and public support for ambitious policies are some of the key things associated with stringent climate action. The meta-analysis by Yeganeh et al. (2020) finds that public support for tackling climate change is the single most important factor driving the adoption of climate policy on the local level. Researchers set up their theoretical frameworks in a multitude of ways, but all seem eventually to arrive at the "median voter theory," according to which the median public opinion gets its way. Fuhr et al. (2018), in a review of the broad literature on local climate policies, point out that cities

with an environmentally-minded civil society are more likely to develop local climate policies.

In recent years, local governments' climate plans have quickly moved from experimentation to implementation. Fuhr et al. (2018) note that cities' climate mitigation efforts have included an array of different policies, such as advanced solid waste management, energy efficiency measures for housing, and investments in electric transportation systems and infrastructure. As cities' ambition to tackle climate change has grown, so too has the variation in policy measures and issues. This points to a need for further analysis not only of the drivers of ambitious climate action, but also of the instruments employed and the topics addressed by local governments. Hence, while studying the quality or ambition level of climate action plans and frameworks is fruitful (Tang et al. 2010), I also seek in Paper IV to identify and to evaluate the components of local policy initiatives.

While there are many studies on the determinants of urban climate policy (Yeganeh et al. 2020), there is less research on the specific types of local policy. Climate mitigation policy on the local level can address various issues, since climate action can touch upon other local policy objectives. For example, climate change mitigation can overlap with policies on electric public transit and recycling in waste management. Municipal approaches to local climate policy exhibit substantial variation (Bae and Feiock 2013). I draw upon Bedsworth and Hanak (2013), who argue it is useful to divide local climate policies into sectoral and comprehensive types. The first category includes policies (whether aimed at mitigating climate change or not) in specific areas, such as land use, transportation, and waste management. Policies of the second type entail actions which demonstrate a clear intent by local governments to reduce GHG emissions through efforts on a larger scale. Comprehensive policies go beyond sectoral or ad hoc plans, which only address immediate or small-scale issues. They include climate action plans (CAPs), strategies, emission inventories, and policy frameworks. CAPs set out targets for GHG emission reduction, and action plans on how to achieve them (Lee and Koski 2015, 1506). Drummond (2010) notes that states which have adopted climate action plans have significantly decreased their GHG emissions.

I propose to take into account the fact that cities have concentrated on different aspects of climate change mitigation. Paper IV examines the emphasis on different climate policy issues by city governments, thereby exploring this variation in thematic focus. Moreover, I take into account the importance of comprehensive approaches, in the form of climate action plans and frameworks, which I distinguish from sectoral approaches in specific policy areas (e.g., energy, waste, water management). Hence, Paper IV contributes to the

literature by investigating the variation between different climate policy issues, and that between cities which focus on specific policy areas and those that adopt more comprehensive and far-reaching policies.

4 Research Design and Methods

All of the papers in this thesis draw upon varied sources of large-N data. There has been a dramatic increase in data on climate policy output, driven by the need to monitor and to review international, national, and local climate pledges. A large proportion of climate policy research employs case study approaches (Bernauer 2013). While “thick descriptions” of policy will remain vital for climate research, many of the gaps in the literature on both national and local levels of governance can be covered by quantitative methods that manage new and larger datasets.

4.1 The Datasets

In this dissertation, I draw upon a number of data sources to investigate climate policy on both national and sub-national levels. I rely principally on large open access datasets, which have been collected by researchers at universities (e.g., the Yale Program on Climate Change Communications and the University of Louvain), NGOs (e.g., Germanwatch and the CDP), international organizations (e.g., OECD), and governmental bodies (e.g., the US Census Bureau). In addition, however, I draw upon novel survey data collected among the bureaucratic organizations involved in the allocation of international climate finance. I discuss the major data sources used in the individual papers below.

4.1.1 Survey Data on Ministerial Involvement in Climate Finance

In Paper I, Jakob Skovgaard and I investigate ministerial engagement in the area of international climate finance. Any study on the role of bureaucratic actors in policy-making requires information on their level of involvement in the given policy area. Climate finance is a relatively new policy area, which includes both established bureaucratic players and "newcomers" to international affairs. Skovgaard (2012) observes that the most important bureaucratic organizations in this policy area have been bilateral development agencies; however, room has now been made for "new players" too, in the form of environment and finance ministries, which had not previously been very

influential in public development assistance. This has led to some interesting variation in ministry involvement, which has previously not been studied over time.

This research gap calls for a time-series dataset detailing the level of involvement by ministries in selection and allocation processes among the major donors of international climate finance. By selection, I mean the choice of developing countries to receive climate finance; by allocation, I mean the amount of funding allotted to climate-related projects in a given year. The data for Paper I relies on a survey conducted from June to October 2017, which was co-ordinated by Jakob Skovgaard and executed by research assistant Klara Fredriksson. We have compiled a dataset based on the results of new survey responses from a number of donor countries. Most of the ministries replied to the survey by email. In the case of Denmark, however, Skovgaard met with representatives from the Ministry of Foreign Affairs and completed the survey based on their answers.

The survey was sent to ministry divisions involved in the allocation of climate financing. It consisted of two main questions and six sub-questions about changes in the allocation of bilateral climate finance:

1. Which ministry or agency has the lead on the national decisions regarding how bilateral climate finance should be allocated between countries?
    1.1. Within the last ten years, have there been any changes to which ministry or agency that has the lead?
    1.2. If yes, which other ministries or agencies have had the lead previously?
    1.3. When did these changes take place?
2. Which ministries and agencies are involved in the national decisions concerning how bilateral climate finance should be allocated between countries?
    2.1. Within the last ten years, have there been any changes to which ministries and agencies that are involved?
    2.2. If yes, which other ministries or agencies have been involved previously and/or which ones have only become involved during the last ten years?
    2.3. When did these changes take place?

Ministries in eleven OECD Development Assistance Committee (DAC) member countries responded to the survey. These countries account for some 45% of all public bilateral climate finance flows in our dataset. We got no response from seven major DAC donor countries: France, Canada, Ireland, Italy, New Zealand, Portugal, and South Korea. The ministries in two countries declined to take part in the survey. Nevertheless, the eleven countries

from which we received responses are among the largest donors of climate finance within the OECD DAC system. Hence, our findings relate to a set of countries that provide relatively large amounts of climate finance. The survey does not cover small donors, since decisions in their case to provide climate finance are likely governed by other dynamics, such as funding to neighboring countries, and an overall focus on other development aid issues beyond climate financing. Furthermore, two of the donors not covered in the survey are Japan and the European Commission. These donors, however, are different in their bureaucratic setup from the others. The allocation of climate finance in Japan differs greatly from that in other countries, due to the heavy involvement in this area of the Ministry of Economy, Trade and Industry and the Ministry of Agriculture, Forestry and Fisheries. The European Commission, for its part, is a supranational institution, so the bureaucratic politics it displays differ sharply from those in sovereign countries.

In sum, the resulting dataset on ministerial involvement in climate finance decisions comprises survey responses from eleven important donors: Australia, Denmark, Finland, Germany, Iceland, Luxembourg, Norway, Sweden, Switzerland, the United Kingdom, and the United States. A few notable donors did not respond to the survey: Canada, France, Ireland, Japan, and South Korea. We focus on the period from 2007 to 2016, which includes the early distribution of climate finance and the "fast-start finance" pledged at the 2009 Copenhagen Summit. The survey is informed, moreover, by previous interviews conducted by Pickering et al. (2015) with ministry personnel responsible for climate finance policy.

Our survey identifies development, environment, and finance ministries as the main bureaucratic organizations in charge of decisions on climate finance selection and allocation. We have coded ministries as either "not involved," "involved," or "leading" on the issue of climate finance. We find that the development ministry is either involved or leading in all of the countries observed, and that it retains a leading role in more than two thirds of the cases. In the most common configuration (30.85% of the observations), the development ministry is leading on the issue of climate finance, while the environment ministry is involved and the ministry of finance is not involved. Time-series data can be fruitfully used here, since ministerial involvement varies not only between countries but also over time. We discover, for example, that the Australian Department of Climate Change and Energy Efficiency (the environment ministry by our coding) was briefly involved in climate finance decision-making - from 2010 to 2013 - but not involved before 2010 or after 2013. In Denmark, the Ministry of Energy, Utilities and Climate (the environment ministry in our coding) was not involved in climate financing initially, but it got involved in 2009 and 2010, at which point the Ministry of Foreign Affairs emerged as one of the two leading ministries

on climate financing. In another case, the Norwegian Ministry of Environment was involved from the early stages of bilateral climate finance in 2006; while from 2014 on, after its name was change to the Ministry of Climate and Environment, it began to share the leading role with the Ministry of Foreign Affairs. Development and foreign affairs ministries were at least involved in all of the countries, and at times were leading.

4.1.2 OECD DAC Data

OECD countries report on and categorize their development finance through the Creditor Reporting System (CRS). Since 1998, moreover, the OECD Development Assistance Committee (DAC) has been collecting data on development finance, the objective of which is to achieve the objectives of the Rio Conventions: the Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), and the United Nations Framework Convention on Climate Change (UNFCCC) (OECD DAC 2016). The DAC asks its members to indicate for each project whether the project targets one of these environmental objectives.

The international climate policy I consider in this dissertation mainly relates to public international climate finance from developed countries to developing ones, undertaken for the sake of climate change mitigation (OECD DAC 2020). I employ the data on the "Rio marker" on climate change mitigation, which is collected based on the commitments of developed countries to furnish "new and additional" financing of 100 billion USD per year by 2020. These promises have been reiterated at climate conferences ever since, and in 2015 they were extended to 2025, as part of the COP 21 in Paris (Roberts and Weikmans 2017).

In examining international climate policy in Papers I and II, I employ data from the OECD DAC External Development Finance Statistics on Rio markers. Figure 1 presents the total flows of bilateral climate-related development finance (2007-2016) provided by the countries represented in the ministerial involvement survey. There is significant variation in terms of total contributions per country, with Germany and the UK among the top providers (which is the main puzzle for Paper I). The dataset reports climate-related development finance flows through both bilateral and multilateral channels. In the former case, developed countries provide climate finance directly to the governments of developing countries. In the latter case, the allocation of climate finance is arranged through international organizations like the UN or regional institutions.

The DAC CRS (2016) categorizes development finance flows in accordance with three "scores." First, if climate change mitigation is the principal goal of the financing activity in question, then the latter is given a score of 2 (which stands for "targeted"). Second, if the objective of the financing explicitly includes climate change mitigation, but said mitigation "is not the fundamental driver or motivation for undertaking and designing the activity," then the financing is given a score of 1 (for "significant") (OECD DAC 2016, 2). Finally, if the financing does not contribute to climate change mitigation, it is given a score of 0 (for "not targeted"). When collecting and publishing the data, the DAC Secretariat relies on self-reporting by the donor countries themselves.

The OECD DAC data on climate finance is a useful resource regarding government-led funding efforts for climate change mitigation, but it is not without its faults. Weikmans and Roberts (2019) note that the self-reported nature of the dataset, together with the pressure on wealthy nations to claim they have delivered on promises to meet the US$100 billion goal of climate finance, have led to inconsistencies and the over-coding of some climate "activities." For example, Michaelowa and Michaelowa (2011) find that some countries, especially those with more left-leaning and green parliaments, are under greater political pressure to make progress, and thus more likely to over-report climate financing in order to seem more successful at achieving their green agenda. However, while doubtless not perfect, the OECD DAC Rio marker data is the most comparable and comprehensive available (Betzold and Weiler 2018). I use it when analyzing international climate policy in Papers II and III.

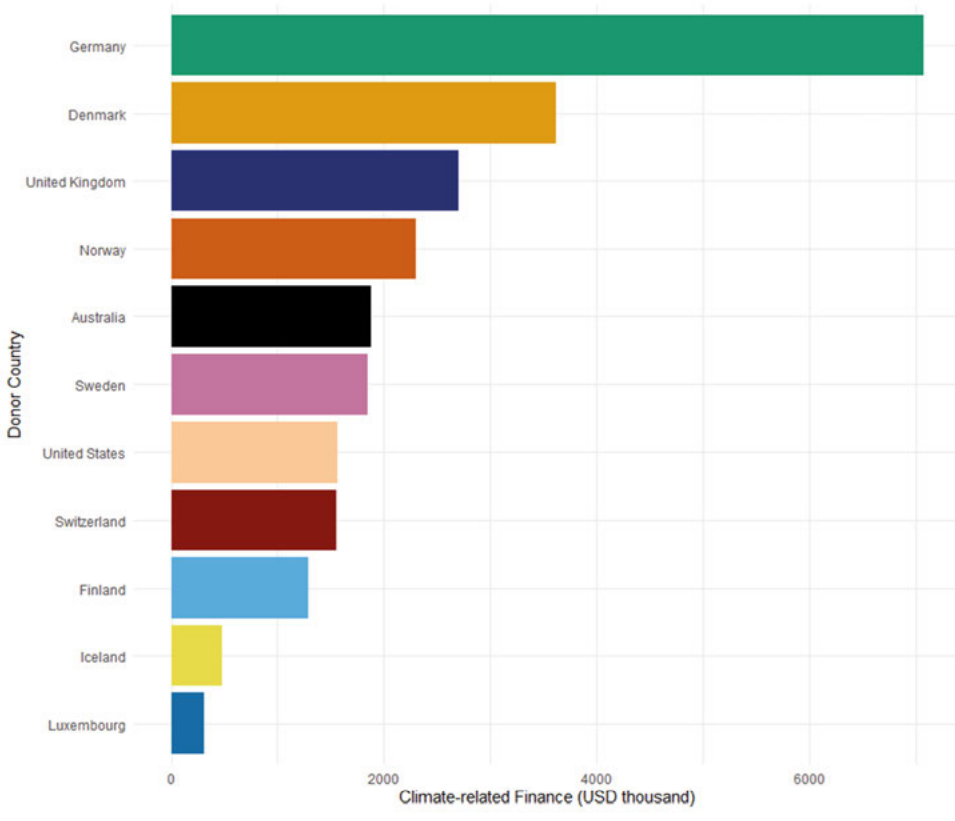

Figure 1. Bilateral Climate Finance Flows (2007-2016)

4.1.3 The Climate Change Performance Index

Certain indicators from the Climate Change Performance Index (CCPI) make up an essential workhorse of this dissertation. Paper II and Paper III both employ indicators from the CCPI to achieve their research objectives. While Paper III is interested in the impact of extreme weather events and democracy on domestic climate action, Paper II studies the relationship between domestic and international climate policy. Measuring climate action and policy is difficult, especially since I seek to assess policy outputs (the policy) and not the outcomes of policies (such as GHG emission reductions). For example, many scientific studies use GHG emission levels as a proxy for climate action, even though it is affected by a number of exogenous factors, such as the historical baseline for GHG emissions and the regional or national potential for particular types of renewable energy. Another issue is the comparability of climate policies over time. It is not just that average GHG levels and renewable energy output are dependent on structural issues, such as economic cycles and technological innovation; it is also that sectoral

GHG emission data tends to lag by two years (Burck et al. 2017, 19). Data inconsistencies make it hard to compare the climate efforts of different countries.

I decide to draw on the Germany-based NGO Germanwatch, which publishes country-level datasets annually for its Climate Change Performance Index (CCPI). This is key dataset that provides the dependent variables for policy ambition in both domestic and international climate policy dimensions. Since 2005, Germanwatch has been tracking the efforts of countries throughout the world to combat climate change, and it has continued to do so for every year up to 2021. The CCPI includes four main categories: GHG emissions, renewable energy, energy use, and climate policy. I draw upon the last-mentioned category, which has two sub-components: the domestic and the international climate policies of countries.

In Paper II and Paper III, I use a CCPI sub-indicator, National Climate Policy, as a measure for domestic climate policy. This measure makes up 20% of the aggregated result of the CCPI index, based on a comprehensive annual study in 58 countries. It is based on assessments by climate and energy policy experts from think tanks, universities, and non-governmental organizations. Burck et al. (2017) note that 300 country experts from 56 countries contributed to the 2018 CCPI. The task of the experts is to respond to a questionnaire and to rate different policies on a scale from one ("weak") to five ("strong"). They are also given the option of commenting further on the most important policies carried out by their country. The questionnaire covers many different policy topics relevant to climate change, from the promotion of renewable energy through efforts to increase energy efficiency to projects in the transport and residential sectors (Burck et al. 2017, 19). The experts from each nation evaluate the progress of their country with respect to the Paris Agreement, and they assess the compatibility (or lack thereof) of its climate policies with the 2-degree goal. For the sake of consistency, I mainly use data from the 2008–2017 period, since the components of the index have gone through methodological changes both before and after that timeframe.

The National Climate Policy sub-indicator provides a useful gauge of climate policy ambition in each country, in two ways. First, the measure concerns policy outputs rather than outcomes. Second, as compared with other measures in connection with climate mitigation – such as the relatively slow-moving "change in GHG emissions" – the National Climate Policy sub-indicator is a better representative of yearly changes in climate policy ambition. The main limitation of the data lies in the lack of local experts in some countries, due to the absence of a functioning civil society or the lack of research institutions. The authors of the index solve this problem by rating these countries with an average score (Burck et al. 2017, 19).

4.1.4 Emergency Events Database

Paper III looks at the impact of extreme weather events on climate policy ambition at various levels of democratic governance. How are we to study the role played by climate change-related disasters in the adoption of more ambitious climate policies? What types of climate-related disaster event are more likely to bring about policy change?

One of the best sources of comparative time-series data for answering these questions is the Emergency Events Database (EM-DAT) on disasters. The database was launched in 1988, by the Centre for Research on the Epidemiology of Disasters (CRED) at the University of Louvain. CRED has been a World Health Organization Collaborating Centre since 1980, and it supports the WHO Global Programme for Emergency Preparedness and Response. EM-DAT includes all disasters since 1900 that fulfill at least one of the following criteria: 10 or more people dead; 100 or more people affected; a state of emergency declared; or a call for international assistance made (CRED 2021). Furthermore, EM-DAT includes information on all types of disasters, as well as on their location, time, and damage to property in USD. Finally, it specifies the number of persons injured, missing, dead, or otherwise affected, as well as the number requiring shelter afterwards.

I use EM-DAT to ascertain the number of climate change-related extreme weather events, on the basis of three pre-defined categories: storms, floods, and wildfires. These are also the types of natural disaster most strongly associated with anthropogenic climate change, in the judgement of climate-attribution scientists (NASEM 2016). Leyda and Negra (2015) note that climate-related disasters of the aforementioned types are also more likely to be discussed by the media.

EM-DAT provides detailed information on natural disasters in each country, but it has limitations. For instance, the reliability of its data on natural disasters is dependent on the resources available in each reporting country. Sometimes EM-DAT lacks the best estimates on the number of fatalities or the amount of financial damage resulting from each disaster. Nevertheless, it is the most comprehensive source available of time-series data on disasters at the national and regional levels. That makes it especially relevant for Paper III, in which I investigate the importance of extreme weather events for national climate policies.

4.1.5 CDP City Mitigation Action Data

Paper IV delves into the local level of climate governance, which requires access to data on local climate policies. The CDP (formerly known as the

Carbon Disclosure Project), a nonprofit organization working with both public and private stakeholders, collects such data and makes it accessible for researchers. The CDP compiles its database on mitigation action in collaboration with city networks, such as the C40 Cities Climate Leadership Group and the Global Covenant of Mayors for Climate and Energy, ICLEI (formerly known as the International Council for Local Environmental Initiatives). Cities report their climate mitigation progress to the CDP through an online reporting system, in which they respond to annual questionnaires. These questionnaires include questions on a wide range of topics, not just mitigation. The CDP also collects local and regional data on GHG emissions, climate hazards, water governance, climate adaptation, renewable energy (targets and current energy mix), and the economic opportunities that climate change offers. The database includes information on more than 800 cities around the world, as well as numerous states and regions.

It is becoming increasingly common to use the CDP's local-level data, since it contains a vast amount of information on local climate action (Groth et al. 2016; Huang-Lachmann and Guenter 2020). The dataset provides particulars about "mitigation actions" (policies and other mitigation activities) by urban local governments. While it includes general terms of categorization for each action, it mainly comprises lengthy descriptions of climate mitigation policies written by city officials. The typology of actions it provides, therefore, is neither fully standardized nor consistent across all cities. This shortcoming requires the researcher to categorize the data. The CDP collected its first questionnaire data in 2012, and it has continued this work up to the present. I have decided to utilize CDP data from the US in particular, since it provides information on more than 200 cities during the period 2012–2019.

Now then, we can reasonably expect cities which are more ambitious on climate matters to be more inclined than their less ambitious counterparts to report their progress to the CDP. The voluntary nature of reports to the CDP may thus introduce bias into the data. Hence, the main limitation of the CDP's data lies in its possible tendency to over-represent cities which, being "front-runners," are happy to circulate information about their success in climate policy. The CDP's data on mitigation action is therefore less useful for identifying variations in overall climate ambition. It is best suited for studying cities which are already "front-runners" in climate affairs. The dataset is also helpful for investigating variations in the type of climate policies – whether sectoral or comprehensive – on which "front-runners" tend to focus.

4.2 The Quantitative Research Design

I have chosen two primary methods of analysis for the empirical research in this dissertation. First, I use fixed effects regression analysis for time-series data in the majority of the papers, as I discuss below. Second, I employ quantitative text analysis, which allows me to classify each mitigation action in the CDP dataset. This is necessary because, in Paper IV, I examine text data reported by city officials which is not categorized for instant use.

4.2.1 Quantitative Models

4.2.1.1 Fixed Effects Regression Analysis

All of the papers in this dissertation employ linear regression analysis to study climate change mitigation, although the models used in the different papers vary greatly. The primary data is in the form of a time-series, which is one of the most common types of data employed in comparative politics and international relations (Beck 2001). The general idea behind using linear regression analysis with time-series data is to model the impact of institutional factors, structural variables, and actors' interests on the distribution of the dependent variable over time. Papers I, II, and III base their analysis on time-series data with yearly data points on the country level. In this case, Y_{it} represents an observation for unit i at point in time t where $i = 1, \ldots N$ and $t = 1, \ldots T$. Linear regression analysis rests on the assumption that the dependent variable is continuous, and that the distribution of the dependent variable (Y) at each value of the independent variable (x) is approximately normally distributed. A classical linear regression model, where the dependent variable is a linear function of the regressions, looks as follows:

$$Y_{it} = \beta X_{it} + \gamma Z_i + u_{it} + \varepsilon_i$$

where X_{it} represents the observable variables, Z_i describes the time-constant variables, while u_{it} is the unobservable time-varying idiosyncratic error, and ε_i is the unobservable time-constant random error of the data (Wooldridge 2010). β, γ, and u represent the coefficients. In order to get an unbiased estimate of β, the researcher must make the strong exogeneity assumption that the individual time-varying variables are uncorrelated with the time-constant error term. For instance, reductions in GHG emissions are likely correlated with time-constant effects, such as the historical legacy of the country and the availability of natural resources. Fixed effects solve this problem by removing the idiosyncratic means from both sides of the equation (Allison 2009). This allows the researcher to relax the strict exogeneity assumption, which is essential for robust estimation in linear regression models. This is the main advantage of fixed effects estimation: it reduces potential sources of bias in the estimations as compared with classical ordinary least squares models, where a correlation between any unobserved variable and the out-

come or the treatment variable of interest results in a biased estimate of the treatment effect (Collischon and Eberl 2020). The fixed effects model restricts potential bias to time-varying variables that correlate with both the dependent variable and the independent variables over time. The 2008 financial crisis, for example, would affect both climate policies and economic trends differently over time. I find this assumption more feasible for my data than the stricter assumption of exogeneity inherent in OLS models.

All of the papers in this dissertation employ fixed effects modeling (which researchers often consider the "gold standard" in political science) as part either of their primary analysis and or of their robustness testing (Bell and Jones 2015, 1). The models featured in this dissertation include both linear and logistic regression. Fixed effects regression is especially fruitful for studying variations in climate policy, since it means I can hold time-constant variables constant on structural factors, like demographics and culture. This in turn allows me to concentrate on the impact of interests and institutions on climate change mitigation.

4.2.1.2 Interaction Effects

Jaccard and Turrisi (2003) describe several types of causal relationship, such as direct causal effect (X → Y), bidirectional relationships (X ↔ Y), and moderated causal relationships (Figure 2). In the last-mentioned case, the nature of the relationship between *X* and *Y* depends on the value of *Z*. In statistics, this type of relationship is commonly referred to as an interaction effect. I will use the example of Paper III, which examines the impact of democracy on climate policy after extreme weather events, as a way to explain the logic of interaction effects. In Paper III, I analyze the relationship between extreme weather events (*X*) on climate mitigation policy (*Y*), which is "moderated" by the level of democracy (*Z*) in each country per year. The impact of extreme weather events namely differs, depending on the level of democracy in a given country. Hence, I expect countries that are more democratic to adopt more ambitious climate policies after extreme weather events than do non-democracies, such as autocracies, hybrid regimes, or totalitarian states. By employing interactions, I am able to compare the effect of an independent variable (extreme weather events) on a dependent variable (climate policy) at high and low levels of the moderating variable (democracy). I employ interaction effects in papers I, II, and III.

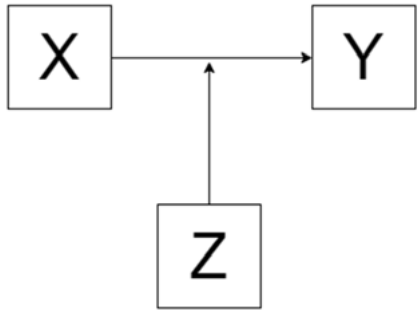

Figure 2. Moderated Causal Relationship

Interaction effects also differ from simple effect tests, where the researcher tests two groups in the sample. In Paper III, I can test the simple effect (also known as the conditioned effect) of extreme weather events on climate policy between democratic and non-democratic groups of countries. The correlation between extreme weather events and climate policies proves to be significant for democracies but not for non-democracies. Jaccard and Turrisi (2003) point out that this does not constitute a valid test of the correlation between extreme weather-related disasters and climate policy, since it does not test the difference between the two correlations. This calls for the use of interaction effects to test the difference between the two correlations.

An interaction effect in a multiple regression is usually presented as follows:

$$Y = \alpha + \beta_1 X + \beta_2 Z + \beta_3 XZ + \varepsilon$$

where Y is the dependent variable, α is the intercept, β_1 is the regression coefficient for the independent variable X, β_2 is the regression coefficient for the moderating variable Z, β_3 is the coefficient for the interaction term ($X \times Z$), and ε is the residual term. In papers I, II, and III, I follow the recommendations of Brambor et al. (2006), who highlight three essential requirements for the use of interaction effects. First, I include all constitutive terms (X and Z) in the model, along with the interaction term ($X \times Z$). Otherwise, the interaction term becomes the "simple effect." Second, I do not interpret the coefficients of the constitutive terms (β_1 and β_2) as unconditional marginal effects, because the model is based on a conditional hypothesis. Third, I calculate substantively meaningful marginal effects and confidence intervals, which I exhibit in marginal effect plots that show how the conditional marginal effect of X on Y changes across levels of the moderator Z. Hainmueller et al. (2019) highlight the problem of a lack of common support for interaction effects. When computing conditional marginal effects, that is, we need

variation in the treatment of *X* and a sufficient number of observations at low values of *Z*. I deal with this issue by generating GAM plots which show that the distribution of the variables is relatively symmetric. In Paper III, I also include a histogram in the marginal-effect plot, to show the distribution of the moderator and the presence of common support. I employ different types of plots, and in each case I follow through with an evaluation to check whether common support is present.

4.2.2 Quantitative Text Analysis

How are we to classify and to analyze large quantities of unstructured text effectively in a reasonable amount of time? This is the main methodological challenge of Paper IV, which relies on a large corpus of text-based responses by city governments from the CDP database.[1] A good solution to this, I find, is to turn to automated text analysis, which exploits modern computing power to the researcher's advantage. This method allows me to map and to analyze large corpora of text in a reasonable amount of time without the need for a team of research assistants. Wilkerson and Casas (2017) note that automated text analysis has become a mainstream method of investigation in political science, and that it has opened up a world of opportunity due to a drastic increase in large corpora of uncategorized text. The use of these methods for analyzing political texts offers great opportunities.

In particular, I employ topic modeling, which is a specific type of automated text analysis that allows me to classify climate action descriptions based on word correlations. Political scientists have found topic modeling particularly useful for studying fields – among them policy agenda change, issue evolution, and comparative politics – in which substantial political texts are found. For example, Farrell (2016) uses this method to analyze the climate change skepticism exhibited by the "climate contrarian movement." Scholars also use topic modeling to study political manifestos put out by political parties (Zirn and Stuckenschmidt 2014).

I apply a "semi-supervised" method – seeded Latent Dirichlet Allocation (sLDA) – developed by Jagarlamudi et al. (2012). Seeded LDA is an augmented technique of unsupervised Latent Dirichlet Allocation (LDA), which was originally developed by Blei et al. (2003). "Latent" in this case refers to topics which are unknown to the researcher but assumed to be present in the text. "Dirichlet" is a continuous multivariate probability distribution; it has often been explained as a "distribution of distributions" through the "dice manufacturing" example. The dirichlet distribution can be described as like a

[1] I describe the data in greater detail in the sub-section entitled "CDP City Mitigation Action Data."

machine that produces dice of different types either with an equal weight on all sides or with a bias on some sides. Each die itself, however, is a distribution, since we get multiple values when we roll it. This is why a dirichlet distribution has been called a "distribution of distributions," which is commonly used as a prior distribution in Bayesian statistics.

Unlike a fully supervised model, sLDA does not require the researcher to code a large training set manually. A dictionary of seed words suffices. The technique allows me to include theoretically meaningful terms in order to delineate topics more effectively. Moreover, unlike an unsupervised method, sLDA improves the interpretability of results by providing topics consistent with the theoretical framework. For example, Boussalis, Coan, and Holman (2019) have used this method to analyze cities' public communications on climate change. Using this method, they were able to sift through 2886 mayoral press releases from 82 major cities.

LDA and sLDA are statistical learning models that use word choices to glean the topics discussed by documents, and to identify the topic of individual documents in a corpus. They belong to a group of text analysis methods that utilize a "bag" of words approach, which fastens on the co-occurrence of words within a document and which disregards the specific order of the words. LDA and by extension seeded LDA rely on two principal assumptions. First, each topic is characterized by the collection of words with which it is most strongly associated (Blei et al. 2003, 996). Second, documents are like containers, which belong to a random distribution of latent topics. Grimmer et al. (2013) describe a topic k as a probability mass function over words, while topics are substantively discrete concepts. In the case of climate action descriptions, topics may range from discussions of renewable energy generation, with a high probability of words such as *solar*, *renewable*, and *clean*, to descriptions of waste management, which can include words like *recycling*, *waste*, *compost*, and *food*.

The algorithm can ascertain the co-occurrence of words among disparate documents. Topic models like LDA are referred to as mixed membership models, since they assume that each document belongs to a mix of topics: for each document, i represents the proportion of the document dedicated to topic k as π_{ik}, and it collects the proportions across topics as $\pi_i = (\pi_{i1}, \pi_{i2,\ldots,} \pi_{iK})$. sLDA infers the underlying topics by way of a "collapsed" Gibbs sampling algorithm (Griffiths and Steyvers 2004), which successively samples conditional distributions of variables. sLDA modifies the original Gibbs algorithm by forcing a particular word to a particular topic.

The main difference between the original unsupervised LDA and sLDA is the fact that the latter allows the researcher to seed topics with theoretically relevant words. Text classification can be broadly divided into supervised

and unsupervised techniques. While the former method depends on already labeled training data, the latter does not need labeled observations, since it infers the natural structure present within a set of data points. sLDA is defined as a semi-supervised approach, since it is more similar to lexicon-based text analysis. This technique combines automated text analysis with the theory-based decisions of the researcher, by including a statistical model for learning additional keywords associated with the seeded topic (Boussalis, Coan, and Holman 2019, 4). Hence, the method plays both to the strengths of the researcher, who employs prior literature to choose theory-driven keywords, and to the advantages of state-of-the-art automation, which increases the capacity to analyze large corpora of texts.

Document	public	work	depart	pay	initi
1	0	0	0	0	0
2	1	1	1	1	1
3	0	0	0	0	0
4	0	0	0	0	0
5	1	1	1	1	1
6	0	0	0	0	0
7	0	0	0	0	0
8	3	3	4	3	0
9	0	0	0	0	0

Figure 2. An Example of a DFM

In practice, sLDA works as follows. Prior to running the algorithm, one imports the data and builds a corpus. Biber (1993) defines a corpus as a large collection of strings of written or spoken text. Next, one applies pre-processing procedures, in order to reduce potential noise in the textual data. The management and analysis of textual data is made significantly easier by the R package *quanteda*, created by Benoit et al. (2018).[2] Pre-processing includes steps such as stemming to the root of a word (*government* is converted to *govern*), and removing punctuation, web URLs, symbols, and stopwords (e.g., the, a, an, at). It can also be helpful to convert all the characters to lower case, in order to standardize the corpus. Researchers may furthermore be advised to trim the most uncommon words from the corpus (such as those that occur only 0.5% of the time), in order to reduce noise in the topics. The text is then split into single tokens (terms), the frequency of each

[2] For more details on the R package, see https://quanteda.io.

token is counted, and the document-feature matrix (DFM) is calculated. The DFM is a table or dataframe that shows the frequency of the different tokens across all documents. I have provided a small example of the construction of a DFM in Figure 3, where each row corresponds to a specific document, and each column (feature) represents an individual word stem. Each cell reports the frequency of the word stem in that particular document.

I employ the R package *seededlda* by Watanabe ([2019] 2021) to implement sLDA, which imports a previously created dictionary of keywords to define the desired topics. The researcher picks an appropriate number of topics (*k*-value) based on diagnostic measures, such as the coherence score, which assigns a higher score for the *k* with words that are more related to each other, which is defined as the relative distance between words within a topic (Stevens et al. 2012). Finally, I calculate the sLDA model with the command *textmodel_seededlda()* (*lda()* in the case of the unsupervised LDA model). Topic modeling allows me to explore per-topic-per-word probabilities β and per-document-per-topic probabilities γ. The results of the algorithm lend themselves to visualization through the R package *ggplot2*. The text analysis in this dissertation was conducted with the statistical program R, but the steps it involves can be repeated with other statistical languages, such as *GuidedLDA* in Python (Singh [2017] 2021).

5 Summary of Papers

5.1 Paper I: Bureaucratic Politics and the Allocation of Climate Finance

In Paper I, Jakob Skovgaard and I study the role of bureaucratic institutions in the decision-making processes connected with international climate financing. The paper draws on a dataset of highly democratic developed countries, which promised at the Copenhagen Agreement in 2008 to allocate USD 100 billion of "new and additional" climate finance per year to developing countries. We find that most of the literature on climate finance has focused on structural factors, such as economic and demographic elements. These determinants are important, but they are difficult to change from a policy-making perspective. Hence, there is a need to account for determinants that policy-makers can affect, such as governance arrangements within bureaucratic organizations. This paper plugs this research gap by investigating the importance of ministries in the selection and allocation processes of international climate finance. We establish that it is development, finance, and environment ministries which are most commonly involved in these processes. According to the literature on bureaucratic politics, bureaucratic organizations seek to modify policy output in such a way as to make it conform to their own policy objectives and worldviews. We use a two-stage quantitative model of donor-recipient relations to study whether and how ministry involvement in climate finance determines (a) the selection of recipient countries for climate finance, and (b) the amount of climate finance allocated to developing countries. We discover that, first, development ministries are more likely – in accordance with their anti-poverty agendas – to select lower-income countries as recipients of climate finance. However, they are associated with the allocation of greater funding to wealthier developing countries. Second, we find that, when environment ministries are involved in the decision-making process, donor countries provide more aid to allies at UNFCCC negotiations. Environment ministries are generally less engaged in international negotiations, but this is not true in the case of climate talks, where they generally head the delegation. We contend that environment ministries are more likely to favor allied recipient countries, in order to promote shared objectives within the UNFCCC.

5.2 Paper II: Domestic and International Climate Policies: Complementarity or Disparity?

The second paper in this thesis asks whether the relationship between domestic and international climate policy is complementary or disparate. If it is complementary, then countries that are highly ambitious domestically will also behave ambitiously abroad. If it is disparate, on the other hand, then countries will prioritize one policy dimension over the other. The possible disparity between domestic and international climate policy has been discussed in the literature previously, but it has rarely been investigated in an empirical study that features data on countries' climate policies. Most studies have implicitly treated the relationship as either complementary or disparate, but without further analysis. The results in Paper II show that the relationship has generally been a complementary one: countries that are more ambitious domestically are also more likely to provide climate finance to developing countries. I also test hypotheses regarding the following: the historical responsibility of certain countries to tackle climate change; vulnerability to climate impacts; industrial opposition to climate policy; and the economic capability to take substantial action. I find that countries which are more responsible for historical GHG emissions are more likely to tackle climate change domestically in an ambitious manner, while also increasing their climate finance flows to developing countries. Where vulnerability is concerned, I observe that countries which are domestically ambitious are more likely to reduce their international climate finance commitment given high physical vulnerability. I argue, that is, that countries under particular threat from climate change tend to focus more on domestic efforts and to turn inward in their climate policies. Where industrial actors are concerned, the paper's findings are at variance with those featured in studies of the "regulatory politics" type – according to which restrictive domestic policies lead countries to push for stronger policies internationally as well, in hopes of "leveling the playing field" for domestic firms. Finally, I do not find that wealthier countries are more likely to press for higher international climate ambitions when they are ambitious at home. This casts some doubt on the universality of the post-materialist hypothesis, according to which people become more interested in curbing environmental degradation as their societies grow wealthier. At least in the case of climate change, my results do not indicate that domestically ambitious countries tend to increase their ambition abroad due to greater wealth.

5.3 Paper III: Silver Lining to Extreme Weather Events? Democracy and Climate Change Mitigation

In Paper III, I investigate the relationship between extreme weather events and climate policy in democratic and non-democratic countries. I use fixed-effects linear regression to analyze 58 countries across the world between 2008 and 2017. The study is divided into two stages. First, I explore the incidence of climate-related extreme weather events – storms, floods, wildfires, etc. – and their association with more demanding national climate policies. Contrary to a common expectation among journalists and policymakers, I do not find that extreme weather events are enough on their own to impel countries to aim higher in their climate mitigation policies. Second, I assess the relevance of political institutions by examining the reaction of democratic and of non-democratic countries to extreme weather events. The typical hypothesis here is that democracies, being both more inclusive and more responsive to societal dangers, will be more likely to adopt ambitious climate mitigation policies after extreme weather events. I find that this is in fact generally the case: democratic countries are more likely to increase climate action after extreme weather events than non-democratic countries are. This constitutes evidence of the importance of democratic institutions in tackling climate change, especially in the aftermath of national crises. This result, it bears noting, calls into question the assumption that physical vulnerability to climate change is enough in itself to impel strong climate action. The findings in my second paper thus imply a need for robust democratic institutions, which are better prepared than autocratic governments are to "bounce back" and to aim higher after climate-related disasters. This is likely the result of an advantageous combination of government transparency, political representation, and open public discourse.

5.4 Paper IV: Climate Change Mitigation Policies in 151 US Cities: A Quantitative Text Analysis Approach

In Paper IV, I explore the policy agendas of 151 cities in the US, with an eye to identifying and assessing variations in local-level policy on climate. I focus on two broad types of climate policy. The first includes measures of eight distinct sectoral kinds, each focused on a specific policy theme, such as renewable energy, electric vehicles, and public transit. The second type comprises comprehensive and supra-sectoral policies, which entail a broader strategy, framework, or climate action plan for tackling climate change on the local level. I conduct the study in two steps. First, I explore the variation in sectoral and comprehensive policies. The results of this mapping exercise follow those found in the existing literature. The most common policy topic during the 2012–2019 period, in terms of the number of words assigned to that topic over the course of a year, is "electric mobility," which covers the adoption of electric bus fleets and the construction of charging infrastructure. This is not surprising, given the rapid electrification of transportation currently taking place in many US cities. "Land use," including urban greenery projects, is the second most frequently discussed topic in connection with local climate action. Land use is discussed extremely often, because it is a traditional policy area driven by strong local interests, and it is likely to overlap with other policy areas. Land use and green space planning are also the policy areas where cities have most control over their planning. "Land use" is followed in popularity by "water use" and "energy efficiency." Second, I study the determinants of comprehensive climate policies, with the help of multiple linear regressions on cross-sectional data from 2019. According to a common view, rigorous and ambitious policies are driven by a clear partisan divide in voter preferences. I find instead, however, that comprehensive climate policies are more common in cities whose residents are more aware of the anthropogenic causes of climate change.

6 Findings and Contributions

Efforts to curb anthropogenic climate change are taking place around the world, at many different levels of governance. Elinor Ostrom (2010) contends that, due to the slow pace of strictly global solutions to climate change, the most effective strategy for achieving GHG emission reductions is a polycentric one, conducted at multiple levels and on various scales. In line with this, climate action is being taken simultaneously at international, national, and local levels (Jordan et al. 2018). Ascertaining the determinants of climate policy has important implications, both academically and in terms of policy. Through its use of large-n data and innovative methodologies, this dissertation extends our understanding of the motivations behind attempts to curb GHGs on both country and city levels. The results herein contribute to the existing literature on multi-level climate governance, by filling gaps in theory, methodology, and empirical findings. I discuss the contributions of this dissertation in detail below.

This thesis explores many theoretical aspects of climate policy that have been overlooked. In Paper I, Jakob Skovgaard and I contribute to theories on the role of bureaucratic politics in climate politics. We fill a gap in the literature on intra-governmental dynamics, by proposing that the selection of beneficiaries of international climate finance is contingent on the characteristics of the bureaucratic organizations that manage the distribution of funds in the donor country. In particular, ministries have considerable control over the selection of developing country recipients and over the amount of funding allocated to climate projects in developing countries. Skovgaard and I suggest that the selection of developing countries for climate financing depends on the policy objectives and organizational interests of ministries, as do decisions regarding the amount of funds allocated. We contribute to the literature by focusing on the particular interests of each ministry involved in climate financing. Development ministries, for example, tend to follow a "pro-poor" philosophy and to continue to favor poorer countries. Environment ministries, which are often responsible for assembling delegations to international climate negotiations, tend to favor allied countries at the UNFCCC.

While studies on climate change mitigation tentatively admit that the domestic and international levels constitute distinct areas of climate governance, this fundamental difference has been left largely un-theorized. I plug this theoretical gap with Paper II, in which I propose arguments regarding the

complementarity and disparity of the policy levels. I suggest, based on prior theorization, that country strategies at both levels of governance are dependent on responsibility (historical emissions), vulnerability to climate change, industry opposition (lobbying), and capability (income). To construct my hypotheses, I draw principally on the literatures on global public goods, two-level games, and regulatory politics.

Paper III contributes to our understanding of the relationship between democracy and extreme weather events. I theorize that democratic countries are more likely than non-democratic ones to tackle climate change after extreme weather events, due to electoral competition, freedom of expression, and bottom-up pressure from voters. My first aim in Paper IV is to fill a gap in our empirical knowledge about sectoral and comprehensive climate policies. I make an important distinction, however, between different themes or topics within local climate action. My second aim is to ascertain the determinants of comprehensive climate policies.

This dissertation also adds much needed nuance to prior empirical findings in the area of environmental politics. Paper I finds that different organizational arrangements in the bureaucratic area determine which developing countries receive international climate finance, as well as the amount they are allocated. The results also show that environment ministries are more likely to pick allied countries and to penalize non-allied ones at the UNFCCC. Development ministries are more likely to choose poorer developing countries, as can be expected in view of their "pro-poor" mission statements. However, development ministries allocate more funds to wealthier developing countries, which contradicts their anti-poverty principles. The paper delineates the differences between ministries in charge of climate financing, and it demonstrates the importance of bureaucratic politics in the area of international climate policy. Hence, national-level actors need to consider the role, perceptions, and motives of bureaucracies, because policy implementation often depends on them. The main limitation of Paper I lies in its dependence on a small sample of countries. This entails a risk that bureaucratic variation will be confounded by exogenous variation which the statistical models fail to take into account. I attempt, however, to resolve this issue by ensuring that the statistical models incorporate information on each donor country's wealth, institutional capacity, overall aid flows, and physical vulnerability to climate change.

In Paper II, I present empirical evidence contradicting the model of "regulatory politics" developed by DeSombre (2000) and Falkner (2007). According to this model, industrial lobbies in industrialized countries object to stricter domestic environmental policies, but they are likely to support the export of green policies internationally, since international rules and regulations help to "level the playing field" for domestic industries, which must

operate under such constraints. However, the outcome I observe among highly industrialized and domestically ambitious countries is the opposite one: they are more likely than less industrialized countries to reduce their climate financing to developing countries. Hence, highly industrialized countries that adopt more ambitious domestic climate policies do not allocate more climate finance to developing countries. My contention is that, while industries in general may acquiesce in the signing of more restrictive international environmental treaties, this tendency does extend to financial assistance in the form of international climate financing. Nevertheless, it is important to keep in mind that these results are restricted to high-income OECD countries; they do not cover middle- or low-income countries.

Paper III finds that physical vulnerability, in terms of the number of people affected by extreme weather events, does not increase governments' willingness to curb GHG emissions. My findings here are thus at odds with those of Baranzini et al. (2003) and Buys et al. (2009). Instead, my results indicate that sudden shocks like extreme weather events do not suffice on their own to push countries to take stronger climate action. Real change must rather be bolstered by support from strong democratic institutions. I contend that extreme weather events have an influence only in countries with strong democratic institutions, such as free elections, independent media, and the rule of law. This adds nuance to the existing literature on climate-related disasters, according to which extreme weather will eventually lead voters and decision-makers to take further action to reduce GHG emissions. I find that the effective operation of this mechanism depends on the institutional set-up of the country in question. Future studies should investigate further variation among democracies, since not all democracies behave the same way after extreme weather events. My results in Paper III pertain to climate ambition; I do not speculate about the particular consequences of climate policies, such as reductions in GHG emissions or the expansion of renewable energy production. That is, my findings concern policy output, not outcomes.

Paper IV identifies the main topics discussed in this area among cities in the US. I find that actors at both the international and national levels need to acknowledge and to support innovative local-level policy processes, which in most cases are driven by the will of city residents themselves. In terms of determinants, I am able to show that partisanship is not always – notwithstanding the traditional expectation in previous studies (Boussalis, Coan, and Holman 2019; Gerber 2013) – the most important determinant of climate policy. I find that partisanship is less important for the adoption of comprehensive climate plans among frontrunner cities than is public awareness of the anthropogenic origins of climate change. Cities whose residents are more likely to believe that climate change is human-caused are more likely to implement plans, frameworks, and strategies for tackling climate change. Nevertheless, it is important to note that these results are confined to cities

whose local governments are willing to self-report their climate actions, which we may reasonably assume are more ambitious on average those taken by other local governments. Furthermore, while the results of the topic modeling are replicable, they are dependent on the keywords I have chosen based on prior literature.

Almost all of the scientific studies in this dissertation employ large-n samples (>20) of countries or cities. This is not yet commonplace in studies of environmental politics (Bernauer 2013). In contrast to prior case studies, which focus on a particular instrument or area of climate policy in one or a few countries, the quantitative approach of this dissertation allows for a greater scope. In fact, all of the datasets I use here, except in Paper IV, come close to representing population-level data for high- and medium-income countries in the world. The availability of data (or the lack thereof) is one of the principal challenges scholars face in studying climate politics (Biesbroek 2018). I attempt to overcome this hurdle by collecting new data, as well as by incorporating data from less commonly used sources. For example, I draw on new data sources which have never been used for the research questions addressed here. For Paper I, most notably, Jakob Skovgaard and I carried out a novel survey among eleven donor countries on the question of ministerial involvement in international climate finance. In Paper IV, moreover, I use urban climate action data from the CDP, which to the best of my knowledge has rarely been used by political scientists. The CDP's data not only allows me to contribute to the literature by identifying different topic areas within urban climate action; it also makes a closer look at both sectoral and comprehensive climate efforts possible.

Moreover, this dissertation employs new text-as-data methods, which are not common in research on climate policies. Paper IV utilizes computer-assisted text analysis, which has hardly ever been used in studies on climate policy, save in the case of the studies by Lee (2020). Hence, Paper IV demonstrates the practical use of semi-supervised approaches for categorizing large corpora in an effective manner. I show that this new technique can produce novel results when we must classify uncategorized or unreliable policy descriptions in large textual datasets. In particular, quantitative text analysis allows me to analyze the policy objectives of local governments. This would not be feasible on the basis of other approaches.

The aim of all the studies in this dissertation is to provide findings with practical implications for policy practitioners, as well as to serve as an impetus for future academic research. Paper I recommends a number of topics for future research: e.g., the influence of bureaucratic politics on adaptation to climate change; the advantages and drawbacks of multilateral funds versus bilateral ones; and the strengths and weaknesses of different multilateral funds (e.g., UNFCCC funds versus Multilateral Development Banks). It

should also be useful to explore the role of specialized climate funds in donor countries, as well as of ministries in recipient countries. Paper II encourages future research on the contextual factors that define the relationship between domestic and international policies. I have focused in this thesis on domestic political actors. Future studies may profitably look at the role of international actors in this relationship. Paper III calls upon researchers to continue investigating vulnerability as a catalyst for climate action. The importance of different types of climate-related disaster for policy outcomes ought also to be of interest. Another fruitful line of inquiry might be to continue exploring institutional explanations for climate policy change in the context of physical vulnerability. Overall, Paper III provides a promising platform for future studies on the specific aspects of democracy that encourage further climate action after the occurrence of sudden shocks. Finally, Paper IV stakes out a path for further research on local policies aimed at tackling climate change. It bears stressing here that one central issue – the need to disentangle the question of political partisanship from that of public awareness about climate change – calls for future studies of other regions of the world as well (i.e., outside of the US and North America).

Climate change is a complex and multi-level challenge, and it has no easy solution. Still, investigating and identifying the most influential determinants of climate policy opens up opportunities for policy-makers to recognize the actors and institutions that matter the most for ambitious climate action. The voluntary character of the Paris Agreement implies that climate policy has become a more polycentric affair. This means climate action needs to be supported by sturdy and dependable institutions – among them democracy – which safeguard it from the interests of actors invested in the continuation of high GHG emissions. At the same time, any attempt to tackle anthropogenic climate change needs to take into account the role of domestic actors and interests like high-emitting industries and consumers. The Paris Agreement has established a more bottom-up architecture. This makes it even more important to apply a multi-level approach to climate governance, where international, national, and sub-national policies work together for a future of low GHG emissions. In this dissertation, I have tried to help assemble the puzzle of effective climate action by adding a vital piece on how the multi-level challenge of climate change can be addressed. I have sought to shed new light on the determinants of climate policy at multiple levels of governance. The aim of research on the key actors and drivers of policy responses to climate change is to inform the strategies we must apply in order to protect Earth's climate system better. Our planet is in trouble, and it is the only one we have.

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