



MARK A. KAYSER
Hertie School of Governance
JOCHEN REHMERT
Humboldt University of Berlin

Coalition Prospects and Policy Change: An Application to the Environment

In most developed democracies, parties adjust their positions to polls and public opinion. Yet, in a coalition government, the policy that emerges is often the outcome of negotiations between governing parties. We argue that the credibility of exit threats by current coalition members and the importance of outside parties for the formation of potential alternative coalitions both matter for policy adoption. Building on a new data set measuring the expected coalition-inclusion probabilities of parties in parliamentary democracies, we estimate the effect of coalition prospects on an important policy outcome—environmental policy stringency—in nine European countries between 1990 and 2012. Our findings demonstrate that only polling shifts that alter coalition probabilities affect outcomes. Changes in the coalition-inclusion probability of green parties—regardless of whether they are in government—predict changes in the environmental policy stringency of sitting governments. Political polls, in contrast, do not.

Policymaking is a complex process with numerous players, incentives, and institutions that make parsimonious explanations, let alone predictions, difficult. Scholars have sought to understand it using approaches as varied as culture (Lodge, Wegrich, and McElroy 2010), election incentives (Abou-Chadi and Immergut, 2014), punctuated equilibrium (Baumgartner et al. 2009), veto points (Immergut, 1990), and veto players (Tsebelis 2002). We argue here that a novel measure of parties' policymaking incentives developed by Kayser, Orłowski, and Rehmert (2019)—*coalition-inclusion probabilities* (CIP)—offers an especially promising means of explaining and predicting policy change, and we present the first

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rigorous test of this measure on an important policy outcome: environmental policy stringency.

Given that parties are the key policy actors in most developed democracies, their incentives should be central to predicting policy. Parties may have multiple incentives to espouse a policy—it may attract voters or motivate their base, for example—but for parties that are not antisystem or purely protest oriented, inclusion in government is also an important goal. Both matter. Holding office offers benefits in the form of ego rents and perks, but it also offers direct access to the levers of policymaking. Thus, for both office- and policy-seeking purposes, the prospect of joining government is included in most parties' objective function. This matters for policymaking in two ways.

For governing parties negotiating within a coalition over policy, a credible threat of leaving government greatly enhances bargaining leverage and exit threats are more credible when the given coalition member has a high probability of inclusion in an alternative governing coalition. For opposition parties, their likelihood of being needed for the formation of a possible future government can also influence policy as potential partners in the current government shift policy to make themselves ideologically compatible with the potential future partner. Thus, *coalition-inclusion probabilities* not only influence which parties are able to push through their preferred policies within the government, but they also affect the selection of those preferred policies in the first place.

We test the effect of coalition prospects on a policy variable, environmental policy stringency, that is both pragmatic and substantively important. Pragmatically, environmental policy stringency is strongly associated with environmental (green) parties, which saves us the step of associating parties with policy preferences. Substantively, climate change is undeniably one of the largest challenges of our time. A warming of 2°C—the targeted limit on temperature change agreed to in the 2015 Paris Climate Agreement—compared to a milder increase of 1.5°C, is predicted to expose 1.5 billion additional people to deadly heat extremes and hundreds of millions to climate-influenced diseases such as malaria (Intergovernmental Panel on Climate Change 2018). Entire ecosystems and the species that depend on them are threatened,¹ and the date by which we will reach a warming of 2°C is likely to occur much sooner than the IPCC predicts (Xu, Ramanathan, and Victor 2018).

Drawing on a detailed and cross-nationally comparable data set on environmental policy stringency compiled by the OECD (Botta and Kozluk 2014), we demonstrate in a sample of

nine European parliamentary democracies between 1990 and 2012 that shifts in the coalition-inclusion probabilities of environmental (green) parties strongly predict environmental policy change. Equally interestingly, polling and environmental public opinion do not. Polls and public opinion may motivate parties to shift their policy positions, but they most often do not shift their bargaining leverage, leaving the coalition government's policy unchanged. This result suggests an important addendum to theories of government responsiveness (e.g., Stimson, MacKuen, and Erikson 1995; Wlezien 1995) when applied in the context of coalition governments. Polls and public opinion matter most for environmental policy shifts when they increase the coalition negotiating leverage of green parties.

Previous Literature

This article speaks to and builds on two separate literatures: environmental policymaking, in particular, and coalition bargaining over policy, in general. Research on why individual governments choose stricter or more lenient environmental policies has been developing quickly both on the international and domestic levels of analysis. Scholars studying international organizations and cooperation have done highly visible work in political science on such topics as mapping out the global regime complex seeking to govern climate change (Keohane and Victor 2011) and linking variation in international climate cooperation to public support for climate agreements (e.g., Bechtel and Scheve 2013). But even in the context of international influences, domestic-level actors play a critical role in national environmental policymaking (Knill, Debus, and Heichel 2010; Roger, Hale, and Andonova, 2017). It is on this level that we focus.

Previous systematic work on the domestic political determinants of environmental policy that extends beyond specific case studies or narrow regulations focuses primarily on the influence of lobbying, institutions, election incentives, and public opinion. The interest group and lobbying literature has sometimes employed environmental policy as an application to demonstrate more general interest group dynamics. Building on a Grossman and Helpman (1994) framework, for example, Aidt (1998) makes the important theoretical point that interest groups will lobby for or against environmental policies because of the distributional implications of both their financial and environmental costs, with the result

that some externalities are internalized. Empirically, scholars have found evidence both in the United States (Cooper, Kim, and Urpelainen 2018) and internationally (Fredriksson, Neumayer, Damania, and Gates 2005) that environmental lobby groups influence policy outputs.

Institutions, of course, also structure equilibria (Ostrom, 1990) and have played a prominent role in the literature. Scruggs (2003) did some early and visible work in this area associating better environmental outcomes with “neo-corporatist” institutions and the field has expanded rapidly in recent years, especially, but not exclusively, in environmental policy journals, as best summarized by Dasgupta and De Cian (2018).

Where this article differs is in its explicit focus on (1) the policymaking process by its main actors, parties, and (2) their policymaking leverage in parliamentary governments. Other research has focused on parties (e.g., Knill, Debus, and Heichel 2010; List and Sturm 2006; Neumayer 2003) and on shifts in public opinion that can influence the position of parties (e.g., Kim and Urpelainen 2018) but has neglected the policy bargaining that determines which party’s preference is adopted in a coalition government. Previous research on the role of parties and public opinion rests on a key assumption—that shifts in parties’ policy preferences map directly onto shifts in policy—and neglects the fact that policies are often the outcome of bargaining and forward-looking positioning by strategic parties with varying degrees of leverage (e.g., Laver and Schofield 1998; Laver and Shepsle 1996; Lupia and Strøm 1995).

Recently, Kayser, Orłowski, and Rehmert (2019) offered a solution to this problem. Combining a large data set of party polling data with a coalition-formation model, they predicted the expected probability of inclusion in government, were a government to be formed at that time, for each party in most developed parliamentary democracies over multiple decades.² Because these coalition-inclusion probabilities can also be calculated as a party’s probability of inclusion in government *excluding* any other party, they can also pick up strategic calculations vis-à-vis specific other parties.³ For example, a junior coalition member that has a high probability of inclusion in an alternative government that would exclude the current PM party would possess a credible exit threat and consequently enjoy considerable leverage over policy in the current government.

Why CIPs Predict Policy (and Polls Do Not)

Central to our theoretical argument is the bargaining (policy) leverage of parties, which changes not only with each election but also varies between them. Theories of agenda-setting power in coalitions differ in the degree to which policy influence—whether the ability to include cabinet members' preferred policies in joint legislative proposals of the cabinet or the frequency with which cabinet members can propose individual policies—vary between elections. Influenced by Gamson's Law (Browne and Franklin 1973; Gamson 1961) and intended to evaluate congruence between government policy outputs and the preferences of citizens (Huber and Powell 1994), the simplest model assumes not only that cabinet seat allocations follow the parties' seat shares in parliament but, implicitly, that agenda-setting power does as well (Powell 2000). Thus, in this conception, policy influence does not change between elections. The election result and consequent cabinet composition should align with policy outcomes regardless of the time since the elections. Such a static view of coalition members' agenda-setting power, however, conflicts with the idea of responsible and responsive government prominently found in the study of legislative responsiveness in the United States (Erikson, Wright, and McIver 1993; Stimson, MacKuen, and Erikson 1995; Wlezien 1995) but not exclusively so (Calvo 2007). While certainly not a theory of agenda-setting power in coalitions—they assume a unitary executive—they present evidence that variation in public opinion over time influences the policy of government.

We build on a second model found in a formal theoretical literature that conceives of governments as dynamic entities whose constituent parties bargain for influences over the life of a government (Lupia and Strøm 1995). Cabinet members repeatedly bargain for cabinet seats in response to critical events—most often shifts in public opinion polls—which are treated as “common knowledge information about what would happen if parliament were dissolved and an election were held immediately” (Diermeier and Stevenson 2000). Thus, changes in public support for specific parties alter parties' bargaining weights in negotiations because they influence the credibility of parties' threats to form an alternative government via replacement or parliamentary dissolution (Becher and Christiansen 2015).

If cabinet members do indeed bargain for seats between elections in response to shifts in their polling, it poses a puzzle because

cabinet reshuffles that alter the proportion of seats between parties are rare. We resolve this contradiction between theory and empirics by noting that (1) agenda-setting power can deviate from cabinet seat shares (Becher and Christiansen 2015) and (2) shifts in parties' polls, especially for smaller parties, map poorly onto their probability of being included in an alternative government—and, hence, the credibility of their exit threat that drives bargaining power (Kayser, Orłowski, and Rehmert 2019). Parties may repeatedly bargain in response to changing events, but we argue that they bargain over policy priorities rather than seats.

In essence, we assume that politicians monitor political polling, and even if polls are not perfectly predictive of elections, politicians, in absence of other information, treat them as if they were. Politicians are aware of past coalition patterns, the ideological compatibility of parties, the likely seat shares of parties given current polling, and other factors that make particular coalitions more or less likely. When parties' standing in the polls shifts, politicians can reasonably infer the implications for potential coalitions. Thus, polling changes translate into bargaining party leverage as various parties in and out of government become more or less viable as future coalition partners. The more a party is needed as a coalition partner, the more influence it will have on policy. If it is in a governing coalition, it can more credibly threaten to exit if its policy preferences are not met when it could join an alternative governing coalition. If it is out of government, parties that would need to form a coalition with it may need to court it by shifting policy in its direction.

More precisely, what may matter most is the specific probability of inclusion in a governing coalition that excludes a particular other party. Junior coalition members wishing to influence the lead party in a coalition, usually that of the prime minister, will have most leverage when they can credibly threaten to exit the coalition to join another one that excludes the party of the prime minister. Similarly, as we will examine below, a prime minister might gauge her need for a particular smaller party such as the Greens by calculating her probability of forming a new government without it. In general, parties that need other parties the least in order to form a government have the most negotiating power.

So, why do not parties simply respond to polling swings? We argue that there is nothing to stop them from doing so. However, policy changes in coalition governments, in contrast to party positions, often require negotiations, the outcome of which depends

on parties' leverage. Expecting policy in coalition governments to shift directly in response to changes in party polls or, for that matter, public opinion, is tantamount to neglecting the role of coalition negotiations in policymaking. Some theories, however, predict change in governmental *policy*, not just party positions, in response to shifts in polls (e.g., Abou-Chadi and Immergut 2014; Kayser and Lindstädt 2015) or public opinion (e.g., Soroka and Wlezien 2010). In circumstances such as single-party government, a dominant coalition party, or all-party consensus, shifts in polls and public opinion should indeed be predictive of policy. In most coalition governments in which parties' preferences differ, it is policy leverage, as proxied by CIPs, that determines which policy emerges.

This distinction between *coalition-inclusion probabilities* and vote shares (or polls or public opinion) matters because increases in vote shares and even in seat shares do not map monotonically onto policy leverage. When a party shifts in seat shares, for example, from the third largest to the second largest, it may be viewed as the most likely challenger to the largest party for a seat plurality (and the prime ministership) and be preferred less as a coalition partner by the largest party. In practice, the correlation between poll percentage (similar to expected seat share in PR systems) and coalition-inclusion probability actually varies by the type of party. For the largest party in each system, which most often is the formateur and, if successful, holds the prime ministership, polling percentage and CIP correlate reasonably well; for smaller parties, the correlation is weak or absent. In essence, we argue that polls should not predict policy well, so long as parties other than the largest matter.

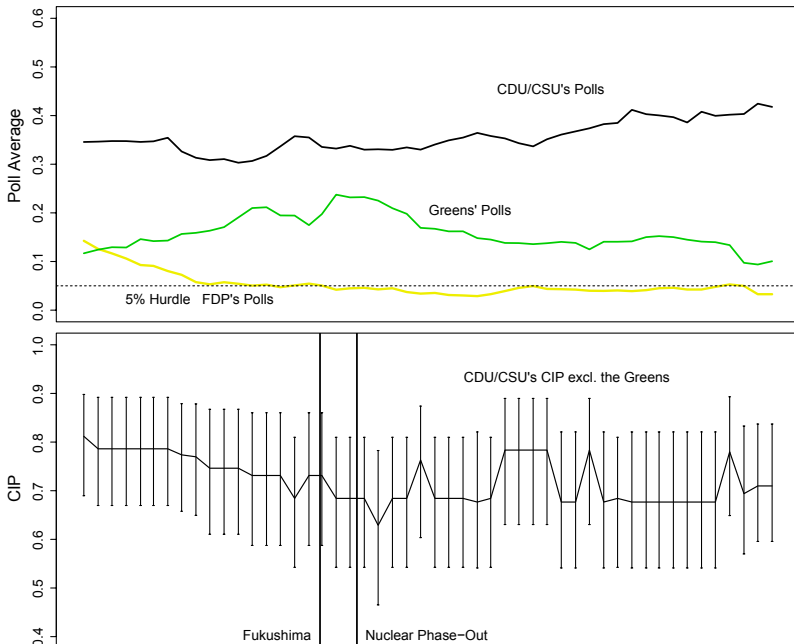
An Illustration: The German Nuclear Phase-Out

Following the 2011 Fukushima nuclear disaster in Japan, only one country in the world decided to phase out nuclear power generation. Surprisingly it was not Japan, but Germany. We argue that the reason for this and, indeed, for policy shifts in many domains, stems from the coalition politics of forward-looking strategic parties. In doing so, we deviate from previous explanations that tended to focus more exclusively on public opinion, interest groups, and political movements (e.g., Bernardi et al. 2018; Jahn and Korolczuk 2012; Schreurs 2012).

The September 2009 German federal election resulted in a narrow minimum-winning governing coalition of Chancellor Angela Merkel's Christian Democrats (CDU/CSU) and the liberal Free Democratic Party (FDP). Following their entry into government, however, the Free Democrats' popularity began to erode under a series of policy missteps and personnel changes. By the end of 2010, the FDP was perilously close to the 5% national-vote-share threshold for entry into the Germany parliament, having dropped nearly 10 percentage points in the polls since the election. The Green Party, in contrast, enjoyed a nearly inverse fortune over this period, steadily gaining in the polls while the CDU/CSU's polling remained mostly steady.

Figure 1 plots the fortunes of the CDU/CSU over time as expressed by its polling average (top panel) and coalition-inclusion

FIGURE 1
Polling and CIPs Over the Merkel II Government, 2009 to 2013,
for the CDU/CSU and Two Potential Future Junior Coalition
Partners



Note: The two vertical lines in the lower panel mark the dates of the Fukushima nuclear disaster and Merkel's announcement of the German nuclear phase-out.

probability (bottom panel). One sees that the CDU/CSU's polling average does not reflect the changing coalition context as the FDP's popularity wanes and that of a potential future coalition partner, the Greens, waxes. The coalition-inclusion probabilities, however, do capture the changing strategic context, showing an approximately 10-point drop in the CDU/CSU's probability of being included in a new government if it were to form without the Greens (bottom panel). The Greens were clearly becoming an important potential coalition partner for the CDU/CSU, but policy differences, especially on environmental policy and the Green's demand for an immediate end to nuclear power generation, posed a barrier.

By March 2011, when the Fukushima nuclear disaster struck Japan—shown by the first vertical bar in the lower panel of Figure 1—the CDU/CSU was likely already contemplating ways in which it could make itself more compatible as a future coalition partner for the Greens. Under pressure from the energy industry, it had agreed in the fall of 2010 to an extension of reactor service lifespans. On June 6, 2011, approximately three months after Fukushima, Angela Merkel seized the opportunity and announced (the second vertical line in Figure 1) that Germany would immediately shut down eight reactors and complete the stepwise decommissioning of all remaining reactors by 2022—accelerating the phase-out by roughly 10 years. From the perspective of coalition politics, Merkel's reversal of her previous position on nuclear power and her decision to shut down atomic reactors appears quite calculated.

By changing policy, she both improved the odds of the CDU/CSU being able to form another governing coalition (with the Greens) in the future and increased her party's current bargaining leverage over the its junior coalition partner. The FDP, which opposed the accelerated nuclear phase-out, could not credibly threaten to exit the government without the risk of facing new elections when it was perilously weak in the polls; nor could it credibly threaten to refuse forming future governments with the CDU/CSU given its ideological distance from the Social Democrats (SPD), the other large party at the time. While at the beginning of the term, the FDP had managed to push through a number of its policy priorities (such as the lowering of the hotel tax), for the remainder of the term, the CDU/CSU dominated policy.

Empirical Overview

We, of course, are interested in a more general phenomenon than the political decision for the German nuclear phase-out. Does the pattern witnessed in Germany generalize to environmental policymaking in other settings? Does the importance of green parties as potential coalition partners influence environmental policy in a larger sample of countries and time periods? Will coalition-inclusion probabilities enable the estimation of parties' policy influence in general?

The scope of application is at least partly governed by our ability to assign policy preferences and their intensity to parties. This is a nontrivial task. A party with high bargaining leverage will only negotiate to shift policy if its policy preference is strong and deviates from that of the other coalition members. Policy preferences and intensities can be estimated with manifesto data (Merz, Regel, and Lewandowski 2016; Volkens et al. 2015) or other data (Bakker et al. 2015) that estimate party policy positions, but most approaches are subject to trade-offs and methodological debate (Dinas and Gemenis 2010). Estimating policy influence across multiple policies is even more complex.

We circumvent the challenge of estimating party policy positions and preference intensities by focusing on the influence of a single-party family (green/environmental parties) on a single issue (environmental policy) on which we can plausibly assume it has the most extreme position in the legislature with maximum intensity. This simple and direct design, applied to a single, albeit important, issue thus allows us to adjudicate between the static proportional model of policy influence (e.g., Golder and Lloyd 2014; Huber and Powell 1994; Powell 2000) and the party bargaining model (Lupia and Strøm 1995). Moreover, the CIPs permit the first dynamic empirical test of the party bargaining model, as called for by Diermeier and Stevenson (2000), albeit with respect to agenda setting rather than seat reallocations.

No less importantly, our research design explicitly tests both the effect of polls, as foreseen in the party bargaining model, as well as coalition-inclusion probabilities—effectively testing the extent of parties' strategic thinking. Will simple changes in poll standings be sufficient for some parties to lodge policy agenda demands and other parties to accede to them or will parties respond only to those changes that influence coalition-inclusion probabilities? The latter implies informed and strategic parties that anticipate other

parties' responses to shifts in polling, given seat shares, ideological positions, coalition history, and other variables that predict coalition formation (Kayser, Orłowski, and Rehmert 2019).

To support generalizability across countries, we assembled a time-series cross-national data set of developed parliamentary democracies with a proportional electoral system, limited primarily by the availability of data on environmental policy stringency and the presence of a green party in parliament. Nine developed parliamentary democracies met these requirements.⁴ The data are measured at an annual frequency between the years of 1990 and the end of the environmental time-series, 2012.

Given that the strategic calculation of parties is captured in the CIP measure, our expectations are straightforward. Parties with greater CIP should be more able to push through their preferred policies, whether sincere or strategic. Because the use of green parties and environmental policy obviates the need for interactions with parties' policy positions and preference intensities, a simple linear model that predicts variation in the environmental policy stringency of a given government as a function of the CIP of environmental parties is possible. Moreover, because a shift in environmental policy stringency depends on both the green party's potential supply of coalition support (CIP) and the largest governing party's demand for coalition support (CIP net of the green party), we will also interact green CIP and the prime minister party's net CIP.

Coalition-Inclusion Probabilities

To measure the dynamic bargaining leverage of parties, one needs to model their evolving coalition options and their dependence on other parties to enter government. A novel measure of parties' bargaining leverage developed by Kayser, Orłowski, and Rehmert (2019) and employed here does precisely this by estimating parties' *coalition-inclusion probabilities* (CIPs)—their time-varying probability of entering government if an election were to be held at that moment and polls were predictive of election results. To estimate these CIPs, they first estimated, using coalition and election data from 20 developed parliamentary democracies, a random-coefficient conditional logit model of coalition formation optimized for out-of-sample prediction.^{5,6} Random-coefficient conditional logit allows for a different coefficient in each unit (i.e., sample country), a feature that improves prediction.

In a second step, in order to estimate CIPs between elections, they treated political polls, aggregated to monthly averages, as the expected seat share that a party would expect were an election to take place at that moment—a reasonable assumption for countries with proportional electoral systems to which this procedure was restricted. They plugged these expected seat shares into an equation with the coefficients obtained from the random-coefficient model and obtained predicted probabilities for all potential coalitions that could theoretically form from all parties expected to gain representation in parliament. By taking the sum of all predicted probabilities of those potential coalitions in which a given party is included, one can obtain that specific party's coalition-inclusion probability. Because they took monthly means of each party's polls, the CIPs are also on a monthly frequency. For the purposes of our upcoming regression models that employ environmental policy stringency at an annual frequency as the dependent variable, we aggregate their CIPs up to an annual frequency by taking yearly averages.⁷

While this measure captures individual parties' overall probability of entering government, it does not give us a specific party's bargaining leverage vis-à-vis another party. Because Kayser, Orłowski, and Rehmert (2019) estimated the probability of every single possible coalition that could form in each country on a monthly frequency, we can create a second measure in which we sum up the predicted probabilities of all potential coalitions in which party A is included but a second party—party B—is not. This type of CIP allows us to estimate party A's specific leverage vis-à-vis party B—specifically, the probability that party A can form or be included in a government that excludes party B. We will refer to this version of CIP as “net CIP” and the first version, capturing the overall probability of entering government, as “gross CIP.”

As parties of the ecological/green party family are central in advancing environmentally friendly policies, we employ green parties' gross CIP. We omit their net CIP excluding the PM party, however, because we are interested in their inclusion in government, most likely with the PM party.⁸ That is, we wish to measure green parties' likelihood of entering government given contemporaneous polls, including the PM party. With larger coalition-inclusion probabilities, we argue, comes greater policy influence irrespective of actual government participation, as green parties are able to play multiple potential partners against each other, and

other parties may find it beneficial to position themselves as credible future partners for green parties.

The policy influence of a green party, however, is not independent of the standing of other parties. Because of this, we also include the probability of the current PM party entering a government that excludes all green parties in the polity. That is, we measure how independent PM parties are from green parties in forming alternative governments. When PM parties have a hard time forming governments excluding green parties, they are expected to court green parties by championing green policies. If they can easily form a government without a green party, they do not.

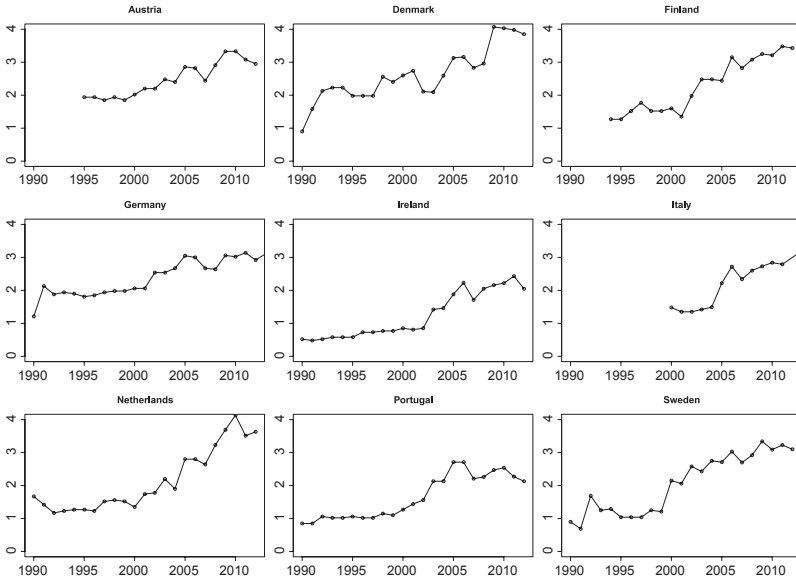
Environmental Policy Stringency

To gauge the impact of green parties' bargaining leverage on environmental policies, we rely on the *Environmental Policy Stringency* (EPS) measure by the OECD for nine West European countries with proportional electoral systems and parliamentary presence of at least one green party for most of the 1990s and the 2000s.⁹ Our data, thus, consist of country-years for these nine countries from 1990 to 2012. To match the yearly EPS data, we aggregate the monthly CIP data to obtain yearly means.

The EPS variable is a composite measure based on multiple environmental policies, with a focus on air and climate policies. The indicator focuses on environmentally related taxes, support for renewables and energy efficiency (including feed-in-tariffs and R&D expenditures), and performance standards. Higher values indicate greater stringency, in the sense that greater prices are allocated to environmental damages (Botta and Kozluk 2014). It is, to our knowledge, the only cross-national environmental policy data for which time-series are available.¹⁰ Figure 2 shows the development of environmental policy stringency over time for the nine parliamentary democracies in our sample. In all countries we observe a clear trend over time towards more stringent environmental policies, though with some pushbacks in some countries. We will account for this in our fixed effects models below by adding a time trend.

Moverover, all countries see a surge around or shortly after the millenium, which might partly be a consequence of the signing (end of the 1990s) and ratification (May 2002 for all countries in our sample) of the Kyoto Protocol. Below we elaborate on our estimation strategy given the clear time trend in the data.

FIGURE 2
Environmental Policy Stringency in Nine Parliamentary Democracies, 1990–2012



Control Variables

Next to our CIP measure, we include in our models a number of control variables that capture economic constraints and environmental pressure affecting the enactment of green policies, such as GDP growth (calculated as yearly averages of quarterly growth rates) and greenhouse gas emissions. Greenhouse gas emissions (energy use, agricultural and economic activity) are measured per capita and exclude emissions or removals from land use and forestry. Both variables are provided by the OECD. For our political control variables, we draw on the ParlGov (Döring and Manow 2016) and the Manifesto Project (Volkens et al. 2015) data sources. We control for the cabinet structure (i.e. minority cabinets) and whether green parties are part of the government, and the cabinet's as well as green parties' environmental outlook, measured by item p501 *Environmental Protection: Positive* of the Manifesto Project.¹¹ We control for these to rule out that intrinsic motivations of PM parties to enact greener policies is what might drive our results. Finally, we control for those years for which the Kyoto

Protocol has been signed by any given state, as we expect that the negotiating and signing of the Kyoto Protocol will lead to higher environmental awareness of political actors.

Table 1 gives an overview of the variables and their distributions. Interestingly, the Danish green party—the Socialist Peoples Party (Socialistisk Folkeparti, SF)—scores a 0 on environmental protection in its manifesto for the 2001 election. In the election before and the one after, the party scores an above-average 22 and 20, respectively. Due to data limitations on political polls and, hence, our CIP measure, we have 175 country-year observations for analysis.

Analysis

In a first step, we show the value-added of our CIP measure compared to raw polling data. Table 2 presents three models for each of the two variables. We choose three different model specifications to account for the intricacies of time-series cross-sectional data in different ways. The first models include country fixed effects to estimate within-country effects (FE). The second

TABLE 1
Descriptive Statistics

	<i>N</i>	Mean	St. Dev.	Min	Max
Environmental Policy Stringency	175	2.117	0.827	0.580	4.130
Minority Cabinet	175	0.349	0.478	0	1
Kyoto Protocol	175	0.714	0.453	0	1
Quarterly GDP Growth (yearly mean)	175	0.560	0.752	-2.298	3.610
Cabinet's Mean Environmental Protection	175	5.808	3.204	0.000	15.900
Total Greenhouse Gas Emissions/ Capita	175	11.858	3.136	5.970	18.050
Green Party in Government	175	0.160	0.368	0	1
Green Party's Environmental Protection	175	17.354	13.098	0.000	53.488
Green Party's Gross CIP (yearly mean)	175	0.166	0.086	0.025	0.357
PM Party's Net CIP Excl. Green Part(ies) (yearly mean)	175	0.615	0.233	0.029	0.925
Green Party's Poll (yearly mean)	175	8.263	3.403	1.900	19.995

Data sources: OECD, Manifesto Project, ParlGov.

TABLE 2
Regressions of EPS on CIP and Polls

	Environmental Policy Stringency				Polls			
	CIP (gross)							
	(FE)	(LDV)	(FD)	(FE)	(LDV)	(FD)	(FE)	(FD)
EPS _{t-1}		0.792*** (0.043)			0.787*** (0.048)			
Minority Cabinet	-0.122 (0.106)	0.056 (0.053)	0.200*** (0.062)	-0.062 (0.139)	0.061 (0.054)	0.209*** (0.070)		
Kyoto Protocol	0.741*** (0.087)	0.039 (0.061)	0.127* (0.077)	0.790*** (0.088)	0.040 (0.061)	0.119 (0.076)		
GDP Growth	-0.068 (0.047)	-0.104*** (0.031)	-0.002 (0.016)	-0.093* (0.053)	-0.115*** (0.033)	-0.010 (0.014)		
Cabinet's Mean Environmental Protection	0.010 (0.013)	-0.005 (0.009)	-0.016 (0.011)	0.011 (0.014)	-0.003 (0.009)	-0.015 (0.012)		
Total Greenhouse Gas Emissions/Capita	-0.244*** (0.033)	0.010 (0.009)	-0.031 (0.034)	-0.257*** (0.035)	0.012 (0.008)	-0.029 (0.034)		
Green Party in Government	-0.352*** (0.131)	-0.148** (0.068)	-0.209*** (0.075)	-0.163 (0.127)	-0.065 (0.060)	-0.142 (0.087)		
Green Party's Environmental Protection	0.002 (0.003)	0.002 (0.002)	0.008*** (0.002)	0.002 (0.004)	0.001 (0.002)	0.008*** (0.002)		
Green Party's Gross CIP	2.745*** (0.729)	0.746** (0.369)	1.356* (0.709)					
Green Party's Polls				0.267 (1.722)	0.936 (0.818)	-0.060 (0.742)		
Intercept	4.132*** (0.389)	-34.955** (14.396)		4.438*** (0.459)	-37.105** (14.597)			
Observations	175	166	166	175	166	166		166
Number of Countries	9	9	9	9	9	9		9
Fixed Effects	Yes	No	No	Yes	No	No		No
Lagged Dependent Variable	No	Yes	No	No	Yes	No		No
Trend	No	Yes	No	No	Yes	No		No
R ²	0.695	0.885	0.072	0.669	0.883	0.059		0.059

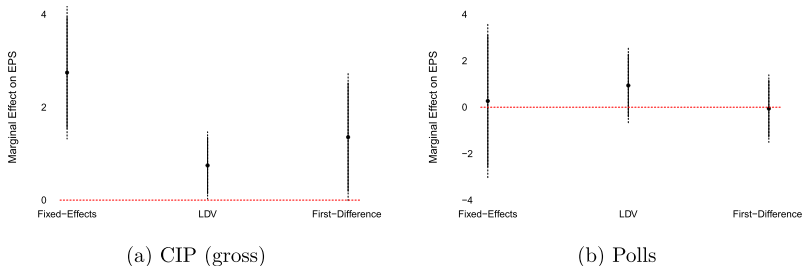
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Standard errors in parentheses.

model employs a lagged dependent variable alongside a time trend variable (LDV) to account for persistence in time-series data. The third model estimates the first difference, effectively looking at changes over time within countries and eliminating time trends and serial correlation (but also a lot of variation). All model specifications are presented with standard errors clustered by country. The political polls variable has been rescaled to the unit interval to make coefficients more comparable.¹²

As immediately visible, the CIP variable—but not the polling variable—exhibits a strong and significant effect on environmental policy stringency. As green parties' probabilities of entering a government increase, the more stringent green policies become. The fixed effect and lagged dependent variable models, however, yield notable differences in the estimated size of the effect of green party CIP. As the bias from these two types of models usually runs in opposite directions, it is reasonable to consider them upper and lower bounds for the unbiased effect (Wooldridge 2002). Figure 3 plots the point estimates and confidence bounds of a one-unit increase from the three types of models for both the CIP and Poll variables (the short-term effect in the case of the LDV models). The CIP coefficients display a strong positive effect while the effects of the polling predictors, in contrast, are not systematically different from zero. Coalition-inclusion probabilities predict green policies, but raw polling data are unable to do so.

Table A8 in the online supporting information presents a number of additional models that rule out alternative explanations (e.g., is public opinion a confounder for the relationship between CIP and policy?¹³), explore the sensitivity of the CIP effects to model specifications, vary the type of standard errors employed,

FIGURE 3
Coefficient Plots for Green Party's CIP



and demonstrate that the influence of green parties' CIP increases as elections draw nearer. Moreover, the table also presents additional evidence using an interaction that government participation is in fact not relevant for the green CIP effects and that external shocks, such as the Fukushima disaster, did not alter the influence of green party CIP. In all models, the effect of green party gross CIP on environmental policy stringency remains significant. Table A9 in the online supporting information similarly demonstrates the robustness of the prime minister parties' net CIP.

We argue that compared to polls and—given their high correlation with polls and vote share in proportional electoral systems—seat shares, the CIP measure is superior in at least three ways: (1) it is time varying between elections, which sets it apart from static seat shares but not from polling data; (2) it takes into account the coalition calculus of parties, which makes it superior to seat shares and polling data—for instance, many second-largest parties in parliamentary systems have poorer prospects of government participation than do the third-largest parties; and (3) it allows for calculation of specific coalition-inclusion probabilities—such as a party's probability of entering governments that exclude green parties—depending on the research question. This is neither possible with seat shares nor with polling data. In fact, in this case of green parties our (gross) CIP measure correlates with green parties' polls at -0.035 , that is, not at all.

In the following section, we investigate how the independence of PM parties from green parties affects environmental policy stringency.

Prime Minister Parties in Need of Green Helpers?

Green party CIP has shown a strong positive effect on environmental policy stringency, but what role does the PM party's prospective dependence on a green coalition partner play? To investigate this, we calculate the prime minister party's probability of entering a government that excludes all green parties. Higher values of this PM's net CIP measure indicate greater independence from green parties and, hence, less political need to court green parties by, for instance, engaging in green policies.

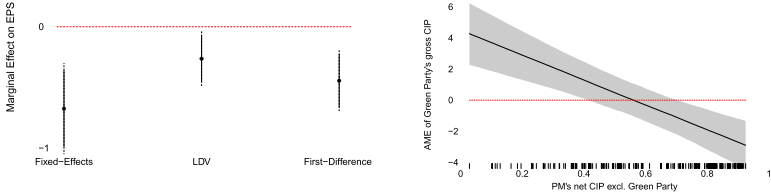
Table 3 shows five model specifications that are, besides replacing the CIP variable and adding two models that include interaction effects, identical to the ones before. Again, we have three different specifications to test the effect of our CIP measure when

TABLE 3
Prime Minister Parties' CIP and EPS

	Environmental Policy Stringency					
	(FE)	(LDV)	(FD)	(FE II)	(FE III)	
EPS _{t-1}		0.789*** (0.043)				
Minority Cabinet	-0.063 (0.115)	0.023 (0.054)	0.238 *** (0.078)	-0.131 (0.095)	-0.032 (0.061)	
Kyoto Protocol	0.791*** (0.084)	0.057 (0.061)	0.148* (0.083)	0.772*** (0.086)	-0.209*** (0.069)	
GDP Growth	-0.083** (0.049)	-0.106*** (0.031)	-0.011 (0.015)	-0.067 (0.048)	-0.006 (0.031)	
Cabinet's Mean Environmental Protection	0.003 (0.013)	-0.007 (0.009)	-0.022 (0.015)	0.011 (0.013)	0.028*** (0.010)	
Total Greenhouse Gas Emissions/Capita	-0.236*** (0.032)	0.016* (0.008)	-0.028 (0.032)	-0.220 (0.034)***	0.042 (0.026)	
Green Party in Government	-0.301** (0.133)	-0.125** (0.062)	-0.199*** (0.077)	-0.413*** (0.141)	-0.110 (0.076)	
Green Party's Environmental Protection	0.003 (0.003)	0.002 (0.002)	0.009*** (0.003)	0.003 (0.003)	0.004** (0.002)	
PM Party's CIP Net of Green parties (PM CIP)	-0.675*** (0.191)	-0.263** (0.117)	-0.445*** (0.133)	0.228 (0.378)	0.785*** (0.245)	
Green Party's Gross CIP (Green CIP)				4.278** (1.700)	4.496*** (1.040)	
PM CIP × Green CIP				-4.422* (2.642)	-8.035*** (1.622)	
Intercept	4.807*** (0.386)	-34.421** (14.571)		3.809*** (0.504)	-253.688*** (15.803)	
Observations	175	166	166	175	175	
Number of Countries	9	9	9	9	9	
Fixed Effects	Yes	No	No	Yes	Yes	
Lagged Dependent Variable	No	Yes	No	No	No	
Trend	No	Yes	No	No	Yes	
R ²	0.691	0.886	0.092	0.703	0.886	

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Standard errors in parentheses.

FIGURE 4
Effects of PM Party's CIP



(a) PM Party's Net CIP

(b) Interaction between PM Party's and Green Party's CIP

accounting for time trends and persistency in the data. As expected, when PM parties become more independent from green parties in terms of forming a government, we tend to see less green policies. Figure 4a shows the marginal effects of PM parties CIP net of green parties for all three models.

Theoretically, we would expect the effect of green party CIP to be conditioned on how dependent the PM party is on the green party in order to form a potential government. Higher green party probabilities of being included in government—they have a maximum of .36 in our sample—only matter when the PM's party is likely to need them to form a potential coalition. Exploring potential conditional effects between PM parties' and green parties' coalition fortunes, we run two separate models with an interaction between the PM party's net CIP excluding green parties and the green party's gross CIP. Both models are estimated as country fixed effects models with standard errors clustered by countries (FE II and FE III in Table 3). In the second model (FE III), we have included a trend variable accounting for the years between 1990 and 2012 to time trends in the data. Based on the estimation from the second interaction model (FE III), Figure 4b plots the marginal effect of a green party's gross CIP on environmental policy stringency conditional on the PM party's likelihood of being able to form a coalition excluding any green party in the polity. When green parties have a high probability of entering government and the PM party cannot exclude the green party from that government, we become significantly more likely to see green policy output. However, if the PM party can form a government

that excludes the green party, the latter's probability of strengthening green policies evaporates.

But how do green parties' probabilities of government inclusion translate into greener policy enacted by a cabinet they are not necessarily part of? Two explanations are possible: (1) cabinet parties attempt to steal policy ideas from ascendant green parties in order to capture their electoral support (Meguid 2008); (2) cabinet parties and, in particular, PM parties, perceive ascendant green parties as possible future coalition partners worth courting. To gain this support, cabinet parties might shift toward greener policies to make themselves more viable coalition partners for the green party. We are partial to the second explanation for two reasons. First, if cabinet parties are afraid of the increasing electoral popularity of green parties, we should see a significant effect of raw polling data on green policy output—but we do not. Second, the interaction effect suggests that PM parties cease caring about green policies if they do not need green parties—irrespective of the green party's standing! Additional models in the online supporting information show that combining a green party's polls and PM net CIP in the same model results in negative effects for both variables, though we would expect a green party's polls to be positive if they drive PM party behavior. This leads us to conclude that the mechanism underlying this empirical pattern works through the prospective coalition concerns of PM parties, a finding barely detectable without our coalition-inclusion probabilities measure. Of course, neither our findings on PM parties nor on green parties' CIP necessarily establish a causal link between CIP and policy output. There are many potential time-varying confounders for which we cannot directly account. Nonetheless, by employing a range of additional checks (e.g., controlling for public opinion) and more rigorous models (i.e., inclusion of time trends), we are confident to have ruled out obvious alternative explanations.

Conclusion

Considerable empirical research into the effects of events on policy in parliamentary democracies with multiparty governments neglects the two-step nature of the process. Parties, as in any system, are free to adopt and amend policy positions in response to events, polls, and public opinion but policy changes that emerge from coalition governments are the outcome of bargaining

among coalition members. Environmental policy is no exception. Employing a new cross-national time-series measure of party leverage developed by Kayser, Orlowski, and Rehmert (2019)—coalition-inclusion probabilities—we demonstrate its utility in predicting environmental policy stringency in nine developed democracies. We find that bargaining leverage from credible coalition exit threats and calculations about future coalition compatibility play an important role in environmental policymaking. While increases in polling numbers for green parties do not predict more environmentally friendly policies, an increase in green coalition-inclusion probability does. Most interestingly, this effect obtains regardless of whether the green party is in government or not. This suggests that even when environmental parties are out of government, governing parties may court them as future coalition partners when their coalition-inclusion probability is high by removing policy obstacles such as incompatible environmental positions. Coalition politics is central to understanding environmental policymaking and measures of party-level incentives are central to understanding coalition politics.

Our results also bear relevance for understanding agenda-setting power in coalition governments. They suggest that policy priorities are dynamic, emerging from repeated bargaining between parties for agenda-setting power in response, not to all shifts in the polls, but primarily to those that change the probability of alternative coalitions forming. We thus validate the core idea of the Lupia and Strøm (1995) model of coalition bargaining—that parties use common knowledge about shifts in public support to repeatedly negotiate during the life of a cabinet—but also extend it by considering and finding that parties bargain over policy priorities, not just seats, and not in response to all polling shifts but to those that change their leverage.

Mark A. Kayser <kayser@hertie-school.org> is Professor of Applied Methods and Comparative Politics at the Hertie School of Governance in Berlin. Jochen Rehmert <jochen.rehmert.1@hu-berlin.de> is a postdoctoral researcher at the Humboldt University of Berlin.

NOTES

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1. For an assessment of the magnitude of the problem, see Intergovernmental Panel on Climate Change (2019).

2. The overlap with the environmental policy stringency data yields the current nine-country sample.

3. Of course, parties' objectives are not limited to entering government. They care about the allocation of portfolios and, specifically, which portfolios they receive. A rich literature examines these questions (e.g., Bäck, Debus, and Dumont 2011; Ecker, Meyer, and Müller 2015) but because of its complexity remains beyond the scope of the CIP measure and the application here. Moreover, as coalition-inclusion probabilities translate most directly into bargaining leverage—one objective of which is favorable portfolio allocation—it is analytically advantageous not to extend CIP further to capture concepts that it should predict.

4. The countries are Austria, Denmark, Finland, Germany, Ireland, Italy, Netherlands, Portugal, and Sweden.

5. These countries are Australia, Austria, Belgium, Canada, Denmark, Finland, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, and the United Kingdom. As they are interested in the formation of any form of government, they also include single-party governments from the Westminster parliaments in this sample.

6. The model, from which the estimated coalition-inclusion probabilities are derived, contains predictors for the largest party in the coalition, whether the government is a minority cabinet, whether it is a minimal-winning coalition, whether it contains the median party, whether it contains an antisystem party following the conceptualization by Abedi (2004), the ideological range in the coalition, the number of parties in the coalition, the status quo government, and the shared cabinet history. For more details, refer to Kayser, Orłowski, and Rehmert (2019).

7. Our sample, after accounting for the overlap of our dependent variable, the CIP measure, and the presence of green parties in parliament will include only nine countries, but we nevertheless use the CIPs estimated by Kayser, Orłowski, and Rehmert for 20 countries, given the advantages of a larger number of units for random-coefficient estimation.

8. No prime minister party in our subsequent samples is a green party.

9. These countries are Austria, Denmark, Finland, Germany, Ireland, Italy, Netherlands, Portugal, and Sweden. The Portuguese green party *Ecology Party—Greens* (Partido Ecologista—Os Verdes, PEV) has for the most part been in an electoral alliance with the *Portuguese Communist Party* (Partido Comunista Português, PCP). We therefore count the whole alliance as one green party. Excluding Portugal from the analyses does not essentially alter the results but decreases statistical efficiency.

10. See <https://stats.oecd.org/Index.aspx?DataSetCode=EPS>.

11. See <http://www.parlgov.org/>; and <https://manifesto-project.wzb.eu/>.

12. See Kayser and Rehmert (2019) for replication data.

13. We measure public opinion by an item in the International Social Survey Programme that asks how worried respondents are about the environment. See <http://w.issp.org/menu-top/home/>.

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web site:

Supporting information is available in an online appendix and replication data has been uploaded to the LSQ DataVerse page.

Table A1: Original Green Party CIP Models Including CIP and Polls Simultaneously. SE Clustered by Country

Table A2: Original Green Party CIP Models Without Clustered Standard Errors

Table A3: Original PM CIP Models Without Clustered Standard Errors

Table A4: Original Green Party CIP Models with Post-Fukushima Controls

Table A5: Original PM CIP Models with Post-Fukushima Controls

Table A6: Original Green Party CIP Models with Environmental Attitude Controls

Table A7: Original PM CIP Models with Environmental Attitude Controls

Table A8: Original and Auxiliary Models with Fixed Effects and Trends Using Green Party CIP Models 1-3 vary the estimation of the standard errors; Model 4 includes Green party polls together with Green CIP; Model 5 tests for Green in-govt effect with

a dummy interaction; Model 6 adds a post-Fukushima dummy; Model 7 includes public opinion on the environment; and Model 8 shows that Green CIP effects increase as elections approach. $*p < 0.1$; $**p < 0.05$; $***p < 0.01$

Table A9: Original and Auxiliary Models with Fixed Effects and Trends Using PM Party CIP. Models 1-3 vary the estimation of the standard errors; Model 4 includes Green party polls together with PM CIP net of Green Parties; Model 5 interacts Green Party CIP and PM CIP net of Green parties; Model 6 adds a post-Fukushima dummy; Model 7 includes public opinion on the environment. $*p < 0.1$; $**p < 0.05$; $***p < 0.01$