Why Comply? The Domestic Constituency Mechanism

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Abstract Why do countries comply with international agreements? While scholars have done rigorous work to address compliance and enforcement in an international game, less analytical attention has been paid to domestic mechanisms of compliance. However, because international agreements have domestic distributional consequences, there exist domestic sources of enforcement. In this article, I develop an analytical framework of domestic accountability, where I identify specific channels of influence through which domestic constituencies can influence national compliance. Using a game theoretic model, I show that a government's compliance decision reflects the electoral leverage and the informational status of domestic constituencies. This framework further provides a theoretical rationale for why and how international institutions may influence states' compliance through domestic mechanisms. The European acid rain regime offers an empirical illustration of the domestic constituency argument.

In the framework of the Long Range Transboundary Air Pollution (LRTAP) Convention, twenty-one European countries agreed in 1985 to reduce their sulphur emissions by at least 30 percent before 1993. In 1993 most countries reported reaching this goal, and some reported much steeper reductions. This presents characteristics of a classic collective action problem. On one hand, sulphur emission reduction entails large short-term costs; on the other hand, because acid rain travels over a long distance and often across borders, potential benefits of emission reduction are widely diffused. The combination of concentrated costs and diffuse benefits may give rise to free-riding incentives. A natural question to ask, therefore, is why do countries comply with their commitments?

Scholars have written much about how international institutions can resolve such collective action problems at the international level. International institutions

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monitor states' compliance with treaties. By providing compliance information, they facilitate reciprocity and thus induce compliance. Analytically, as in the repeated prisoners' dilemma game, a cooperative equilibrium can be supported with tit-for-tat strategies if the players' behavior is transparent. When information on players' behavior is missing, then defection may not be punished with sticks while compliance may not be rewarded with carrots, thus the cooperative equilibrium may break down.[1]

However, the monitoring program under the LRTAP Convention only monitors the aggregate pollution levels. It does not monitor or verify each country's emission reduction. Rather, for compliance measurements, the convention essentially relies on governmental self-reports. Indeed, faced with collective action problems, many international institutions do not directly monitor states compliance with treaties.[2] In those situations where international institutions provide information, often it is not states that use the information to either reward or sanction other states. Thus one is confronted, once again, with the puzzle of compliance.[3]

This article conceptualizes an alternative mechanism of compliance. The point of departure is that problems that resemble a prisoners' dilemma game at the international level may present governments with an entirely different strategic environment domestically. Within a country, some actors gain while others may lose if the government does not comply with an international agreement. When those who are victimized by noncompliance have crucial leverage over the government, compliance can be rational even if the country as a whole pays for it more than benefits from it. One needs to specify such domestic sources of enforcement before one can begin to identify, in theoretically coherent ways, how international institutions may work through these sources to influence national compliance.

I thus model a government's compliance decision in the shadow of competing domestic constituencies. Two key observations inspire this conception. First, governments are to varying extents in agency relationships with their domestic constituents. That is, a government (as an agent) makes policy decisions on behalf of various domestic constituents (as principals). While the agent's decision affects the welfare of the principals, the principals have the power to sanction the agent through various mechanisms. In the context of this article, while a government makes compliance decisions that affect the welfare of domestic constituents, the latter can exercise certain leverage to influence the government's compliance decisions. Constituents possess political leverage over governments because national leaders want to stay in office by making and implementing policies that have the constituent support. Second, a government is usually accountable to a variety of constituencies with competing claims. Trade agreements, for instance, affect import

1. See Keohane 1984; Axelrod 1984; Oye 1986; and Kreps 1990.
2. For an explanation of diverse monitoring arrangements in treaty regimes, see Dai 2002a.
3. For the need to better understand how international institutions influence states' behavior, see Martin and Simmons 1998; as well as Simmons and Martin 2002.

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competing industries and consumers differently within a single country. Similarly, regarding compliance with environmental agreements, industries and environmental groups often take opposing stands. In such cases, interest groups who care about compliance decisions compete to get the government to devote relatively more time and effort to their interests at the expense of the interests of other groups. In order to maximize political support, the government must respond to different claims from competing constituents.

The central task in this model is, therefore, to specify how competing constituencies influence a government's compliance decision. In agency relationships, the problem of moral hazard often presents itself: while the agent takes an action that affects the principals' welfare, the principals may not observe the action directly.[4] Rather than directly observing a government's compliance efforts, constituents experience only their welfare, which depends jointly on the governmental action and a variety of exogenous probabilistic factors. Constituencies have varying ability to infer the governmental action from the welfare they experience. The accuracy of their inference depends on how much information they have about the policy process and how much resources they invest in monitoring the governmental action. The informational status or the monitoring ability of constituents should thus affect their ability to shape the policymaker's incentives in a way quite distinct from the political clout originating from the size of constituencies.

As this model shows, a government's compliance decision is determined not only by the electoral leverage of domestic constituencies but also by their informational endowment. On one hand, compliance decisions tend to bias toward large interest groups that have significant electoral influence. On the other hand, interestingly, compliance decisions can also bias toward special interests if these groups are much better informed about the policy process. This is because, facing an inference problem, the relatively better informed group is more likely to base its approval of the government on the actual policy rather than noise in the policy process. Accordingly, the policymaker would lose more support by fooling the well-informed than by fooling the ill-informed.

The European Acid Rain regime provides an important empirical illustration of the domestic constituency mechanism. Typically viewed as in a classic collective action problem, European countries' compliance with the LRTAP Convention is often taken as evidence for the direct effect of international institutions. A closer look however, reveals that national compliance varies significantly from country to country, which suggests a domestic story in the first place. To illustrate how the domestic constituency mechanism works in this case, I conduct categorical data analysis involving all participating countries as well as in-depth examination of some of these countries. Consistent with the central finding in the model, European countries' compliance with the 1985 Sulphur Protocol reflects the electoral leverage and informational status of domestic constituencies.

4. See Holmström 1979; and Grossman and Hart 1983.

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While the primary purpose of this article is to advance a theory of domestic compliance mechanism and to delineate specific channels of influence by domestic constituencies, this study also has important implications on international institutions. The fact that compliance decisions tend to reflect the electoral leverage and the informational status of domestic constituencies suggests indirect but incentive-compatible ways in which international institutions can influence national compliance. Specifically, international institutions can facilitate national compliance by increasing the electoral leverage and improving the informational status of procompliance constituencies. In doing so, international institutions can facilitate a decentralized compliance system, where the enforcement source is not from some states over others, but rather from some domestic constituencies over their government. In the case of the LRTAP Convention, I find that the Convention has empowered domestic environmental activists by providing them with specific relevant information and by legitimizing their demands.

The article proceeds as follows. The next section develops a model of domestic compliance mechanisms and, in that framework, delineates specific channels of influence over national compliance. The third section provides an empirical illustration of the domestic constituency mechanism. The fourth section highlights major implications for the role of international institutions in the context of domestic enforcement. The last section concludes.

A Model of Domestic Constituency Mechanism

In this section, I develop a model in which a government makes a compliance decision in the shadow of competing domestic constituencies. I build on moral hazard models in political science, where voters' retrospective voting gives the policymaker incentives to attend voters' interests.[5] Specifically, a chief policymaker decides how much to comply with an international agreement on behalf of two competing interest groups. While the policymaker's decision affects the welfare of interest groups, it is up to the interest groups to decide whether to keep the incumbent policymaker in power. In making the compliance decision, therefore, the policymaker must consider how it may affect each interest group's voting decision.

I begin with the basic setup of the model, where I first discuss the environment in which players interact and derive their preferences accordingly and then describe the sequence of the game. I then analyze equilibrium decisions in two scenarios, one where the chief policymaker faces electoral pressure and the other where the chief policymaker does not face any pressure. Finally, I compare the two equilibrium decisions of compliance. With the compliance decision under no electoral pressure as a benchmark, I derive the central result about the effects of domestic

5. In particular, see Ferejohn 1986; Lohmann 1998; and Fearon 1999.

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constituencies on compliance through the electoral process. Appendix 1 contains the complete derivations of all formal results.

The Setup of the Model

There are three players in this model of domestic enforcement: besides the national government or the chief policymaker, there are two distinctive groups of voters or interest groups.[6] The decision of interest is the government's compliance policy in a unidimensional policy space $X = R^1$. After an international agreement is signed, the policymaker chooses a target compliance level $x \in X$ to implement the agreed terms. Compliance is defined as the degree to which the explicit treaty provision is achieved by a participating country. Oftentimes, the question about compliance is not whether to comply, but rather how much to comply. The target compliance level as a policy decision can thus range from no action at all to exceeding the requirement set in the treaty. To capture the empirical variation of compliance decisions, therefore, the compliance policy x in the model takes the form of a continuous variable ranging from noncompliance to overcompliance.

A thoughtful reader would question treating the compliance stage independent of the negotiation stage and thus treating the content of the agreement exogenous, because it does not confront an important alternative hypothesis that compliance is because of shallow agreements.[7] I believe, however, the varying levels of compliance by participating countries cannot be fully explained by the same "shallowness" of the same agreement that binds all participating countries. In fact, it is reasonable to view compliance as an analytically different stage of international cooperation from the agreement-making stage. For various reasons, governments often conduct different strategic calculations when they comply with an international agreement than when they negotiate it. Frequently, a government only decides how much resource to allocate to the implementation of an agreement after it has already been signed by the current government or by its predecessor, sometimes years afterwards. Furthermore, the cost that domestic groups must incur in complying with international agreements tends to become concrete at the compliance stage. This may initiate actions—and reactions, depending on the changing political salience of the issue—from previously involved and/or newly mobilized actors. Indeed, studies have found that participation by interest groups often rises when policymakers shift from negotiating commitments to complying with

6. This of course does not mean that all voters can be categorized into two competing interest groups. What matters in this model are those constituents who have preferences on the given issue rather than those who are indifferent. The former can be categorized roughly into two competing interest groups. Naturally, those who do not care about an issue can be subsequently persuaded by those who do. That possibility is captured by the changing size of two interest groups.

7. Downs, Rocke, and Barsoom 1996. However, Gilligan 2004 argues that broad multilateral agreements are not necessarily shallow.

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them.[8] Although one may always say that any agreements that are lucky enough to get made are likely the shallow sort compared to those that never make it, the interesting question is what happens at the compliance stage that helps explain the varying levels of compliance with the same agreement. The model of the domestic constituency mechanism helps shed light on such issues.

The interest groups differ in their preferences regarding compliance. Each group i has an ideal point x_i, for $i \in \{1,2\}$. Each group i desires the policymaker to take a compliance policy x as close to its ideal point x_i as possible. A simple function representing these preferences is the negative quadratic, $-\alpha_i(x - x_i)^2$, where $\alpha_i \in (0,1)$ reflects the intensity of preferences. To mark the difference between the two groups, let group 1 prefer a low compliance level and group 2 prefer a high compliance level. That is, $x_1 < x_2$.

The interest groups also differ in another aspect: their informational endowment. Domestic constituents do not perfectly observe a government's compliance efforts. They, do however, experience their welfare, which depends partly on the government's compliance efforts and partly on exogenous and probabilistic factors. In deciding whether to vote for the incumbent policymaker, both groups need to infer how much the welfare they experience is attributable to the government's compliance policy versus some exogenous factors. The relative accuracy of their inference depends on how well each group understands the policy process.[9] A natural way to capture the effect of their information endowment is to incorporate a group-specific exogenous shock in each group's utility function. This group-specific exogenous shock, θ_i, is a random variable drawn from a strictly unimodal and symmetric probability density function f_i with mean zero. Thus, the closer θ_i is to 0 or the lower the variance of θ_i is, the better informed the interest group i is and thus the better able it is to infer the compliance decision made by the government.

Accordingly, each interest group experiences a group-specific outcome of the government's compliance policy. Formally, each group's single-period utility function is

$$U_i(x, \theta_i) = -\alpha_i(x - x_i)^2 + \theta_i, i \in \{1, 2\} \quad (1)$$

8. Victor, Raustiala, and Skolnikoff 1998.

9. This is a general assumption to capture the informational asymmetry between the principals and the agent. The acid rain case to be investigated in the empirical section of this article fits this hidden action assumption just as well as economic voting where this assumption is frequently applied. Regarding an economic policy, voters do not necessarily observe the policy taken by the government, but they do experience how much money they have in their pockets. Similarly, regarding an environmental policy, domestic groups do not necessarily observe the policy taken by the government, but they do have a sense of how polluted the surrounding air is. However, assuming that voters and groups experience their own welfare does not mean that they know the precise effect of the policy in question, because their welfare is a function of more than the policy. Just as voters do not know precisely how and how much an economic policy that they do not perfectly observe contributes to their pocket book, whether domestic groups can infer how and how much an environmental policy that they do not perfectly observe contributes to the air quality depends on how much they invest in monitoring the governmental policy and learning about the policy process. That uncertainty and its effect are partially what the analysis below seeks to capture.

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It is a function of the group's preference as well as its informational endowment, in addition to the compliance policy chosen by the policymaker.

The policymaker's preference over the compliance decision is shaped by both his public spirit and his private interest. While the policymaker aims to increase the aggregate welfare, he also desires to increase his chance of getting reelected into office. Thus, the policymaker's utility function consists of two main components:

$$U_{govt}(x) = \sum_{i=1}^{2} U_i(x) + \Pr(\omega)\delta V, \forall i \in \{1, 2\} \quad (2)$$

The first part, $\sum_{i=1}^{2} U_i(x)$, captures aggregate social welfare, where U_i is the utility function of interest group i. The second part, $\Pr(\omega)\delta V$, captures the expected value of getting reelected, where $\Pr(\omega)$, is the probability that the policymaker wins reelection, $\delta \in (0,1)$ is the discount factor and $V > 0$ is the benefit of being reelected.

The assumption that the policymaker cares about aggregate social welfare ensures that any predictions that I make about the policymaker's shifting attention to those with more electoral leverage and better information stem from the electoral process rather than the policymaker's preferences. However, this assumption is not necessary for the central result in this model. An alternative assumption, for instance, is that the policymaker is either a partial rent-seeker or a pure rent-seeker.[10] This can be incorporated into the model by letting the policymaker weigh special interest more heavily, even to the extent of putting all weight on special interest. Because this modification affects the compliance decision with electoral pressure and that without electoral pressure in identical ways, it does not alter the difference between the two compliance decisions. Accordingly, this modification does not affect the central result in this model about the effects of domestic constituencies through electoral accountability.

The other assumption about the policymaker's preference is that, the policymaker values holding office and thus chooses policies to maximize his chance of staying in office. It implies that the policymaker is concerned with how voters evaluate his performance on a given policy. This assumption is crucial: if the policymaker does not value holding office and thus is indifferent to his chance of retaining office, the policymaker does not need to pay any attention to what voters want. Then the source of electoral accountability is eliminated. It is of course possible that the policymaker may maximize his chance of retaining office until he is reasonably sure that he has enough to win. In that case, electoral accountability reaches the cap at the point when the policymaker feels secure. That point, however, is arguably difficult to reach in a competitive election and particularly with a

10. Important recent studies have explored rent-seeking behavior as a function of regime types. See, for instance, Persson, Tabellini, and Trebbi 2001; and Bueno de Mesquita, Smith, Siverson, and Morrow 2003. In the current model, I do not assume different preferences for political leaders in different regimes. My purpose is to isolate the effect of electoral accountability from that of preferences.

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risk-averse policymaker. The qualitative results in this model hold so long as the policymaker cares about gathering public support to some extent.

There are two periods in the model. I use subscript $t \in \{1,2\}$ to denote each of the two periods of the game. In the first period, the sequence of events goes as follows. First, the policymaker chooses a compliance policy, x. Then, observing the policy outcome, each group i subsequently votes the incumbent policymaker either in or out. In the second period, the incumbent policymaker remains in power if he receives the majority of votes.[11] In that case, to simplify the analysis, he can stay in office at most one more term. Because he can no longer get reelected for another term, the incumbent policymaker simply decides on a compliance level and players' payoffs are realized, and the game ends. If the incumbent loses the election, a new game with a new policymaker starts.[12]

The assumption that no policymaker can stay in office for more than two terms is not necessary for the central results in this model. The purpose of this simplifying assumption is to allow the governmental action without electoral pressure to serve as a benchmark for the governmental action with electoral pressure. Because I assume that most governments do care about staying in office, the central question that this model addresses is: When a government is motivated by reelection and thus constituencies have leverage over the government's fate of staying in power, what influences the government's choice of the compliance policy?

Equilibrium Analysis

To trace how domestic constituencies influence the government's compliance policy through the electoral process, I compare the government's compliance decision in the first period under electoral pressure with that in the second period where the government no longer faces any electoral pressure. To do so, I first derive the equilibrium decisions in the two scenarios respectively.

Proposition 1: The following strategies constitute a Subgame Perfect Equilibrium: In the first period, the incumbent chooses a compliance level

$$x^*_{t=1}(k^*_i) = \frac{\sum_{i=1}^{2} \alpha_i(1 + \lambda_i \phi_i \delta V)x_i}{\sum_{i=1}^{2} \alpha_i(1 + \lambda_i \phi_i \delta V)} \tag{3}$$

11. To capture the intuition that voters in each group may possibly vote differently, one can interpret the probability that group i votes for the incumbent policymaker as the percentage of voters within that group that vote for the incumbent policymaker.

12. As a common assumption in this sort of formal models, the competing candidate does not play any active role. The importance of the competing candidate lies in his or her availability, without which the voters' leverage over the incumbent would be diminished.

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and interest group i chooses the retrospective voting rule

$$v_i = \begin{cases} 1 \text{ if } U_i \geq k_i^*, & \text{where } k_i^* + \alpha_i(x(k_i^*) - x_i)^2 = 0 \\ 0 \text{ otherwise} \end{cases} \tag{4}$$

In the second period, the incumbent chooses a compliance level

$$x_{t=2}^* = \frac{\sum_{i=1}^{2} \alpha_i x_i}{\sum_{i=1}^{2} \alpha_i} \tag{5}$$

Throughout, $\phi_i = f_i(0)$*, and* $\lambda_i = \partial \Pr(\omega)/\partial \Pr(v_i = 1)$*, for* $i \in \{1,2\}$.

In the second period, the incumbent policymaker cannot get reelected for any more terms. Without electoral pressure, the compliance level simply reflects the ideal points of the two groups and their preference intensity.

In the first period, however, the policymaker can compete for reelection. Because the goal of this model is to understand the domestic sources of enforcement attributed to electoral accountability, I now focus on the policymaking with electoral pressure in the first period.

In choosing the compliance policy, the policymaker must consider how his decision in the first period affects the probability that he gets reelected in the second period. As shown in Appendix 1, the effect of the compliance policy on his chance of getting reelected can be expressed as follows: $\partial \Pr(\omega)/\partial x = \sum_{i=1}^{2}[\partial \Pr(\omega)/\partial \Pr(v_i = 1)][\partial \Pr(v_i = 1)/\partial x]$. This effect consists of two elements. One term, $\partial \Pr(v_i = 1)/\partial x$, captures how the compliance level affects the probability that each interest group votes for the incumbent policymaker. The other term, $\partial \Pr(\omega)/\partial \Pr(v_i = 1)$, captures how the probability that each group votes for the incumbent policymaker affects the probability that the incumbent wins reelection.

Regarding the term $\partial \Pr(v_i = 1)/\partial x$, whether a chosen compliance policy can induce a particular interest group to vote for the policymaker depends on the voting strategy of that group. The voting strategy for each interest group is a rule that says whether, at the end of the first period, to reelect the incumbent policymaker. Because the groups do not directly observe the actual compliance policy, they assess how much the policymaker attends their interests according to the welfare they experience. Group i votes for the incumbent, if and only if the first period welfare for group i is at least as great as k_i, that is, $U_i(x) \geq k_i$.[13] As

13. The voting strategy often takes the form of a cut rule. See, for instance, Ferejohn 1986; and Fiorina 1981. For how a cut rule is a delicate choice for voters, see Fearon 1999.

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shown in Appendix 1, interest group i chooses the optimal cut rule k_i^* to maximize the sensitivity of the incumbent's chance of reelection to how much the incumbent attends the group's interests.[14] The actual choice of k_i^* is shaped by the group-specific exogenous shock θ_i, which captures the extent to which group i is able to infer the government's action from its observed welfare. Intuitively, the better informed a group is, the more likely that its voting rule reflects the policymaker's effort rather than the noisy outcome. Accordingly, to win the support of such a better-informed group, the policymaker must attend its interests in return.[15]

Regarding the other term $\partial \Pr(\omega)/\partial \Pr(v_i = 1)$, besides the voting strategy of each group, the policymaker must also consider the extent to which the support of a particular group enhances his chance of getting reelected. That is, the policymaker must consider the electoral significance of each group. Empirically, the electoral significance or leverage of a group can be a number of things, depending on the specific electoral mechanism. It can be the number of voters in each group, or the amount of campaign contributions the group can generate, or the ability of the group to mobilize those with weaker preferences over a given issue, just to name a few.

Anticipating the effect of his compliance decision on his chance of reelection, the incumbent policymaker decides on a compliance policy, $x(k_i^*) = \sum_{i=1}^{2} \alpha_i(1 + \lambda_i \phi_i \delta V) x_i / \sum_{i=1}^{2} \alpha_i(1 + \lambda_i \phi_i \delta V)$ for $i \in \{1,2\}$. Again, $\phi_i = f_i(0)$, where f_i is the probability density function of the group-specific exogenous shock θ_i. Capturing the informational status of group i, ϕ_i influences group i's voting strategy. Furthermore, $\lambda_i = \partial \Pr(\omega)/\partial \Pr(v_i = 1)$. Capturing the electoral significance of group i, λ_i reflects how group i's actual vote affects the election outcome. To examine how these group-specific factors influence the compliance policy, I turn to comparative statics.

Comparative Statics

To establish the effect of constituencies on the government's compliance policy through the electoral process, I compare the compliance decision with electoral pressure in the first period to that without electoral pressure in the second period as a benchmark.

14. Arguably, the interest groups and voters who use retrospective voting rules are not entirely rational, because it is not certain that their retrospective voting strategy serves their prospective interests. Nevertheless, if the voters seek to influence their future welfare with their votes and yet they are bounded in the amount of information they have and their ability to process the information, then a government's retrospective performance provides voters with a proxy of how the government may serve their interests in the future. In this sense, therefore, a retrospective voting strategy has a prospective purpose. For an excellent discussion on this point, see Schultz 1998.

15. The importance of the information status or the monitoring ability is consistent with earlier moral hazard models such as Ferejohn 1986; Lohmann 1998; and Fearon 1999. However, most authors focus on these traits of the electorate as a whole rather than that of disaggregated interest groups, except for instance Lohmann 1998.

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Proposition 2: The compliance policy in the first period differs from that in the second period, if and only if two interest groups differ in the interactive effect of their electoral leverage and informational status, $x^*_{t=1}(k^*_i) = x^*_{t=2} \Leftrightarrow \lambda_1\phi_1 = \lambda_2\phi_2$, $\forall i \in \{1,2\}$.

Furthermore, the compliance policy under electoral pressure increases with the electoral leverage and the monitoring ability of the group that favors compliance, $(\partial/\partial\lambda_2)x^*_{t=1} > 0$ *and* $(\partial/\partial\phi_2)x^*_{t=1} > 0$. *It decreases with the electoral leverage and the monitoring ability of the group that opposes compliance,* $(\partial/\partial\lambda_1)x^*_{t=1} < 0$ *and* $(\partial/\partial\phi_1)x^*_{t=1} < 0$.

So long as the two groups differ in their electoral leverage and informational status, the compliance level under electoral pressure as in the first period deviates from that without electoral pressure as in the second period. If one considers the deviation of the compliance level in the first period from that in the second period as a policy bias induced by electoral control, the direction as well as the magnitude of the policy bias is determined by the electoral leverage and the informational status of interest groups. Specifically, the equilibrium policy under electoral pressure favors the more electorally significant group. All else equal, the more electorally significant the group that favors compliance, the higher the compliance level, that is, $(\partial/\partial\lambda_2)x_{t=1} > 0$. Furthermore, the equilibrium policy in the first period also favors the better informed group. All else equal, the better informed the group that favors compliance—better able to monitor the governmental action—the higher the compliance level, that is, $(\partial/\partial\phi_2)x_{t=1} > 0$.

It is important to note that the strength of each group originates not only from its electoral leverage, but also from its informational endowment. Here is an example of how these factors influence the compliance decision. Assume that one important indicator of a group's electoral leverage is the size of the group. Now suppose the group that prefers a high compliance level (for example, environmental groups and interested public) is two times as large as the group that prefers a low compliance level (for example, industry groups). Then, the policymaker will bias the compliance decision in favor of the larger group, if both groups have the same monitoring ability. Typically, however, special interests such as industry groups may be better informed because their activities may be directly subject to regulations. If the smaller group is three times as information rich as the larger group, then the policy bias turns to favor special interests. As the less informed larger group improves its informational status, the policy bias toward the originally better informed special interests decreases.

Electoral control is therefore exercised through the electoral leverage and the informational endowment of interest groups. The importance of the electoral leverage is intuitively straightforward, so long as one assumes a government cares about maximizing support. However, the way information works in this model is less intuitive. Besides considering which group controls more votes, an incumbent policymaker also considers what it takes for each group to vote him back into office. The voting strategy of each group depends on how well each group is informed about the policy process. Compared to the less well informed group, the better-

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informed group is more likely to base its voting decision on the policy, since their inference of the policymaker's compliance decision from their welfare is less disturbed by noise. In other words, the incumbent policymaker would lose more votes by deceiving the well-informed than by deceiving the ill-informed.

While the direction of the policy bias is solely determined by the attributes of interest groups, the magnitude of the policy bias is influenced by two additional factors. That is, the stakes the incumbent perceives in getting reelected and his discount factor directly affect the compliance level under electoral control. First, the more the incumbent values the reelection benefits, the more the policy favors the electorally significant and the better informed group. Second, the less the incumbent discounts the future, the more the policy favors the electorally significant and the better-informed group.

Although I do not have space to expand, the second point above deserves a brief comment. One way to interpret this result is that, a government under immediate electoral pressure—with a low discount factor—responds more to the electoral control of domestic interests than a government that is more insulated. It is thus possible that, to the extent that democratic governments face more regular and frequent elections than nondemocratic governments, electoral accountability tends to shape the compliance decision in democratic states more than it does in nondemocratic states. This alone, however, does not mean that democratic states tend to comply with international agreements more than nondemocratic states do. This is because, although democratic institutions may intensify the effect of electoral control, the direction of electoral effect on the compliance level is determined by the attributes of competing domestic interests such as their electoral leverage and informational endowment. This is consistent with the finding that popular pressure in democratic states does not necessarily point toward a higher level of compliance with international agreements.[16] To fully account for the effects of democratic institutions—a fascinating but a much broader and different issue than the one addressed in this article—one needs to look in addition at various other dimensions of democratic institutions[17] as well as the preferences that go into the institutions.[18]

Compliance with the 1985 Sulphur Protocol: An Illustration

The preceding analysis suggests, because governments are interested in retaining office, a country's compliance effort responds to the demands of domestic constituencies. Specifically, compliance reflects the electoral leverage and the informational status of competing domestic constituencies. To illustrate how the domestic

16. Simmons 2000.
17. Martin 2000.
18. Dai 2002b.

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constituency mechanism works empirically, I take another look at the LRTAP Convention.

Responding to acid rain that typically travels across borders, European countries collaborated within the framework of the LRTAP convention. Since the establishment of the LRTAP Convention in 1979, there have been a series of substantive protocols requiring specific amounts of pollutant emission reductions. I focus here on the 1985 Sulphur Protocol, which required signatory countries to reduce sulphur emissions by at least 30 percent by 1993, with 1980 as the base year. As this protocol was the first substantive agreement in the framework of the LRTAP Convention and it reached its deadline for implementation the earliest, it allows a sufficient time span to study the subsequent compliance with the protocol. Furthermore, the fact that more than twenty countries signed this protocol offers variation in dependent and independent variables.

In this section, I examine how domestic constituents affected national compliance with the 1985 Sulphur Protocol. I carry out the analysis in two different modes. I first conduct categorical data analysis with opinion survey data involving all signatory countries. To supplement the data analysis, I then examine some signatory countries in more depth. By combining quantitative and qualitative evidence, I hope to provide both a broad picture about and an in-depth look into how domestic compliance mechanisms work in this case.

A Broad Picture

To provide a general pattern of national compliance as mapped against politically relevant traits of domestic constituencies as suggested by the formal model, I first develop measures for the dependent and independent variables, respectively, and then trace how they relate to each other.

A measure of the dependent variable is straightforward. As required by the 1985 Sulphur Protocol, each participating country should reduce sulphur emissions by at least 30 percent with 1980 as the base year. As compliance is defined as the degree to which the explicit treaty provision is achieved, the actual percentage reduction of sulphur emissions thus serves as the perfect measure of compliance in this case. Consistent with the definition of compliance as capturing outcomes ranging from noncompliance to overcompliance, the percentage reduction of sulphur emissions is a continuous variable capped at 100 percent.[19]

Regarding independent variables, a natural measure of the electoral leverage and the informational status of competing domestic constituencies in this case is what I call domestic environmental activism mobilized around the acid rain issue. First, this measure captures both political clout and informational status of domestic constituents, because it covers the following four specific dimensions:

19. Consistent with the general conceptualization of compliance in the literature, the definition of compliance does not address the motivations behind the observed behavior. See Fisher 1981; Mitchell 1994; and Raustiala and Slaughter 2002.

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(1) public opinion regarding acid rain; (2) public consciousness over the environment; (3) the membership of environmental nongovernmental organizations (NGOs); and (4) the electoral strength of Green parties. Two of these dimensions—the size of environmental NGOs and potential votes for political parties that endorse environmental agendas—contribute to the electoral leverage of environmental activism. Two other dimensions—the public awareness of the environment in general and the acid rain problem in particular—reflect the informational status of environmental activism.[20] Second, this measure captures competing interests within a society in a parsimonious way. In each of the four dimensions as mentioned above, it takes into consideration the opinion and organizational inclination from the entire spectrum of the society, including procompliance elements as well as anticompliance interests. For instance, the score that I derive regarding the perceived urgency of acid rain policies is based on the opinion of both those who favor such policies and those who oppose them. Similarly, the score that I derive regarding one's likelihood to vote for political parties such as the Greens is based on the inclination of both the environmentally friendly and unfriendly groups. Thus the measure of domestic environmental activism reflects the strength of procompliance force somewhat averaged by the strength of the opposition to compliance. Overall, even though each indicator along each of these dimensions can be biased in its own ways, together they provide a sense of how strong procompliance force is in comparison to anticompliance sentiments, in terms of both political clout and informational endowment.

I construct an ordinal measure of domestic environmental activism. That is, I rank order the signatory countries according to the level of environmental activism mobilized around the acid rain issue. I have six data sets, each of which provides useful information on at least some dimensions of domestic environmental activism in at least some countries under study here. These are Euro-barometer 25, 29, 31A, 35, 43.IBIS, and the International Social Survey Program (ISSP) on Environment.[21] Appendix 2 contains a list of relevant variables in each data set.

With each data set, I derive a ranking of the signatory countries covered in that data set by the level of domestic environmental activism mobilized around the acid rain issue. This takes three steps. First, I rank order the signatory countries along each of the four dimensions. Second, I sum up each country's rankings along all dimensions to attain an aggregate score for that country. Third, I rank order the signatory countries according to the aggregate score of each country. Thus, a country that ranks consistently high along all dimensions tends to rank high in

20. Incorporating both electoral leverage and informational status into one independent variable is consistent with the theoretical expectation from the model. While the model captures the individual effect of electoral leverage and informational status respectively, it also captures the interactive effect of the two, allowing the strength in one dimension to compensate the weakness in the other. Of course, with a fuller empirical model and sufficiently more data points, one could measure these dimensions separately while taking into account their interactive effect.

21. See Rabier, Riffault, and Inglehart 1988; Reif and Melich 1990, 1993, and 1998; Reif and Marlier 1998; and International Social Survey Program 1996.

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domestic environmental activism around the acid rain issue. Appendix 3 contains the ranking of relevant countries in each data set.

The first four data sets, Euro-Barometer 25, 29, 31A and 35, cover six signatory countries under investigation here. These six countries naturally form two groups, with Denmark, West Germany, and the Netherlands ranking consistently at the top and Belgium, Italy, and France ranking consistently at the bottom. The ISSP Environment data set covers, in addition, Norway and several Eastern European countries. With Italy—from the second group in each of the first four data sets—as a reference point, Norway falls into the first group above Italy and East Germany, Czechoslovakia, Bulgaria, and Hungary form a third group below Italy.[22] The Euro-Barometer 43 covers Sweden, Austria, and Finland, in addition. With all the signatory countries from the first four data sets as reference points, Sweden, Austria, and Finland—ranking above or between the Netherlands and West Germany—naturally belong to the first group.[23]

As a result, three groups present themselves, with domestic environmental activism around the acid rain issue ranging from high to low: (1) West Germany, the Netherlands, Denmark, Norway, Sweden, Austria, and Finland; (2) Belgium, Italy, and France; and (3) East Germany, Bulgaria, Czechoslovakia, and Hungary.[24] This categorization of countries is consistent with secondary sources on environmental movements and the struggle against acid rain in Europe.[25] What some secondary sources also show, but the analysis here based purely on survey data cannot demonstrate, is that West Germany, Sweden, and Norway—with particularly high political salience of the acid rain problem—stand out from the first category of countries.[26] Whether or not the category of countries with a high level of domestic environmental activism is further differentiated, the importance of domestic constituencies is clear in Table 1.

With signatory countries categorized into three groups, the group of countries with the highest level of domestic environmental activism reduced their sulphur

22. There is additional support for this categorization. For instance, Kitschelt 1993 finds that the influence of green and other left-libertarian parties is much more significant in Norway than in Italy. In Eastern European countries, according to Jancar-Webster 1993a, environmental movements sprang out of democratic movements and the priority they placed on the environment per se was unclear.

23. Compared to the other five data sets, the Euro-Barometer 43 is not good for this analysis because it is the only one among these six data sets that was conducted after the Sulphur Protocol reached its implementation deadline. However, if using this data set carries with it any bias, it is a bias against my argument. Sweden, Austria, and Finland were among the most significantly traumatized by the acid rain problem, which was a more serious problem in the mid-1980s. If any data had been collected on these countries, then these countries would have more likely ranked even higher than other countries but not lower. For instance, since the late 1970s, the acidification problem was one of the most prominent environmental issues on the Swedish public agenda. Beginning in the early 1990s, political priorities shifted somewhat from environmental issues towards economic issues, when the country entered a recession with growing unemployment.

24. Signatory countries to the 1985 Sulphur Protocol that are not covered by any of these data sets are inevitably left out of the analysis.

25. This is largely consistent with Dalton 1994, who studied some of the signatory countries. Domestic environmental activism is treated less systematically in studies of international cooperation to combat acid rain, but see Sprinz 1992.

26. Levy 1993.

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TABLE 1. *Average level of sulphur emission reduction in signatory countries of the 1985 Sulphur Protocol, by domestic environmental activism mobilized over acid rain, with signatory countries categorized into three groups and four groups respectively*

	Environmental activism around acid rain <*strong*----------*weak*>		
Signatories in three groups	West Germany Norway Sweden Denmark Netherlands Austria Finland	Belgium Italy France	Bulgaria Czechoslovakia East Germany Hungary
Average reduction	72%	56%	26%
Standard deviation	8%	13%	28%

	Environmental activism around acid rain <*strong*----------*weak*>			
Signatories in four groups	West Germany Norway Sweden	Denmark Netherlands Austria Finland	Belgium France Italy	Bulgaria Czechoslovakia East Germany Hungary
Average reduction	75%	70%	56%	26%
Standard deviation	6%	11%	13%	28%

Sources: Data on emission reductions are from Economic Commission for Europe 1995. Data on former Czechoslovakia, the West Germany and East Germany are from Economic Commission for Europe 1993.

emissions by 72 percent on average by 1993; while the group of countries with the lowest level of domestic environmental activism reduced their sulphur emissions by only 26 percent on average by 1993. The positive correlation between sulphur emission reductions and domestic environmental activism around the acid rain issue persists when the signatory countries are categorized into four groups. Just as remarkably, the average reduction of sulphur emissions increases with domestic environmental activism mobilized around the acid rain issue. Consistent with the core hypotheses from the model, European countries' compliance with the 1985 Sulphur Protocol has remarkably reflected the electoral leverage and the informational endowment of domestic constituencies.

An In-depth Look

A closer look into individual countries supports the aggregate finding that compliance with the 1985 Sulphur Protocol reflected the electoral leverage and the informational status of domestic constituencies. Because of space limitations, I focus

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here on a subset of signatory countries, namely Norway, West Germany, France, and the former Czechoslovakia. In presenting the evidence from each country, I identify competing domestic interests and examine both their electoral leverage and their informational conditions.

Norway. Facing similar ecological and geographic vulnerability as Sweden, Norway joined Sweden early on to push for an international solution to the acid rain problem. However, compared to Sweden, the implementation of sulphur reduction policies in Norway was more contested. The treaty compliance process activated both procompliance activism and anticompliance interests.

The major opposition was the industrial sector. Initially it was not particularly interested in the acidification policy, as Norwegian effort was mainly framed as getting central European countries and Britain to reduce their sulphur emissions. As information regarding abatement costs unfolded and as the industry came to realize that the LRTAP negotiations would have serious domestic consequences, the industrial sectors pushed the corresponding ministries to voice both reservation over sulphur reduction at home and opposition to further international targets.[27]

Overcoming this opposition, however, was the growing strength of procompliance interests. Initially only the Norwegian Ministry of Environment and the natural science community showed much interest in the acid rain issue.[28] In the mid-1980s, while more societal groups that had previously been indifferent about environmental issues became sensitive to the acid rain problem, a new generation of environmental activists entered the stage.[29] Environmental groups old and new conducted the important task of information gathering and dissemination. They not only compiled information on the severity of the acidification problem,[30] but they also monitored their government's environmental regulations for any implementation and enforcement deficits.[31] As such information spread through environmentalist networks and through media, public awareness and concern over environmental policies steadily increased. The upsurge of public environmental awareness further stimulated the greening of the political arena. According to opinion polls, the percentage of people who viewed the environment as the most important election issue rose from 1.3 percent in 1981, to 2.1 percent in 1985, and to 18.8 percent in 1989; the percentage of people who viewed the environment as the second most important election issue rose from 1 percent in 1985 to 11.6 percent in 1989.[32] By another account, back in the mid-1970s, only 25 percent of the public rated environmental issues as the primary reason for party choice. In 1989 this percentage reached a record of

27. Laugen 2000, 120–24.
28. Ibid., 120.
29. Two important organizations are Nature and Youth (Natur og Ungdom) and Bellona (Reitan 1997, 294).
30. Wetstone and Rosencranz 1983, 65.
31. Reitan 1997, 294.
32. Laugen 2000, 121.

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37 percent.[33] The ensuing green cleavage cut across the traditional party lines, which resulted in increasing institutionalization of green policies and an increased percentage of party programs devoted to ecological issues. These increases were most notable in the 1985–89 era, following the Sulphur Protocol.[34]

Against the background of increasing political salience of the acid rain issue, costly measures were still being introduced to reduce the sulphur contents in oil in 1985 and 1989. This was well after Norway had met the minimum compliance requirements. Furthermore, this was despite the fact that its sulphur emissions contributed only about 5 percent of total sulphur dioxide fallout in Norway and thus even the most costly measures would not dramatically reduce the ecological damage Norway suffered from acid rain. Yet, these measures made sense as the environment emerged to be the single most important issue in the late 1980s.[35]

West Germany. Achieving an even greater percentage of sulphur reductions, West Germany experienced less domestic opposition in the compliance process while witnessing a high level of domestic environmental activism mobilized around the acid rain issue. The position of the West German government itself toward the LRTAP regime began to change after the discovery of German forest death in the early 1980s. This alarming information and the subsequent media coverage overwhelmingly alerted the public and even partially silenced the potential opposition to sulphur reduction policies.

The industrial sector largely maintained a neutral position regarding sulphur reduction policies, partially because the three leading industries—fabricated metal products, wholesale and retail, and real estate and business—were neither among those highly vulnerable to exposure nor among those particularly hurt by abatement costs. The only sector that opposed the LRTAP process was the automobile industry, which was, however, somewhat compensated by tax exemptions provided by the federal government.[36]

The government's effort to buy off any opposition and to adopt aggressive abatement measures was more than justified by the overwhelming surge in procompliance sentiments. In addition to environmental NGOs and Green parties, procompliance interests in Germany also included part of the industrial sector: industries producing abatement technologies and industries selling environment friendly products.[37] This was largely a result of intense media exposure and subsequent public sensitivity to environmentalism.

The strength of procompliance interests, in terms of both informational conditions and electoral leverage, was significant in the 1980s. The increase of public environmental awareness was clearly shown in the German election surveys:

33. Reitan 1997, 305.
34. Ibid., 305–6.
35. Laugen 2000, 121.
36. Sprinz and Wahl 2000, 154.
37. Ibid., 155.

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43 percent of voters viewed environmental protection as very important in 1972. This number increased to 69 percent in 1987.[38] Coupling the growing environmental awareness was the large number of citizen action groups concerned with environmental issues. By 1980 there were more than 130 supraregional and more than 1,100 regional environmental groups.[39] The grass-roots environmental organizations served a voluntary monitoring function over governmental implementation of desulphurization policies at different levels. These organizations further voiced the increasingly widespread public concern over the acid rain issue to increase its salience. Capitalizing on scientific reports and media coverage, environmental activists helped ensure that the acid rain issue was widely discussed and debated in Germany. Such information about the acid damage to German forest and the debate over acidification policies further mobilized public opinion and brought out widespread support for environmental policies.

Meanwhile, with the increase in public environmental consciousness, air pollution became one of the central electoral issues in the 1980s. This substantially facilitated the electoral success of the Greens. According to surveys in the late 1980s, the public viewed the Greens as the party best suited to solve environmental problems.[40] Indeed, the Green Party's presence in the center of national politics facilitated a direct influence of the environmentalists, which was also facilitated by a somewhat "green" bureaucracy and "green" media.[41] As a result, West Germany displayed a steady record of reducing sulphur emissions. Particularly, it continued with serious sulphur reductions after the Sulphur Protocol was signed. By the time of German unification, West Germany had already reduced more than 70 percent of sulphur emissions.

France. Unlike such leaders as West Germany and Norway in complying with the 1985 Sulphur Protocol, France along with Belgium and Italy displayed much less impressive records of compliance. In France, sulphur reductions in the early 1980s were largely attributable to a switch of energy policy to rely on nuclear power. In the years after the 1985 Sulphur Protocol was signed, France barely undertook any further reductions. A look into its domestic dynamics helps illustrate why.

When the 1985 Sulphur Protocol was being negotiated and signed, France viewed sulphur pollutants as originating from the heavy industry in East Europe and thus considered itself not so vulnerable. The government's low profile in the LRTAP process spurred little opposition from the industrial sectors. However, when the acid rain damage soon became associated with motor vehicle exhaust emissions, the French automobile industry led the opposition to domestic and international measures to reduce air pollution. Taking advantage of the lack of knowledge at

38. Conradt and Dalton 1988.
39. Boehmer-Christiansen and Skea 1991, 85.
40. Frankland 1995, 30.
41. Boehmer-Christiansen and Skea 1991, 85–92.

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the domestic level on the science of acid rain, the automobile industry questioned whether new measures or technologies were truly necessary and thus further contributed to the aura of skepticism over the acid rain issue.[42] Such skepticism presented a serious obstacle to both enforcement of existing abatement measures and the adoption of new measures.

Facing such opposition, procompliance elements enjoyed neither informational nor electoral advantage. Regarding public awareness, the French public knew little about the acid rain problem and was by and large not concerned with it. This had to do with several factors. First, sulphur emissions resulted in increased vulnerability only in certain regions in France and not the whole country. Consequently, sulphur damage did not get exposed extensively in the media. Second, although the scientific community gathered more information on the science of acid rain through international networks, that information did not achieve any significant degree of salience domestically, partially because of a lack of either an elite or a grass-roots element to employ it. Unlike Germany, where the Greens helped ensure the salience of the acid rain issue in national politics and environmental NGOs helped monitoring governmental policies at various levels, French Greens and environmentalists played a limited role in information gathering and dissemination.

Partially resulting and further worsening the low level of public environmental awareness was the limited electoral leverage of procompliance interests. First, environmental NGOs in France were traditionally marginalized. In fact, a large percentage of the public perceived ecological policies as opposing national welfare, a perception that was further fueled by the anticompliance alliance of the car industry and the Ministry of Industry.[43] Indeed, the membership of environmental NGOs was low and their image poor.[44] Furthermore, the Green movement was unable to alter the dominant class confrontation in electoral politics, as the two major Green parties failed to form a unified green front.[45]

Czechoslovakia. Different from Norway and West Germany and also different from France, Eastern European signatory countries including the former Czechoslovakia share, among other things, the following: they have been among the most heavily polluted, and yet such vulnerability did not translate into a high level of environmental activism around the acid rain issue. Accordingly, their compliance with the 1985 Sulphur Protocol was limited.

In Czechoslovakia, the opposition to sulphur reduction policies came from the energy sector that traditionally relied on the combustion of fuel high in sulphur.

42. Skea and Monteuil 2000, 245, 249.

43. Even though the public gradually gained greater awareness of environmental issues, it was more attributable to the rise of Europe-wide ecological movements and much less to the acid rain issue in France or any other national or local environmental issues. See Cole and Doherty 1995, 59.

44. Skea and Monteuil 2000, 250.

45. Cole and Doherty 1995, 56, 60–63.

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As these industries were largely state-owned, local governments took the lead in opposing air pollution abatement proposals. They argued that governmental authorities at the federal level should place priority on economic goals.[46]

Countering such opposition, procompliance interests were limited in both informational advantage and political clout. First, although most air pollution in Czechoslovakia stemmed from sulfur dioxide emissions, basic information on acid rain was limited until the late 1980s. This had to do with a number of factors. One factor was the sparse scientific research into these matters. Another factor was the information control, or what has been called "a state embargo on environmental data."[47] A further compounding factor was the absence of a comprehensive system of NGOs gathering and disseminating environmental information. The informational condition only began to improve gradually in the 1990s. Second, the political clout of procompliance interests was rather complex. In some sense, environmental NGOs played a significant mobilizing role in the late 1980s, certainly more than many of their counterparts in other Eastern European countries. However, at the same time, their environmental appeal was limited. This was because that environmental activism took place under the umbrella of opposition to the totalitarian regime and thus it is unclear to what extent it was environmentally driven. This was also because that, as in other Eastern European countries, economic concerns predominated the public mind. The majority of the public saw seeking economic and social security as the most important goal.[48]

Such preference ordering of the public over the economy and the environment partially explains why the procompliance force became even weaker in the years following the transition from communism to a multiparty system. Despite the improvement in its informational conditions and overall hospitable changes, such as freedom in press and association, the environmental movement lost strength in membership. The environmental concern of the public was overshadowed by the much more pressing economic survival. Jobs and social security were viewed by the public as much more important than the environment. The new government—including previous leaders of the environmental movement—had electoral obligations to fulfill their promises of not only a democratic society but also economic prosperity.[49] Consistent with such weak support for sulphur reduction policies, right before the separation of the two republics, Czechoslovakia was still quite some distance away from the minimum compliance requirement.

The purpose of the above empirical analysis—both quantitative and qualitative inquiries—has been to illustrate how the domestic constituency mechanism works. I have therefore focused on the informational and electoral advantages of competing domestic interests. This, of course, is not to say that no other factors have anything to do with sulphur emission reductions. However, the focus on domestic

46. Adamova 1993, 53.
47. Ibid., 43.
48. Ibid., 44. Also see Jancar-Webser 1993b for Eastern Europe in general.
49. Hardi 1994.

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constituencies provides a key to understanding the political nature of domestic enforcement of international agreements in this case.

Implications for International Institutions

In the preceding sections, I have developed a model of domestic compliance mechanism and provided preliminary empirical evidence that compliance reflects the electoral leverage and informational status of competing domestic constituencies. A natural question to ask is that, if compliance is largely a function of domestic constituencies, what is the role of international institutions? In this section, I develop implications for international institutions in the context of domestic enforcement.

Although the formal model does not explicitly incorporate international institutions as a strategic player, the conceptualization of domestic compliance mechanism provides a theoretical rationale for why and how international institutions may influence states' compliance indirectly. Because a policymaker's pursuit for reelection is ultimately determined by voters, and thus governments are primarily responsive to domestic constituencies, international institutions may influence the policymaker's compliance decision through domestic constituencies. To explore how outside-interested parties such as international institutions may use domestic pathways of influence, I turn to those factors that are subject to deliberate manipulation in the model. As shown in the model, two manipulable parameters determine the direction of policy bias under electoral pressure. Indeed, international institutions can influence both parameters through specific features or activities.

One parameter is the incremental change in the probability that the incumbent policymaker wins reelection due to the change in the probability that an interest group votes for the policymaker. This captures the electoral leverage of interest groups. International institutions can strengthen the electoral leverage of those who favor compliance. For instance, by writing compliance provisions into international agreements and by providing this information directly or indirectly to potential victims of noncompliance, international institutions may help increase the number of people who favor compliance.

The other parameter is the variance of the density function of the exogenous shock. This captures the informational status or monitoring ability of interest groups. While few international institutions are able to directly inspect states' compliance, many can facilitate domestic constituencies in monitoring their governments. For instance, international institutions can publish information associated with compliance to make it easier for domestic groups to infer states' compliance. They can also publish governmental reports, thereby enabling domestic constituents to check them.

Therefore, international institutions can influence states' compliance calculations through two specific channels: (1) strengthening the electoral leverage and (2) improving the informational status of procompliance constituencies. Frequently, domestic constituencies use the information made available by international institutions to mobilize support. Often, domestic constituencies employ

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international initiatives in debates for legitimation purposes. Thus, while domestic constituencies are the direct source of enforcement, international institutions may influence governments' compliance decisions indirectly by empowering pro-compliance constituencies. Furthermore, given the resource constraints that international institutions usually face, rational institutions have incentives to endorse low-cost enforcement mechanisms. It may be both effective and efficient for international institutions to facilitate domestic enforcement.

In the remainder of this section, I discuss briefly how the LRTAP Convention has indirectly influenced states' compliance with the 1985 Sulphur Protocol.[50] I argue that the LRTAP Convention has empowered domestic environmental activists by providing them with specific relevant information and by legitimizing their demands. In so doing, the LRTAP Convention has facilitated national compliance indirectly. The specific ways in which the LRTAP Convention empowered domestic environmental activism can be summarized as follows.

First, the LRTAP Convention facilitated research on acid damage and helped disseminate research findings.[51] The accumulated research results and their dissemination are critical to mobilizing public concern with the acid rain problem. When the LRTAP Convention was signed in 1979, only the bureaucratic and scientific communities in Sweden and Norway were convinced of the transboundary damage of acid rain. Reluctant to make any explicit commitment, countries nonetheless agreed on the need to study the ecological damage of acid rain. The Working Group of Effects oversaw a series of research programs, each of which was operated by a lead country. For instance, Germany, Norway, and Sweden operated research programs respectively on forest, fresh water, and materials. It was not entirely coincidental that Germany conducted its first systematic forest survey in 1982, which demonstrated serious forest damage as a result from acid rain.[52] Through institutional arrangements such as annual review meetings of the Executive Board, the LRTAP Convention further helped collecting and disseminating information on acid damage. Such information contributed significantly to the perceived salience of the acid rain issue in many other countries.[53] Environmental activists used this information to mobilize public concern through publications and symbolic action.[54] These activities illustrate how international institutions can

50. While the aggregate level of sulphur pollution has been declining since the early 1980s, most signatory countries of the 1985 Sulphur Protocol have reported much deeper reductions in sulphur emissions than nonsigners. On average, nonsigners and signers have reduced 17 percent and 50 percent, respectively, with 1980 as the base year (Economic Commission for Europe 1993).

51. For the coordination by the LRTAP of national research programs and the effects of such coordination, see Levy 1993, 87–90.

52. There was no official connection between the LRTAP convention and the German forest survey, but some experts attribute the decision to conduct such a national survey partially to the influence from Nordic countries through the LRTAP convention. Author's interview with German forest survey experts.

53. See Enyedi, Gijswijt, and Rhode 1987; Wetstone and Rosencranz 1983; and Levy 1993. Author's interviews with officials from the Austrian Federal Environmental Agency and the Hungarian Ministry of Environment.

54. Author's interviews with staff members at the Swedish NGOs Secretariat on Acid Rain and World Wide Fund for Nature.

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strengthen the electoral leverage of procompliance constituents by increasing the number of people who care about the issue.

Second, the LRTAP Secretariat compiled information on emission trajectories and abatement strategies. This information enabled environmental activists to better understand the policy processes and thus made them better able to monitor governmental action. The LRTAP Secretariat coordinated the Cooperative Program for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP). Its main objective was to provide "information on the deposition and concentration of air pollutants, as well as the quantity and significance of the long-range transmission of pollutants and fluxes across boundaries."[55] In addition, governments were required to report on policies taken in accordance with the Sulphur Protocol. Through the annual review meetings, the LRTAP Secretariat published compilations of abatement strategies. The abatement strategies adopted by one country were frequently cited by environmental activists in other countries in demanding stricter environmental policies.[56] It was more difficult for governments to neglect the better-informed environmental activists and the general public. These activities illustrate how international institutions can improve the informational status of procompliance constituencies.

Third, what was important for the above two channels to be effective was that the LRTAP Convention facilitated the involvement of environmental activists in the compliance process. The review meetings of the LRTAP Convention were open to environmental NGOs. For example, Greenpeace and World Wide Fund for Nature were regular participants at such meetings. This was instrumental to environmental activism in three ways. First, environmental NGOs could get all documents released by the convention.[57] Thus the convention provided environmental activists, particularly those from countries with information controls, access to information that they might not receive otherwise. Second, because NGOs sometimes had information about a particular country that the LRTAP Secretariat did not necessarily know, they were usually given the chance to present their knowledge and opinion at meetings.[58] These opportunities often provided environmental NGOs with additional forum to appeal to public opinion and helped them to increase their influence over their governments. Third, environmental activists from different countries used such meetings to share information and strategies and, in fact, built networks with one another as well as with the environmental branches in governments. Such a broad network of like-minded people was important in strengthening the environmental forces.[59]

Finally, the LRTAP Convention helped legitimize the environmental demands of procompliance advocates. The signing of the convention and the Sulphur

55. Economic Commission for Europe 1991.
56. Author's interviews with staff at the World Wide Fund for Nature.
57. Author's interviews with staff from the LRTAP Secretariat.
58. Ibid.
59. Sand 1991. See also Haas 1989; and Young 1989.

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Protocol helped establish expectations regarding environmental policies and their implementation. To some extent, it functioned as a benchmark for correct governmental behavior. This was particularly important in those countries where environmental activists lacked domestic instruments. For instance, shortly after Czechoslovakia ratified the Sulphur Protocol, about 300 people in North Bohemia protested against government authorities regarding the inadequate system to control air pollution. For the first time, environmental protesters were not punished. Instead, government representatives promised to take appropriate action.[60] Even for countries where substantial measures have been taken to reduce sulphur emissions, the fact that a more demanding sulphur protocol was already in the making under the LRTAP Convention lent support to environmental demands to actually go much beyond the minimum level of compliance. In Norway and Sweden, the way that environmental activists resorted to the convention was particularly interesting. Procompliance activists in these countries argued that "now that we finally got other countries to sign up on the Convention and the Protocol, we need to set an example with deeper reductions."[61] Essentially, domestic environmental activists used the LRTAP Convention in various ways to defend the legitimacy of their demands, thus adding international support to domestic pro-environmental constituencies.

Overall, rather than enabling states to enforce each other through carrots or sticks, the LRTAP Convention performed important functions to empower domestic environmental activism, which directly affected governments' compliance calculations.

Conclusion

This article advances a theory of domestic constituency mechanism. Because a government's pursuit for reelection is ultimately determined by domestic constituencies, a government's compliance policy is primarily responsive to competing domestic interests. Within such a conceptual framework of electoral accountability, I identify specific channels of influence through which domestic constituencies can influence national compliance. In analytically distinctive ways, policymakers attend disproportionately not only those with more political clout but also those better informed. To illustrate the domestic constituency mechanism empirically, I show that European countries' compliance with the 1985 Sulphur Protocol reflected the electoral leverage and the informational status of competing domestic constituencies. Among major implications this study provides, I highlight the role of international institutions in the context of domestic enforcement. The conceptualization of domestic constituency mechanism provides a theoretical rationale for why and how international institutions may influence national compliance indirectly through

60. Jancar-Webster 1993a.
61. Author's interview with staff at the Swedish NGOs Secretariat on Acid Rain.

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domestic mechanisms. Indeed, the LRTAP Convention empowered domestic environmental activists by providing them with specific relevant information and by legitimizing their demands.

I conclude with a discussion of how this study contributes to three broad areas in the fields of international cooperation. First, whereas scholars have done rigorous work to address compliance and enforcement in an international game,[62] less analytical attention has been paid to domestic enforcement. Indeed, in the increasingly large literature on compliance, systematic theorizing of domestic mechanisms has been limited. Among those studies that allude to domestic stories, the theoretical component is often confined to a laundry list of possible mechanisms, without careful attention to how these mechanisms interact in a unified theoretical framework. This article fills the gap by developing a conceptual framework, where I spell out the logic of domestic constituency mechanism and delineate specific channels of influence. One frequently recognized channel of influence is domestic support in terms of size or financial endowment of competing interests. Yet, in politics, sheer number does not always determine the outcome. What explains varying success of those who are numerous? This study takes into account the less theorized trait of informational status and specifies how information may affect policy outcomes through political accountability.

Second, this study joins the scholarly effort to uncover indirect ways in which international institutions may influence state behavior. Early theories of international institutions have focused primarily on the functions that international institutions perform directly for states. Although these functions remain important, the state centric focus has left unaccounted for a range of indirect pathways through which international institutions may influence national policies.[63] I argue that, because compliance with international agreements has domestic consequences, there exist domestic sources of enforcement. It not only is efficient but also can be effective for international institutions to use these sources to influence states' behavior. Furthermore, by altering the domestic balance of competing interests and thus indirectly influencing policymakers' compliance decisions, even "weak" institutions and "soft" laws can impact national policies.[64] Thus, although the specific causal mechanisms differ, this study contributes to the literature on how international institutions empower domestic actors in pursuit of international rules.[65]

Third, this study also contributes to the literature on transnational politics of information. Although many studies frequently refer to information dynamics and

62. See Snidal 1985; Martin 1992; Morrow 1994; Downs, Rocke, and Barsoom 1996; and Fearon 1998.

63. For the need to specify, not just whether, but how international institutions influence national policies, see Keohane and Martin 1995; and Martin and Simmons 1998. For early calls and recent efforts to explore how international institutions work through domestic mechanisms, see Haggard and Simmons 1987; Milner 1997; and Martin 2000.

64. See Weiss 1997; and Abbott and Snidal 2000. See also Lipson 1991.

65. See Burley and Mattli 1993; Goldstein 1996; Cortell and Davis 1996; and Keck and Sikkink 1998.

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describe an increasing number of relevant factors in these dynamics,[66] the literature as a whole has paid inadequate attention to delineating analytically the large number of diverse conjectures. Within the context of domestic enforcement, as this study suggests, information has two analytically distinct effects. While information can be used to mobilize domestic support by essentially altering some citizens' preferences, it can also enable those who possess it to make relatively more accurate inferences without changing their preferences. At the international level, although information provision by international institutions is commonly recognized, various kinds of information can be used by different actors to evoke different compliance mechanisms. For instance, while information from the International Monetary Fund can work through the financial market to influence states' compliance,[67] information from international human rights networks can influence states' compliance through powerful states, which can punish noncomplying states by withholding aid.[68] This study suggests a different mechanism, in which information made available by international institutions can be used by domestic actors to influence a government's compliance decision. Of course, whether or not such information bolsters compliance depends on its content and its impact on domestic power balance.[69] This study highlights the need to specify who has which type of information and, more importantly, who has incentives to use the information and who has the leverage to turn that information into influence.

Appendix 1: Formal Solutions

Proof of Proposition 1. The game is solved by backwards induction. In the second period, because the incumbent policymaker can no longer compete for reelection, $\Pr(\omega) = 0$.

$$\max_x U_{govt}(x) = \max_x \sum_{i=1}^{2} (-\alpha_i(x - x_i)^2 + \theta_i), i \in \{1,2\} \tag{6}$$

The first-order condition is $\sum_{i=1}^{2} - 2\alpha_i(x - x_i) = 0$. The second-order condition is $\sum_{i=1}^{2} - 2\alpha_i < 0$. Thus, the policymaker's choice of the compliance level is $x^*_{t=2} = \sum_{i=1}^{2} \alpha_i x_i / \sum_{i=1}^{2} \alpha_i$, as solved in Equation (5).

In the first period, because the policymaker can compete for reelection, $\Pr(\omega) \neq 0$.

$$\max_x U_{govt}(x) = \max_x \sum_{i=1}^{2} (-\alpha_i(x - x_i)^2 + \theta_i) + \Pr(\omega)\delta V, i \in \{1,2\} \tag{7}$$

66. Studies of environmental commitments are rich in describing relevant international and domestic factors. See Haas, Keohane, and Levy 1993; Victor, Raustiala, and Skolnikoff 1998; Weiss and Jacobson 1998; and Underdal and Hanf 2000.
67. Simmons 2000.
68. Sikkink 1993.
69. Goldstein and Martin 2000.

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The first-order condition is given by

$$\sum_{i=1}^{2} -2\alpha_i(x - x_i) + \frac{\partial \Pr(\omega)}{\partial x}\delta V = 0 \tag{8}$$

To solve for x, we need to figure out $\partial \Pr(\omega)/\partial x$, that is, how the incumbent's choice of the compliance level changes his chance of reelection, given voters' voting strategies.

Let v_i be the voting strategy of group i. Because the interest groups do not directly observe the actual compliance level, they assess—in deciding how to vote—how much the incumbent has attended their interests according to the first period welfare they observe. Thus, for $i \in \{1,2\}$,

$$v_i = \begin{cases} 1 & \text{if } U_i \geq k_i \\ 0 & \text{otherwise} \end{cases} \tag{9}$$

How does interest group i decide on the optimal threshold k_i^*? If one lets $F_i(.)$ be the cumulative density function of θ_i, the probability that group i votes for the incumbent policymaker is

$$\Pr(v_i = 1) = \Pr(U_i \geq k_i) = \Pr(-\alpha_i(x - x_i)^2 + \theta_i \geq k_i) = 1 - F_i(k_i + \alpha_i(x - x_i)^2) \tag{10}$$

How precisely do the voting strategies of interest groups affect the government's choice of the compliance level? Applying the generalized chain rule,

$$\frac{\partial \Pr(\omega)}{\partial x} = \sum_{i=1}^{2} \frac{\partial \Pr(\omega)}{\partial \Pr(v_i = 1)} \frac{\partial \Pr(v_i = 1)}{\partial x} \tag{11}$$

Thus, the impact of the compliance level on the probability that the incumbent policymaker wins reelection is expressed in terms of (1) the effect of the compliance level on the probability that each interest group votes for the incumbent policymaker; and (2) the effect of the probability that each group votes for the incumbent policymaker on the probability that the incumbent wins reelection.

Letting $\partial \Pr(\omega)/\partial \Pr(v_i = 1) = \lambda_i$, which represents the electoral leverage of group i, and applying Equation (10),

$$\frac{\partial \Pr(\omega)}{\partial x} = \sum_{i=1}^{2} -2\lambda_i \alpha_i (x - x_i) f_i(k_i + \alpha_i(x - x_i)^2) \tag{12}$$

Now that one has figured out $\partial \Pr(\omega)/\partial x$, the first-order condition defined by Equation (8) becomes

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$$-\sum_{i=1}^{2} 2\alpha_i(x - x_i) - \sum_{i=1}^{2} 2\lambda_i \alpha_i (x - x_i) f_i(k_i + \alpha_i(x - x_i)^2)\delta V = 0 \tag{13}$$

Provisionally assuming that the second-order condition is also satisfied, Equation (13) implicitly defines the policymaker's best response as a function of $k_i, i \in \{1,2\}$. I now proceed to find out the optimal threshold k_i^* and the best response $x*(k_i^*)$ in the following three steps.

Step 1. Rearranging terms of the first-order condition as expressed in Equation (13), for group 1,

$$f_1(k_1 + \alpha_1(x - x_1)^2) = -\frac{1}{\lambda_1 \delta V} - \frac{\alpha_2}{\lambda_1 \alpha_1 \delta V} \frac{x - x_2}{x - x_1} - \frac{\lambda_2 \alpha_2}{\lambda_1 \alpha_1} \frac{x - x_2}{x - x_1} f_2(k_2 + \alpha_2(x - x_2)^2) \tag{14}$$

It is straightforward to verify that the right-hand side of Equation (14) is decreasing in x, given that $x_1 < x_2$ and $x_1 < x < x_2$ and if $f_2'(k_2 + \alpha_2(x - x_2)^2) \geq 0$, which is to be verified later. Accordingly, x is smallest when the left hand of Equation (14) is at the maximum. So, group 1–who prefers a low compliance level—chooses a unique cut rule k_1^* so as to maximize the left hand and thus minimize x. The assumption that $f_1(.)$ is strictly unimodal and symmetric with mean zero implies that $f_1(.)$ reaches its maximum at $f_1(0)$. Thus, to induce a lowest possible compliance level, group 1 chooses k_1^* such that $k_1^* + \alpha_1(x(k_1^*) - x_1)^2 = 0$.

Step 2. Rearranging terms of the first-order condition as expressed in Equation(13), for group 2,

$$f_2(k_2 + \alpha_2(x - x_2)^2) = -\frac{\alpha_1}{\lambda_2 \alpha_2 \delta V} \frac{x - x_1}{x - x_2} - \frac{1}{\lambda_2 \delta V} - \frac{\lambda_1 \alpha_1}{\lambda_2 \alpha_2} \frac{x - x_1}{x - x_2} f_1(k_1 + \alpha_1(x - x_1)^2) \tag{15}$$

The right hand side of Equation (15) is increasing in x, because $x_1 < x < x_2$ and $f_1'(k_1 + \alpha_1(x - x_1)^2) \geq 0$. Regarding $f_1'(k_1 + \alpha_1(x - x_1)^2) \geq 0$, it is satisfied at k_1^* because, as shown in Step 1, group 1 chooses k_1^* such that $k_1^* + \alpha_1(x(k_1^*) - x_1)^2 = 0$ and thus $f_1'(0) = 0$. Thus, x is biggest when the left hand of Equation (15) is at the maximum. So, group 2—who prefers a high compliance level—chooses a unique cut rule k_2^* so as to maximize the left hand. Again, the assumption that $f_2(.)$ is strictly unimodal and symmetric with mean zero implies that $f_2(.)$ reaches its maximum at $f_2(0)$. Thus, to induce the highest possible compliance level, group 2 chooses k_2^* such that $k_2^* + \alpha_2(x(k_2^*) - x_2)^2 = 0$, and thus $f_2'(0) = 0$.

Because k_2^* is chosen such that $k_2^* + \alpha_2(x(k_2^*) - x_2)^2 = 0$ and thus $f_2'(0) = 0$, the condition pending for verification from Step 1, $f_2'(k_2 + \alpha_2(x - x_2)^2) \geq 0$, is therefore satisfied at k_2^*.

Therefore, interest group i chooses the optimal cut rule k_i^* such that $k_i^* + \alpha_i(x(k_i^*) - x_i)^2 = 0$, for $i \in \{1,2\}$, as given in Equation (4).

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Step 3. With the optimal strategies k_i^* such that $k_i^* + \alpha_i(x(k_i^*) - x_i)^2 = 0, i \in \{1,2\}$, Equation (13) which implicitly defines the policymaker's best response x^* becomes

$$-\sum_{i=1}^{2} \alpha_i(x^* - x_i) - \sum_{i=1}^{2} \lambda_i \alpha_i (x^* - x_i) f_i(0) \delta V = 0 \tag{16}$$

Because f_i is strictly unimodal and symmetric with mean zero, the value of $f_i(0)$ decreases with the variance of the density function f_i. That is, the better informed group i is, the higher the $f_i(0)$ value. This term expresses how well informed group i is. Letting $f_i(0) = \phi_i$, one can solve directly for the incumbent policymaker's best response, $x_{t=1}^*(k_i^*) = \sum_{i=1}^{2} \alpha_i(1 + \lambda_i \phi_i \delta V) x_i / \sum_{i=1}^{2} \alpha_i(1 + \lambda_i \phi_i \delta V)$, as given in Equation (3).

It remains to check that the second-order condition is indeed satisfied at x^* and k_i^*. Carrying on from Equation (13), the necessary second-order condition is

$$-\sum_{i=1}^{2} \alpha_i - \sum_{i=1}^{2} \lambda_i \alpha_i \delta V f_i(k_i + \alpha_i(x - x_i)^2)$$

$$- \sum_{i=1}^{2} 2\lambda_i \alpha_i^2 \delta V (x - x_i)^2 f_i'(k_i + \alpha_i(x - x_i)^2) < 0 \tag{17}$$

This is true because $k_i^* + \alpha_i(x^*(k_i^*) - x_i)^2 = 0$, $f_i(0) > 0$, and $f_i'(0) = 0, \forall i \in \{1,2\}$.

Proof of Proposition 2. I now turn to what makes the second period compliance policy differ from that in the first period. Given $x_{t=1}^*(k_i^*)$ and $x_{t=2}^*$ as in Proposition 1, $\forall i \in \{1,2\}$,

$$x_{t=1}^*(k_i^*) = x_{t=2}^* \Leftrightarrow \frac{\alpha_1(1 + \lambda_1 \phi_1 \delta V) x_1 + \alpha_2(1 + \lambda_2 \phi_2 \delta V) x_2}{\alpha_1(1 + \lambda_1 \phi_1 \delta V) + \alpha_2(1 + \lambda_2 \phi_2 \delta V)} = \frac{\alpha_1 x_1 + \alpha_2 x_2}{\alpha_1 + \alpha_2}$$

$$\Leftrightarrow \alpha_1 \alpha_2 \delta V (x_2 - x_1)(\lambda_2 \phi_2 - \lambda_1 \phi_1) = 0$$

$$\Leftrightarrow \lambda_2 \phi_2 = \lambda_1 \phi_1, \text{ because } \alpha_i > 0, \delta > 0, V > 0, \text{ and } x_2 > x_1 \tag{18}$$

Thus, $x_{t=1}^*(k_i^*) = x_{t=2}^* \Leftrightarrow \lambda_1 \phi_1 = \lambda_2 \phi_2$, as provided in Proposition 2.

Furthermore, it is straightforward to verify the following comparative statics:

$$\frac{\partial}{\partial \lambda_2} x_{t=1}^* = \frac{\partial}{\partial \lambda_2} \frac{\alpha_1(1 + \lambda_1 \phi_1 \delta V) x_1 + \alpha_2(1 + \lambda_2 \phi_2 \delta V) x_2}{\alpha_1(1 + \lambda_1 \phi_1 \delta V) + \alpha_2(1 + \lambda_2 \phi_2 \delta V)}$$

$$= -\alpha_2 \phi_2 \delta V \alpha_1 \frac{-(x_2 - x_1)(1 + \lambda_1 \phi_1 \delta V)}{(\alpha_1 + \alpha_1 \lambda_1 \phi_1 \delta V + \alpha_2 + \alpha_2 \lambda_2 \phi_2 \delta V)^2} \tag{19}$$

$$> 0$$

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$$\frac{\partial}{\partial \phi_2} x^*_{t=1} = \frac{\partial}{\partial \phi_2} \frac{\alpha_1(1+\lambda_1\phi_1\delta V)x_1 + \alpha_2(1+\lambda_2\phi_2\delta V)x_2}{\alpha_1(1+\lambda_1\phi_1\delta V) + \alpha_2(1+\lambda_2\phi_2\delta V)}$$

$$= -\alpha_2\lambda_2\delta V\alpha_1 \frac{-(x_2-x_1)(1+\lambda_1\phi_1\delta V)}{(\alpha_1+\alpha_1\lambda_1\phi_1\delta V+\alpha_2+\alpha_2\lambda_2\phi_2\delta V)^2}$$

$$> 0 \tag{20}$$

$$\frac{\partial}{\partial \lambda_1} x^*_{t=1} = \frac{\partial}{\partial \lambda_1} \frac{\alpha_1(1+\lambda_1\phi_1\delta V)x_1 + \alpha_2(1+\lambda_2\phi_2\delta V)x_2}{\alpha_1(1+\lambda_1\phi_1\delta V) + \alpha_2(1+\lambda_2\phi_2\delta V)}$$

$$= \alpha_1\phi_1\delta V\alpha_2 \frac{-(x_2-x_1)(1+\lambda_2\phi_2\delta V)}{(\alpha_1+\alpha_1\lambda_1\phi_1\delta V+\alpha_2+\alpha_2\lambda_2\phi_2\delta V)^2}$$

$$< 0 \tag{21}$$

$$\frac{\partial}{\partial \phi_1} x^*_{t=1} = \frac{\partial}{\partial \phi_1} \frac{\alpha_1(1+\lambda_1\phi_1\delta V)x_1 + \alpha_2(1+\lambda_2\phi_2\delta V)x_2}{\alpha_1(1+\lambda_1\phi_1\delta V) + \alpha_2(1+\lambda_2\phi_2\delta V)}$$

$$= \alpha_1\lambda_1\delta V\alpha_2 \frac{-(x_2-x_1)(1+\lambda_2\phi_2\delta V)}{(\alpha_1+\alpha_1\lambda_1\phi_1\delta V+\alpha_2+\alpha_2\lambda_2\phi_2\delta V)^2}$$

$$< 0 \tag{22}$$

Appendix 2: *Variables Used to Measure Domestic Environmental Activism*

Euro-Barometer 25: Holiday travel and environmental problems, April 1986[70]
- Public opinion or awareness of acid rain as damage to the environment: variable 172
- Public opinion over the environment in general: variable 218
- Membership in environmental NGOs: variables 276 and 277
- Voting intention for Green parties or other ecologist parties: variable 286

Euro-Barometer 29: Environmental problems and cancer, March–April 1988[71]
- Public awareness about acid rain as damage to the environment: variable 181
- Public opinion over the environment in general: variable 221

Euro-Barometer 31A: European elections; postelection, June–July 1989[72]
- Public awareness of acid rain: variable 488
- How well informed are people about acid rain: variables 503 and 504
- Public opinion over the environment in general: variable 323
- Voting intention for green parties or other ecologist parties: variable 656

70. Rabier, Riffault, and Inglehart 1988.
71. Reif and Melich 1990.
72. Reif and Melich 1993.

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Euro-Barometer 35: Foreign relations, the common agricultural policy, and environmental concerns, Spring 1991[73]
- Public awareness of acid rain: variable 127
- How well informed are people about acid rain: variables 145 and 146
- Public opinion over environmental protection in general: variable 114
- Voting intention for Green parties or other ecologist parties: variable 235

International Social Survey Program: Environment, 1993[74]
- Concern over industry pollution (a main source of acid rain): variable 46
- Public opinion over the environment in general: variable 13
- Membership in environmental NGOs: variable 60

Euro-Barometer 43.1BIS: Regional development and consumer and environmental issues, May–June 1995[75]
- Public awareness of acid rain as damage to the environment: variable 170
- Public opinion over the environment in general: variable 182
- Membership in environmental NGOs: variable 188

Appendix 3. *Ranking countries by domestic environmental activism over acid rain*

	Public opinion acid rain	*Public opinion environment*	*NGOs membership*	*Votes for Greens*	*Score*	*Ranking*
Euro-Barometer 25	*v172*	*v218*	*v276/v277*	*v286*		
Denmark	2	1	1	4	8	1
West Germany	3	3	5	1	12	2
Netherlands	1	5	2	5.5	13.5	3
Belgium	4	6	3	2	15	4
Italy	6	2	4	5.5	17.5	5
France	5	4	6	3	18	6
Euro-Barometer 29	*v181*	*v221*				
Denmark	1	1			2	1
West Germany	4	2			6	2
Netherlands	2	5			7	3
Belgium	3	6			9	5
Italy	6	3			9	5
France	5	4			9	5
Euro-Barometer 31A	*v488/v503/v504*	*v323*		*v656*		
Denmark	2	3		1	6	1
West Germany	2	2		3	7	2
Netherlands	2	1		6	9	3
Belgium	4	4		2	10	4
Italy	5.5	5		5	15.5	5
France	5.5	6		4	15.5	6
Euro-Barometer 35	*v127/v145/v146*	*v114*		*v235*		
Denmark	1	1		6	8	2

73. Reif and Melich 1998.
74. International Social Survey Program 1996.
75. Reif and Marlier 1998.

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	Public opinion acid rain	*Public opinion environment*	*NGOs membership*	*Votes for Greens*	*Score*	*Ranking*
West Germany	2.5	3		3	8.5	3
Netherlands	2.5	2		2	6.5	1
Belgium	4	4		4	12	4
Italy	5.5	5		5	15.5	6
France	5.5	6		1	12.5	5
ISSP Environment	*v46*	*v13*	*v60*			
West Germany	1	2	2		5	1
Netherlands	6	3	1		10	2
Norway	7	1	3		11	3
Italy	3	6	4		13	4
Czechoslovakia	5	4	5		14	5
East Germany	2	7	6		15	6
Bulgaria	4	5	8		17	7
Hungary	8	8	7		23	8
Euro-Barometer 43	*v170*	*v182*	*v188*			
Sweden	2	2	3		7	1
Denmark	6	1	2		9	2.5
Netherlands	4	4	1		9	2.5
Finland	1	3	6		10	4
Austria	3	7	4		14	5
East Germany	5	5	5		15	6
Italy	8	6	8		22	7
Belgium	7	9	7		23	8
France	9	8	9		26	9

Note: *v* = variable.

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