

INFORMATION SYSTEMS IN TREATY REGIMES

By XINYUAN DAI*

SINCE the mid-1980s work on international institutions has been largely influenced by one simple model: the repeated Prisoner's Dilemma (PD). In light of this model, international institutions are seen as resolving the collective action problem by providing compliance information and thereby facilitating compliance mechanisms such as reciprocity or reputation.¹ Although information provision by international institutions lies at the foundation of neoliberal institutionalism, little effort has been made to specify exactly how international institutions provide information on compliance.

In the great domain of international life, there is tremendous diversity in how information systems are organized. Thus, for example, in the Nonproliferation Treaty (NPT) regime the treaty organization carries out both routine and special inspections; in contrast, most human rights treaty organizations rarely go beyond collecting governmental self-reports. While these examples show the diversity in how much or how little treaty organizations do, the following examples illustrate the diversity in how involved other actors are in different treaty regimes. The rules of the General Agreement on Tariffs and Trade (GATT) and those of the World Trade Organization (WTO) are enforced only when states file formal complaints, whereas in many environmental regimes nongovernmental organizations (NGOs) are the ones to detect noncompliance and bring it to light. In fact, except in a few large and strong regimes, treaty organizations themselves rarely perform the function of information provision completely on their own.

What accounts for the diverse organizational forms of information systems? I answer this question by specifying the underlying incentive

* I thank Damon Coletta, Paul Diehl, Daniel Drezner, James Fearon, Robert Keohane, Charles Lipson, Sharon Morris, Charles Myers, Robert Pahre, Michel Regenwetter, Duncan Snidal, and the anonymous reviewers for their very helpful comments on previous drafts, as well as Douglas Stinnet for excellent editorial assistance. Financial support from the MacArthur Foundation and the U.S. Institute of Peace is gratefully acknowledged.

¹ Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton: Princeton University Press, 1984).

structures in regimes across a range of issue-areas. Although institutional outcomes are complex phenomena that relate to multiple theories, the main concern here is with the political economy of monitoring arrangements. Taking primarily a rationalist perspective, I assume for simplicity that states are the principal decision makers regarding international institutions. Furthermore, states are guided by their interests. Facing resource constraints, they are concerned with efficiency.² Thus, two critical questions present themselves: do states have interests in monitoring and how do they pursue cost-effective monitoring arrangements?

I argue that two factors—the common or divergent interests of non-compliance victims and their states and the presence or absence of non-compliance victims as low-cost monitors—provide a concrete handle for addressing the above questions. To assess states' interests in monitoring, we need to know whether they want to protect the potential victims of noncompliance. This will depend on who the victims are and whether their interests and the interests of their states are aligned. Additionally, because states must tackle multiple domestic and international tasks simultaneously, they face resource constraints. To pursue cost-effective solutions, states may turn to other stakeholders who are able to detect noncompliance and who are willing to bring this information to light. The availability of noncompliance victims as low-cost monitors thus interacts with states' interests in shaping how states design monitoring arrangements. Along these two dimensions, cost-effective monitoring solutions differ among regimes.

Differentiating and explaining monitoring arrangements is important from several perspectives. Theoretically, it fills a hole in the institutionalist literature, where compliance mechanisms require information on noncompliance and yet where it is unclear how international institutions provide this information. By focusing on monitoring arrangements, this article complements work on enforcement,³ because the detection of treaty violations is a prerequisite for enforcement. Furthermore, compliance information can be important even in regimes that have no formal enforcement provisions,⁴ because potential punishment sometimes rests on tacit expectations regarding the consequences

² Duncan Snidal, "Political Economy and International Institutions," *International Review of Law and Economics* 16 (March 1996).

³ George W. Downs, David M. Rocke, and Peter N. Barsoom, "Is the Good News about Compliance Good News about Cooperation?" *International Organization* 50 (Summer 1996).

⁴ I thank an anonymous reviewer for emphasizing this point.

of noncompliance.⁵ Such informal enforcement can be international or domestic.⁶ In addition, while compliance information is obviously critical in situations where enforcement formally or informally plays a role, such information is also important for compliance mechanisms other than enforcement. Compliance information is important, for example, even in situations where compliance is treated as a management issue.⁷ Overall—whether treaty regimes embody formal enforcement provisions or not, whether actual enforcement sources are international or domestic, and whether compliance is enforced or managed—virtually all compliance mechanisms require some level of compliance information. Thus, arrangements to monitor compliance warrant independent study in their own right. By focusing on *monitoring* arrangements rather than *enforcement* mechanisms,⁸ this article contributes broadly to scholarship on international institutions and compliance.

This research also has significant policy implications. As the importance of international institutions grows—a fact that is evident from the transformation of existing institutions and the creation of new institutions—practitioners and scholars alike are concerned with how to make international institutions more effective. Frequently, recommendations for making a specific regime effective reference successful institutional features in other regimes. It is suggested, for example, that some environmental regimes should copy centralized inspection procedures such as those in the NPT regime or the Chemical Weapons Convention.⁹ This study suggests that such prescriptions are problematic, not because we cannot learn from other regimes, but because such learning must be based on an understanding of the different incentive structures underlying different regimes. Do states' interests allow such

⁵ George W. Downs, "Enforcement and the Evolution of Cooperation," *Michigan Journal of International Law* 19 (Spring 1998).

⁶ Downs, Rocke, and Barsoom (fn. 3) demonstrate that the expectation that punishment may follow any dramatic defection played an important role in complying with some U.S.-Soviet arms control agreements, despite the lack of formal enforcement provisions in these treaties. Elsewhere this author explores the role of domestic enforcement in some regimes where enforcement provisions are formally lacking. See Xinyuan Dai, "Compliance without Carrots or Sticks: How International Institutions Influence National Policies" (Ph.D. diss., University of Chicago, 2000).

⁷ Ronald B. Mitchell, "Regime Design Matters: Intentional Oil Pollution and Treaty Compliance," *International Organization* 48 (Summer 1994); Abram Chayes and Antonia Handler Chayes, *The New Sovereignty: Compliance with International Regulatory Agreements* (Cambridge: Harvard University Press, 1995).

⁸ Although monitoring and enforcement are closely related analytically, they are nevertheless distinct; similarly, who is in the position to collect information and who can actually use the information to enforce behavioral change are two different issues.

⁹ George Downs highlights the prescriptive nature in the study of environmental regimes. See Downs, "Constructing Effective Environmental Regimes," *Annual Review of Political Science* 3 (2000).

centralized procedures? Are such procedures efficient or cost effective? Because such incentive structures vary substantially among regimes, policymakers seeking to devise the most effective solution need to understand the conditions under which such an arrangement can be sustained. It is thus essential to focus on *incentive-compatible* solutions, rather than on the most *effective* monitoring arrangements.¹⁰

By emphasizing the differences in the incentive structures that give rise to different monitoring arrangements, this article ultimately has implications for the pursuit of effectiveness. In particular, it helps determine whether an effective monitoring arrangement is sustainable given the particular incentive structure. It also provides some clues for how policymakers can make incentive-compatible solutions more effective. For instance, while many treaty organizations face resource constraints, international institutions can utilize the information flow from voluntary monitors—those stakeholders that may be willing and able to detect noncompliance at low cost. In designing and reforming international institutions, states can devise ways—formally and/or informally—to facilitate this information flow.¹¹

Four sections follow. Section I draws upon the bureaucratic control literature and more broadly the new institutionalism to spell out the theoretical approach. Section II analyzes how underlying incentive structures shape monitoring arrangements. Section III illustrates how this theory can shed light on diverse monitoring arrangements in substantively important treaty regimes. Section IV concludes.

I. THE LITERATURE: ASYMMETRIC INFORMATION AND SOLUTIONS

Information provision by international institutions lies at the foundation of neoliberal institutionalism. As Robert Keohane argues, international institutions create situations similar to the iterated Prisoner's Dilemma through issue linkage and they facilitate cooperation as an equilibrium outcome through information provision.¹² According to Duncan Snidal, regimes that address different problems may have dif-

¹⁰ Throughout the article, I ask how varying incentive structures give rise to observed monitoring arrangements. But I do not claim or imply that what we observe empirically are the most effective monitoring arrangements in terms of discovering all incidences of noncompliance.

¹¹ To take advantage of low-cost monitors, states need not formally institutionalize these decentralized monitors. Neither is it necessary for these nonstate monitors to cease the pursuit of their self-interest or independence. The relationship between nonstate monitors and treaty organizations varies, which I will discuss in more detail later with empirical examples.

¹² Keohane (fn. 1). See also Robert O. Keohane, "The Demand for International Regimes," in Stephen D. Krasner, ed., *International Regimes* (Ithaca, N.Y.: Cornell University Press, 1983).

ferent informational requirements.¹³ While regimes pertaining to coordination problems need only gather information on parties' preferences, regimes solving PD problems require, in addition, information on compliance behavior. Alternatively, as James Fearon suggests, international cooperation involves first negotiation (as in a bargaining game) and then enforcement (as in a PD game).¹⁴ If international institutions are to provide information to facilitate cooperation, they need to provide information on parties' preferences at the negotiation stage and information on compliance behavior at the enforcement stage. It is in fact a centerpiece of neoliberal institutionalism that international institutions provide *compliance* information to facilitate compliance with international agreements.

Yet exactly how do international institutions provide compliance information? Why do arrangements to monitor compliance differ among regimes? And what accounts for the diverse organizational forms of information systems? Surprisingly, contemporary IR scholarship provides no clear theoretical answers to these critical questions.¹⁵ To understand monitoring arrangements, this article builds on insights both from the bureaucratic control literature in the agency framework and from the new institutionalism more generally.

To analyze specific monitoring arrangements, we must focus on asymmetric information and the literature that directly addresses it. Once a party signs an agreement with all other parties, it may have incentives to shirk its own responsibilities while benefiting from the contribution of others. Although other parties want to prevent noncompliance by this party, they do not have as much information on this party's compliance behavior as the party itself does. The need for monitoring emerges from this problem of asymmetric information.

¹³ Snidal, "Coordination versus Prisoner's Dilemma: Implications for International Cooperation and Regimes," *American Political Science Review* 79 (December 1985). See also Arthur A. Stein, "Coordination and Collaboration: Regimes in an Anarchic World," in Krasner (fn. 12); Lisa L. Martin, "The Rational State Choice of Multilateralism," in John Gerard Ruggie, ed., *Multilateralism Matters* (New York: Columbia University Press, 1993); James D. Morrow, "Modeling the Forms of International Cooperation: Distribution versus Information," *International Organization* 48 (Summer 1994); and Downs, Rocke, and Barsoom (fn. 3). For broader functions of international organizations, see Kenneth W. Abbott and Duncan Snidal, "Why States Act through Formal International Organizations," *Journal of Conflict Resolution* 42 (February 1998).

¹⁴ Fearon, "Bargaining, Enforcement, and International Cooperation," *International Organization* 52 (Spring 1998).

¹⁵ Ronald Mitchell addresses transparency, a related but more general question; see Mitchell, "Sources of Transparency: Information Systems in International Regimes," *International Studies Quarterly* 42 (March 1998). Barbara Koremenos, Charles Lipson, and Duncan Snidal address variations in institutional features such as membership, scope, and flexibility, but not monitoring arrangements; see Koremenos, Lipson, and Snidal, "The Rational Design of International Institutions," *International Organization* 55 (Autumn 2001).

Solutions to problems of asymmetric information are treated extensively in the agency literature.¹⁶ The literature on political control of bureaucracy, in particular, explores how Congress controls bureaucratic agencies, despite its informational disadvantage. As Mathew McCubbins and Thomas Schwartz argue, Congress overcomes its informational disadvantage by externalizing monitoring costs to "fire alarms." That is, instead of directly monitoring administrative agencies' compliance with legislative goals, Congress enables individual citizens and organized interest groups to monitor administrative agencies.¹⁷ The more interest groups are adversely affected by agency decisions, the more motivated they become to monitor agencies and seek remedies from Congress.¹⁸ Furthermore, Congress adopts administrative procedures that facilitate such cost-effective solutions. These procedures make it easier for the constituents to monitor agencies' decisions and affect the costs to agencies of implementing policies that are opposed by these constituents.¹⁹

Similarly, to the extent that they can detect noncompliance, potential victims of noncompliance provide a partial solution to the information problem in treaty regimes. One caveat is that the relationship between Congress and bureaucratic agencies differs from that between international institutions and signatory countries. Whereas agencies are created and their power delegated to them by Congress, international institutions by contrast are negotiated by participating countries, and

¹⁶ David M. Kreps, *A Course in Microeconomic Theory* (Princeton: Princeton University Press, 1990); see also Bengt Holmström, "Moral Hazard and Observability," *Bell Journal of Economics* 10 (Spring 1979).

¹⁷ McCubbins and Schwartz, "Congressional Oversight Overlooked: Police Patrols versus Fire Alarms," *American Journal of Political Science* 29 (February 1984).

¹⁸ Arthur Lupia and Mathew McCubbins address a credibility problem of fire alarms and explore ways in which Congress can influence the amount of useful information available in the course of legislating administrative arrangements. See Lupia and McCubbins, "Designing Bureaucratic Accountability," *Law and Contemporary Problems* 57 (Winter-Spring 1994); idem, "Learning from Oversight: Fire Alarms and Police Patrols Reconstructed," *Journal of Law, Economics and Organization* 10 (April 1994). For a larger framework of how people in general get informed by third parties, see Arthur Lupia and Mathew D. McCubbins, *The Democratic Dilemma: Can Citizens Learn What They Need to Know* (New York: Cambridge University Press, 1998). Arguably, although verification is important, even being suspected of committing violations can often cause much damage and thus may have some deterrent effect.

¹⁹ Mathew D. McCubbins, Roger G. Noll, and Barry R. Weingast, "Administrative Procedures as Instruments of Political Control," *Journal of Law, Economics and Organization* 3 (Fall 1987); idem, "Structure and Process, Politics and Policy: Administrative Arrangements and the Political Control of Agencies," *Virginia Law Review* 75, no. 2 (1989). Still debatable, however, is the extent to which administrative procedures control agencies and to which Congress indeed stacks the deck. As Kathleen Bawn argues, Congress's use of administrative procedures depends on technical uncertainty about the policy consequences and uncertainty about the political environment; see Bawn, "Political Control versus Expertise: Congressional Choices about Administrative Procedures," *American Political Science Review* 89 (March 1995).

thus they do not have as much leverage over participating countries as Congress has over agencies. This is not to say, however, that factions within Congress never allow agencies to evade sanctions and that winning coalitions embodied by international institutions cannot successfully punish a noncomplying country. More importantly, direct sanctions are rarely the key mechanisms of enforcement in either arena.²⁰

The way in which Congress mitigates its informational disadvantage echoes a key proposition of "the new institutionalism": *institutions define an organizational form regarding monitoring and information transmission*.²¹ In the law merchant system, as analyzed by Paul Milgrom, Douglas North, and Barry Weingast,²² a trader would know whether his trading partner has been honest or has cheated during or after a trade was conducted. But an outsider cannot readily observe what has transpired in a given bilateral trade. The law merchant thus serves as a repository and communicator of information. Although the basic logic of the law merchant system holds, information systems at the international level are usually more complex.²³ First, the effect of noncompliance by a state may not be experienced by another state with a reasonably short delay. Depending on the behavior that is regulated, the detection of noncompliance can be costly. Second, states are not unitary. Governments—the primary decision makers for international monitoring arrangements—may or may not represent the interests of noncompliance victims. Accordingly, the channels through which noncompliance is brought to light are more complicated.

²⁰ As McCubbins, Noll, and Weingast (fn. 19) argue, Congress's ability to apply sanctions is limited. Elsewhere, Dai (fn. 6) identifies the domestic constituency mechanism as an alternative to the logic of carrots and sticks in interstate politics.

²¹ See Paul R. Milgrom, Douglas C. North, and Barry R. Weingast, "The Role of Institutions in the Revival of Trade: The Medieval Law Merchant, Private Judges, and the Champagne Fairs," *Economics and Politics* 2 (March 1990); Randall L. Calvert, "Rational Actors, Equilibrium, and Social Institutions," in Jack Knight and Itai Sened, eds., *Explaining Social Institutions* (New York: Cambridge University Press, 1994); Avner Greif, Paul Milgrom, and Barry R. Weingast, "Coordination, Commitment, and Enforcement: The Case of the Merchant Guild," *Journal of Political Economy* 102 (August 1994). For a study of organizational forms of trade liberalization, see Beth V. Yarbrough and Robert M. Yarbrough, *Cooperation and Governance in International Trade* (Princeton: Princeton University Press, 1992).

²² Milgrom, North, and Weingast (fn. 21).

²³ For information provision by institutions at various aggregate levels, see Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (New York: Cambridge University Press, 1990); Margaret A. McKean, "Success on the Commons: A Comparative Examination of Institutions for Common Property Resource Management," *Journal of Theoretical Politics* 4 (July 1992); Peter Haas, Robert O. Keohane, and Marc Levy, eds., *Institutions for the Earth: Sources of Effective International Environmental Protection* (Cambridge: MIT Press, 1993); Elinor Ostrom and Robert O. Keohane, "Introduction," *Journal of Theoretical Politics* 6 (October 1994). For a cautious view on transferring propositions across levels of analysis, see Oran Young, "The Problem of Scale in Human/Environment Relationships," *Journal of Theoretical Politics* 6 (October 1994).

Availability of Noncompliance Victims as Low-Cost Monitors	
	<div>Yes</div> <div>No</div>
Interest Alignment between Noncompliance Victims and Their States	<div>Yes</div> <div>monitoring by victims and states</div> <div>monitoring by treaty organizations</div>
	<div>No</div> <div>monitoring by victims and NGOs</div> <div>monitoring by NGOs</div>

FIGURE 1
ORGANIZATIONAL FORMS OF INFORMATION SYSTEMS

The next section addresses directly how international institutions provide compliance information, specifically, by discussing who detects noncompliance and who brings it to light, and why.

II. A THEORY OF INFORMATION SYSTEMS

To account for specific monitoring arrangements in different regimes, we need to examine the strategic environment in which they are devised and, accordingly, the incentives of states in designing international institutions. To provide a concrete handle for such an assessment, I consider two principal dimensions: the interest alignment between noncompliance victims and their states and the availability of noncompliance victims as low-cost monitors. The interaction of these dimensions lead to four different forms of monitoring, as summarized in Figure 1.

Why these dimensions? How is each defined? How do they together account for the organizational forms of information systems? In the following, I elaborate the rationale and define the two principal determinants, respectively. I then discuss the resulting monitoring solutions.

INTEREST ALIGNMENT BETWEEN NONCOMPLIANCE VICTIMS AND THEIR STATES

As states are the primary decision makers in establishing and reforming international institutions, it is critical to know what they have to lose if

noncompliance goes unnoticed. This will depend on the relationship between states and those injured by noncompliance. To assess this relationship, I pose two questions. *First, who are the potential victims of noncompliance?* The potential victims of one country's noncompliance can be other states, as in most security regimes; nonstate actors in other states, as in trade regimes; or nonstate actors in that same country, as in most human rights regimes. *Second, do states have incentives to protect noncompliance victims?* The answer is straightforward in two cases. When the victims of one country's noncompliance are other states, as in security regimes, these other states are good agents for themselves. When the victims of one country's noncompliance are domestic nonstate actors, as in human rights regimes, this state does not represent the victims' interests. When, however, the victims of one country's noncompliance are nonstate actors in other states, the interest alignment is more complex. Indeed, these other states may or may not protect the victims. They have incentives to protect the victims unless such protection conflicts with more important subnational interests. For instance, the GATT/WTO tends to represent interests of producers more than those of consumers. In many environmental regimes states have competing incentives to simultaneously protect their citizens from other countries' noncompliance and shelter their own industries from expensive compliance measures.

To the extent that noncompliance victims are protected by their own states, I say that the interests of noncompliance victims and those of their states are aligned.²⁴ Thus, as shown in Figure 2, I derive one determinant of monitoring arrangements by considering who the noncompliance victims are and whether their governments have incentives to protect them. That is, *are the interests of noncompliance victims and those of their governments aligned?* In other words, *are states good agents of noncompliance victims?*

THE AVAILABILITY OF NONCOMPLIANCE VICTIMS AS LOW-COST MONITORS

States' interests alone do not determine the design of monitoring arrangements. Because states simultaneously tackle multiple domestic and international tasks, they face resource constraints. To pursue cost-

²⁴ It is important to note that the interest alignment in my theory is between noncompliance victims and their own states. A different kind of alignment—cross-country interest alignment—is possible where, for instance, state A has incentives to protect human rights victims in country X. But that is not how the interest alignment in this article is defined. Empirically, such interests of states are often derivatives of other more fundamental interests.

Who are Noncompliance Victims?

Are Noncompliance Victims Protected by Their BGovernments?	Who are Noncompliance Victims?		
	Other States	Nonstate Actors in Other States	Nonstate Actors in One's Own State
Yes	aligned	aligned	
No		or not aligned	not aligned

FIGURE 2

INTEREST ALIGNMENT BETWEEN NONCOMPLIANCE VICTIMS AND THEIR STATES

effective solutions, states often recognize that there are other stakeholders in most regimes. To the extent that the potential victims of noncompliance can easily detect noncompliance, they suggest a relatively cheaper solution to the informational problem in treaty regimes. Accordingly, the existence of noncompliance victims as low-cost monitors partially shapes the choice of monitoring arrangements made by states concerned with efficiency. To assess the availability of noncompliance victims as low-cost monitors, we need to answer two separate questions. *First, is the effect of noncompliance apparent or latent?* The easiest way to detect noncompliance is when its consequence is clearly felt or seen, as with human rights victims, who suffer directly from abuses. So do export firms from import constraints. However, when the consequence of noncompliance is latent, as in the cases of armament or ozone depletion, no obvious indicators alert potential victims and, thus, the detection of noncompliance is much more costly. *Second, are those affected able to discern the source of noncompliance?* Even when the effect of noncompliance is directly felt or seen, it is not always a straightforward matter to pin down the source of noncompliance. For instance, in common pool resource situations such as fisheries, the reduction of commonly shared resources may be obvious, but whose action has caused it is not transparent. While many environmental regimes face this difficulty, noncompliance victims in human rights and trade regimes are often able to discern the source of noncompliance.

To the extent that noncompliance victims can detect both the effect and the source of noncompliance, I say that they are available as low-

Effect of Noncompliance

		Apparent	Latent
Source of Noncompliance	Obvious	low-cost monitors available	low-cost monitors lacking
	Ambiguous	low-cost monitors lacking	

FIGURE 3

AVAILABILITY OF NONCOMPLIANCE VICTIMS AS LOW-COST MONITORS

cost monitors.²⁵ Thus, as shown in Figure 3, I derive the other determinant of monitoring arrangements by considering whether the source of noncompliance is obvious and whether the effect is transparent. That is, *are noncompliance victims available as low-cost monitors?* In other words, *are noncompliance victims in a convenient position to detect noncompliance?*

RESULTING MONITORING ARRANGEMENTS

The above two principal determinants interact to shape the monitoring arrangements in treaty regimes. At one level, given the interest (non)alignment between victims and their states, whether victims are available as low-cost monitors determines who may detect noncompliance. At another level, given the (in)ability of victims to detect noncompliance, whether states have incentives to protect victims determines who may bring noncompliance information to light. It is important to note that the two stages of monitoring—detecting noncompliance and then bringing it to light—are generally associated with somewhat different levels of centralization.²⁶ While victims can some-

²⁵ Note that the cost is defined as the extra effort by noncompliance victims in discovering whether they are being victimized and who is injuring them. A low-cost monitor is such because he may directly experience noncompliance, not because his monitoring does not cost states anything. Therefore, one cannot infer from my definition of low-cost monitors that NGOs are generally low-cost monitors simply because, from the perspective of states, their monitoring costs nothing.

²⁶ Throughout this article, centralization refers to the degree to which monitoring tasks are carried out by treaty organizations.

times easily detect noncompliance, collecting the information and bringing it to light often require some involvement by states and/or nongovernmental organizations.²⁷ Such interactions between the two dimensions give rise to four types of cost-effective monitoring arrangements, as illustrated in Figure 1.

When interests are aligned between noncompliance victims and their states, states desire a sound monitoring system. However, their willingness to contribute resources and delegate authority to treaty organizations depends on whether there are cheaper ways to do the job. *If noncompliance victims are not in a convenient position to detect noncompliance* (the upper-right-hand corner of Figure 1), then states have to either monitor each other themselves or contribute resources for treaty organizations to conduct centralized monitoring. My focus in this article is on multilateral regimes that, as the number of participating countries increases, tend to call for monitoring by treaty organizations on efficiency grounds. This leads to the most centralized information systems, where treaty organizations detect noncompliance and bring it to light. However, *if noncompliance victims can conveniently detect noncompliance* (the upper-left-hand corner of Figure 1), then they will utilize this informational advantage and feed the information into the right channel so that compliance can be enforced. Since the interests of noncompliance victims and those of their governments are aligned, potential victims feed noncompliance information to their governments, which in turn help bring it to the international forum. Therefore, this incentive structure results in less centralized information systems, where noncompliance victims detect noncompliance and their governments bring it to light in treaty regimes.

When interests are not aligned between noncompliance victims and their states, states are not likely to contribute to information systems. They are not only unlikely to incur costs to detect noncompliance, but also unlikely to help bring noncompliance to light. Instead, communication of noncompliance information has to depend largely on special interest groups and entrepreneurs, or more generally NGOs. On the one hand, the absence of states' interests in information systems creates a vacuum for NGOs to fill. On the other hand, more subtly, the involvement of NGOs further reinforces the underinvestment by states in these monitoring arrangements. These information systems are accordingly the most decentralized. *If noncompliance victims can conveniently detect non-*

²⁷ This is consistent with some lessons from the bureaucratic agency literature: while noncompliance is often detected by fire alarms, communication of this information is often assisted by police patrol.

compliance (the lower-left-hand corner of Figure 1), then the victims and NGOs monitor compliance jointly. Although victims have information about noncompliance, they may or may not be in a position to bring it to light.²⁸ In the latter case, interested NGOs may fill the gap in collecting compliance information and bringing it to international regimes. However, *if noncompliance victims are not in any convenient position to detect noncompliance* (the lower-right-hand corner of Figure 1), NGOs are the primary monitors of noncompliance, voluntarily incurring the cost of detecting noncompliance and then bringing it to light.

The interplay of the interest alignment between noncompliance victims and their states, together with the varying availability of noncompliance victims as low-cost monitors, thus defines monitoring tasks of different actors in different monitoring arrangements and accordingly determines the organizational forms of information systems.

COLLECTIVE ACTION PROBLEMS AMONG MONITORS

Empirically whether monitoring arrangements occur as specified above is subject to potential collective action problems among monitors. In the remainder of this section, I briefly discuss the degree to which collective action problems impede monitoring and the ways in which they may be resolved.

In contributing to the centralized monitoring bodies, states may face a collective action problem that influences the amount of resources that treaty organizations can receive and thus how thorough centralized monitoring can be. One important circumstance in which collective action problems can be resolved in a centralized information system is when some states form a privileged group, that is, when some states have incentives to ensure an effective information system even if they have to bear the full cost.²⁹ This presumes not only an asymmetry of demand for a centralized monitoring system among participating states but also sufficient resources of the privileged group. For instance, states with substantially high shares of world investment may be not only willing but also able to bear the full cost to ensure that debtors use their fund responsibly. In this sense, power capabilities, in terms of resources,

²⁸ One problem that victims may face is that of collective action. By speaking out against human rights abuses, for instance, one may attract even more abuse. Thus, there may be free-riding incentives among potential victims. I will address collective action problems in the next section.

²⁹ For the notion of privileged group, see Mancur Olson, *The Logic of Collective Action: Public Goods and the Theory of Groups* (Cambridge: Harvard University Press, 1965). For a refined version of it, see Russell Hardin, *Collective Action* (Baltimore: Johns Hopkins University Press, 1982). Applications of this notion in international relations are many. For a classic example, see Mancur Olson and Richard Zechhauser, "An Economic Theory of Alliances," *Review of Economics and Statistics* 48 (August 1966).

can influence monitoring arrangements by helping to resolve possibly severe collective action problems in centralized information systems.

Collective action problems may also affect decentralized information systems. Even when potential victims may easily detect noncompliance, they in turn face collective action problems in bringing that information to light, because frequently the cost of bringing noncompliance to light is concentrated while the benefit is diffused. In the case of human rights violations, for example, a particular victim who speaks out against human rights abuses may get targeted for more abuse. In the case of trade violations, for another example, a particular firm that incurs the cost of documenting foreign trade violations and lobbying its government to take the case to the WTO may in fact benefit the entire industry, including its competitors. There exist, however, some solutions for the collective action problems in decentralized information systems. First, decentralized monitors count on external provision of public goods by states, instead of internal provision. A collective action by a small fraction of a group—which is inadequate to provide the group's good—might be sufficient to engage its government.³⁰ For instance, it does not require all firms from the same industry to lobby the government to take the industry's case to the WTO. Second, collective action problems among decentralized monitors can often be resolved through the pursuit of private benefits. For instance, when the operation of regimes promises redress for noncompliance victims, those victimized by noncompliance can get private benefits from mobilizing to monitor compliance. Third, even a purely collective good often has diverse attributes. Different potential monitors may value different attributes differently and, by sounding alarms and getting their voices heard, they may influence the provision of the good in a way they like.³¹ Thus, for example, the resolution of trade disputes may benefit an entire industry generally. But since firms within an industry usually have different product mixes, the specifics of a trade-dispute settlement could benefit those who sound the alarm more than those who free ride.³²

Among the monitors in decentralized systems, states may want to protect their own citizens' interests and victims want to avoid being further victimized. Why may NGOs be able to resolve collective action problems? One important piece to this puzzle is that many NGOs sup-

³⁰ Hardin (fn. 29), 52.

³¹ For a discussion of asymmetry in the contents of goods, see Hardin (fn. 29).

³² For the way in which carefully drawn tariffs may easily benefit cooperative firms more than free riders, see George J. Stigler, "Free Riders and Collective Action: An Appendix to Theories of Economic Regulation," *Bell Journal of Economics and Management Science* 5 (Autumn 1974).

port themselves by keeping track of governmental policies and implementation. The level of their success partially determines their membership, which is the main source of income for most of them. The publicity that NGOs get by detecting noncompliance and particularly by bringing it to light thus serves their own interests as well.

Overall, collective action problems are ubiquitous and, when severe, may prevent potential monitors from monitoring. Nonetheless, such problems do not necessarily prevent monitoring, as is attested by the empirical observation that monitoring occurs even though not all victims sound alarms and not all NGOs attend to noncompliance of all kinds. There is always shirking, but fortunately the success of collective action often does not require the cooperation of all members. Although the varying success of collective action surely influences the effectiveness of different monitoring arrangements, the basic organizational forms of information systems are shaped primarily by the availability of noncompliance victims as low-cost monitors and the interest alignment between noncompliance victims and their states.

III. DIVERSE ORGANIZATIONAL FORMS OF INFORMATION SYSTEMS

This section illustrates how the above theory can shed light on the observed pattern of information systems in treaty regimes. Two problems immediately present themselves for an empirical account of monitoring arrangements. One problem is that monitoring arrangements are sometimes not neatly spelled out in the relevant treaties. Thus, more effort is required to look into how compliance information is gathered in practice. This difficulty is further compounded by the fact that until recently scholars have not paid much attention to monitoring arrangements, and consequently the information on monitoring arrangements is at best scattered. These two sorts of limitations constrain the depth of my empirical cases. Furthermore, to illustrate the utility of a general theory, this empirical analysis must cover a wide range of examples. My strategy, therefore, is to pursue breadth rather than depth by discussing a panoply of regimes in such diverse issue areas as money, trade, security, human rights, and the environment.

To explain monitoring arrangements in each regime, I start with the nature of the problem that the regime is designed to solve; that is, what constitutes noncompliance? To assess the interest alignment between noncompliance victims and their states, we need to know who the noncompliance victims are. The level of interest alignment is high when the victims of a country's noncompliance are other states and low when

Availability of Noncompliance Victims as Low-Cost Monitors			
		Yes	No
Interest Alignment between Noncompliance Victims and Their States	Yes	GATT	IMF, NPT environment
	No	human rights	

FIGURE 4
EMPIRICAL EXAMPLES OF MONITORING ARRANGEMENTS

the victims are domestic citizens. When victims are nonstate actors in other countries, the level of interest alignment can be measured by the degree of political organization of noncompliance victims. To assess whether noncompliance victims can cheaply detect noncompliance, we need to know what effect this noncompliance generates, who experiences it, and to whom the noncomplying behavior is transparent. Low-cost monitors are available when those injured by noncompliance directly experience its effects and readily observe its source. In examining the resulting monitoring arrangements in treaty regimes, I focus on who in practice detects noncompliance and who brings it to light.

The examples considered—the International Monetary Fund (IMF), the NPT, the GATT/WTO, and various human rights and environmental regimes—display variations in the availability of noncompliance victims as low-cost monitors and the interest alignment between noncompliance victims and their states. As they vary along these dimensions, their monitoring arrangements fall into different scenarios, as displayed in Figure 4. Of course, since each of the two principal dimensions in my theory is more than dichotomous in the real world, not all information systems fall neatly into the four corners. Furthermore, within each of the aggregate categories—human rights and environment—there are many individual treaty regimes. Each individual information system varies with its specific strategic environment and thus its location varies within its respective quadrant in the figure. The relative rather than absolute locations of these cases are more important. I shall now discuss the examples in four different quadrants of the figure.

MONITORING BY TREATY ORGANIZATIONS

Many treaty organizations merely “manage” information systems, which is often a nominal and elastic task. Only a few treaty organizations have the resources and authority to carry out the entire monitoring procedure, particularly detecting noncompliance and bringing it to light. Examples include the IMF and the NPT. I argue here that the information system in the IMF is centralized. I further explain this system in light of its strategic environment, characterized by the lack of low-cost monitors and the aligned interests between noncompliance victims and their states. I proceed to demonstrate that the strategic environment in the NPT is similar to that of the IMF and illustrate the centralized monitoring in the NPT regime.

The IMF has a very strong treaty organization with one of the largest budgets and an information system more centralized than that of most other regimes. The IMF supervises the exchange-rate policies of member states through periodic reviews of national policies and routine consultation with each member. The IMF staff studies a member's overall economic position, with emphasis on monetary and balance-of-payment elements. The member government cooperates to arrange staff visits to the member's capital. The IMF staff then reviews and revises its study before reporting at the meeting of the executive directors, where the discussion includes comments, criticism, and suggestions for policy changes. The information is usually not made public.

This centralized information system is consistent with the incentive structure characterized by two facts. First, creditor governments, with their loan returns and profits of investment at stake, are themselves noncompliance victims and thus want to be informed about debtor governments' compliance with negotiated agreements. One principal function of the IMF is to assist member countries that experience serious payment disequilibria. Through stand-by arrangements, the fund can assure a member that it will be able to borrow foreign exchange during a specified period and up to a specified amount. Qualification for borrowing on favorable terms requires meeting certain performance criteria, which usually include reduction of budget deficits, elimination of subsidies, freeing of prices, exchange-rate depreciation, and setting ceilings on total domestic credit expansion and on credit to the public sector.³³ As such orthodox measures may intensify economic hardships

³³ Joan M. Nelson, “The Political Economy of Stabilization: Commitment, Capacity and Public Response,” *World Development* 12 (October 1984).

and even political instability in the short term,³⁴ a debtor government may not fully implement the programs as negotiated.³⁵ In these situations the loan returns to creditors as well as profits from investment may be at risk, thus giving creditor governments a strong incentive to be informed of debtor governments' economic performance. Second, creditor governments, as potential noncompliance victims, are not in a convenient position to directly detect noncompliance. For instance, they do not experience the effect of domestic credit expansion, nor is it easy to trace the actual source of exchange-rate fluctuation. Meanwhile, although potential noncompliance by debtor governments may be conveniently observed by some domestic actors (for example, banks or state-owned firms), these actors experience economic hardships from orthodox measures and thus do not have incentives to expose noncompliance.³⁶ Without voluntary monitors, creditor states have to rely on authoritative institutional instruments to detect noncompliance and bring it to light in the IMF regime. Centralized monitoring thus emerges as an efficient and feasible solution.

The incentive structure in the NPT is similar to that of the IMF. First, like creditors and debtors, nuclear and nonnuclear weapon states each have something different to gain from the NPT regime. Nuclear weapon states want to enjoy the security provided by a nuclear capability but do not want nuclear technology to fall into the wrong hands. By promising not to build nuclear arsenals, nonnuclear weapon states are given valuable access to peaceful nuclear technology and the possibility of being active players in the nuclear commerce. As potential victims of noncompliance, states have a stake in preventing other countries (particularly those without nuclear weapons) from secretly developing nuclear arsenals. Second, as in the IMF, potential victims of noncompliance do not cheaply detect noncompliance. Unless a noncomplying country tests a nuclear weapon, the effect of noncompliance is usually not ex-

³⁴ For the structural disadvantage facing debtor governments, see Miles Kahler, "Orthodoxy and Its Alternatives: Explaining Approaches to Stabilization and Adjustment," in Joan M. Nelson, ed., *Economic Crisis and Policy Choice: The Politics of Adjustment in the Third World* (Princeton: Princeton University Press, 1990).

³⁵ Jeffrey D. Sachs, "Strengthening IMF Programs in Highly Indebted Countries," in Catherine Gwin and Richard E. Feinberg, eds., *The International Monetary Fund in a Multipolar World: Pulling Together* (New Brunswick, N.J.: Transaction Books, 1989); Randall W. Stone, *Lending Credibility: The International Monetary Fund and the Post-Communist Transition* (Princeton: Princeton University Press, 2002).

³⁶ Domestic actors who support compliance occasionally exist; the IMF, for instance, would seek out such actors in trying to influence debtor governments to reduce military spending. However, civilians interested in reducing military expenditures and the bureaucratic section competing for power against the military do not usually have the information on military spending. Rather they need the data that the IMF gets. See Chayes and Chayes (fn. 7).

perienced. Meanwhile, although there may be domestic actors who have an interest in disclosing their government's nuclear activities, these activities are usually classified and kept very secret.³⁷

Given the interest of states in compliance information and the lack of low-cost monitors, parties delegate substantial resources and authority to the centralized information system managed by the International Atomic Energy Agency (IAEA). Under the safeguards system, state parties are required to establish and maintain a system of accounting for and controlling all nuclear materials subject to safeguards. Besides collecting governmental reports, the IAEA conducts routine inspections on all safeguarded facilities every six months to ensure that they are not used for any military purposes. In addition, the NPT safeguards system also provides for special inspection in case of suspected noncompliance. Although detailed targets for inspection may vary, both types of investigation may include checking the consistency of reports with records; verifying the location, identity, quantity, and composition of all safeguarded nuclear materials; and investigating possible causes of materials unaccounted for, shipper/receiver differences, and uncertainties in records.³⁸

The cases of the IMF and the NPT demonstrate that the need for centralized monitoring increases when there are not noncompliance victims to serve as low-cost monitors. Meanwhile, states' interest in a sound information system—the interest alignment between states and themselves as potential noncompliance victims, in a trivial sense—determines their contribution to a costly centralized information system and thus the feasibility of such a system. In each case, the fact that a number of states constitute a privileged group helps resolve the collective action problem in establishing the centralized information system. However, it is primarily the combination of states' interests in the information systems and the lack of low-cost monitors that accounts for the particular organizational form—monitoring by treaty organizations—that states collectively aim to achieve in the IMF and the NPT.

MONITORING BY VICTIMS AND STATES

Very few information systems are as centralized as that of the IMF and the NPT. The GATT/WTO is one of the strongest treaty regimes, but its

³⁷ South Africa essentially managed to keep its twenty years of nuclear activity—leading to the bomb and eventually to nuclear dismantlement—out of the public eye. See Mitchell Reiss, *Bridled Ambition: Why Countries Constrain Their Nuclear Capabilities* (Washington, D.C.: Woodrow Wilson Center Press, 1995).

³⁸ International Atomic Energy Agency, *Information Circular (INFCIRC) 153* (Vienna, 1971).

information system is comparatively decentralized. Monitoring in the GATT/WTO is largely performed jointly by noncompliance victims and their states, rather than by the treaty organization. In this discussion I first demonstrate why the centralized arrangement—the Trade Policy Review Mechanism (TPRM)—is generally not used in practice to identify noncompliance. I then show how the often-used dispute settlement procedure encourages monitoring of noncompliance by states and private producers. I argue that this comparatively decentralized monitoring arrangement is consistent with a strategic environment that is characterized by the ability of private producers to detect noncompliance and the incentives of states to protect domestic producers from foreign trade violations.³⁹

The TPRM is generally viewed as a mechanism to monitor the trade policies of participating countries.⁴⁰ It is based on two reports, with the country report being the primary source of information on which the secretariat relies in preparing the overall GATT/WTO report. In practice, the TPRM has been used only a very limited number of times and has not produced accurate and complete information on compliance.⁴¹ In fact, according to some practitioners, the TPRM was not meant to uncover noncompliance in the first place, as “[t]he reviews do not attempt to evaluate specific measures of aspects of policy for their conformity with GATT rules.”⁴²

Whatever its intentions, the TPRM does not effectively reveal noncompliance. Instead, detecting and reporting noncompliance are much more decentralized, as the GATT/WTO system encourages state parties to monitor each other. The dispute settlement procedure established under the GATT has served for decades and remains as an important instrument in the WTO. Accordingly, only states can bring complaints against other states and GATT/WTO rules are enforced only in response to formal complaints from state parties.

³⁹ The level of interest alignment between noncompliance victims and their states is naturally not as high in cases where victims are subnational actors as in cases where victims are states themselves. Indeed, interests between a specific group of producers and those of their government are not always aligned. This, as I mentioned in the theory section, relates to whether the government's protection of such a group conflicts with other more important subnational interests, either other business sectors or more generally the consumers. In practice, however, states often represent producers' interests more than they do consumers' interests. I will discuss the complications with interest alignment in more detail later in this section.

⁴⁰ Petros C. Mavroidis, “Surveillance Schemes: The GATT's New Trade Policy Review Mechanism,” *Michigan Journal of International Law* 13 (Winter 1992).

⁴¹ Asif H. Qureshi, “Some Reflections on the GATT TPRM, in the Light of the Trade Policy Review of the European Communities: A Legal Perspective,” *Journal of World Trade* 26 (December 1992).

⁴² Roderick Abbott, “GATT and the Trade Policy Review Mechanism: Further Reflections on Earlier Reflections,” *Journal of World Trade* 27 (June 1993).

This relatively decentralized form of the GATT/WTO information system is consistent with the strategic environment of international trade. When a country violates GATT/WTO rules, it is usually the private producers in trading partner countries that are the direct victims. The private producers, including export-oriented and import-competing firms in trading partner countries, are typically able to detect both the effect and the source of noncompliance when, for instance, they experience import restrictions by foreign governments or dumping by foreign firms. Potential noncompliance victims are therefore fairly well placed to detect trade violations. Meanwhile, trading partner countries often have incentives to protect their industries from foreign trade violations and thus tend to lodge complaints by domestic industries against foreign trade practices with the GATT/WTO forum. Naturally, the incentives of governments to protect domestic industries sometimes depend on the extent to which such protection conflicts with other subnational interests. So the degree to which governments pursue the complaints and indeed bring them forward may vary. Overall, however, domestic industries are often able to get governments to push their interests, especially when they are effectively portrayed as the victims of foreign trade violations. Indeed, despite the imperfect alignment of interests, states tend to represent the interests of producers much more than those of consumers. As a result, private producers usually feed non-compliance information to their governments, which then bring it to the GATT/WTO forum. In the GATT/WTO information system, therefore, the detection costs are largely borne by domestic business interests that are vulnerable to the trade practices of trading partner countries. To the extent that domestic producers bring noncompliance to the attention of their governments, and these governments then file formal complaints to the trade regime, the communication costs are largely borne by both the domestic business groups and their governments.

Such a decentralized information system is necessarily a multistage process, where initial potential complaints greatly outnumber eventual formal complaints.⁴³ When a firm experiences a profit loss resulting directly from the practices of trading partner countries, it may or may not report it to its government. That decision depends on how seriously the firm is hurt by trade violations, how costly it is to collect preliminary evidence of those violations, and how much its actions could influence its government and eventually the outcome of trade dispute settlement.

⁴³ For documentation of this phenomenon in the GATT/WTO, see Christina R. Sevilla, "Complaints and Compliance: The Politics of Enforcing GATT/WTO Rules" (Paper presented at the annual meeting of the American Political Science Association, San Francisco, August 29–September 1, 1996).

Furthermore, when a government receives a complaint from domestic producers against trading partner countries, it may or may not investigate the matter and subsequently bring it to the trade regime. That decision depends on the firm's resources and access to the government, as well as on the perceived benefits in addressing these complaints in the GATT/WTO forum. Through this multistage process, however, politically important cases of noncompliance are brought to light.

Although many factors may influence how many and which instances of noncompliance are brought to light, the basic organizational form of the GATT/WTO information system is primarily shaped by two facts. First, states have incentives to protect domestic producers from trade violations by trading partner countries. Second, export-oriented and import-competing firms are often in a convenient position to detect both the effect and the source of noncompliance by trading partner countries. This availability of noncompliance victims as low-cost monitors, along with a fairly high level of interest alignment between noncompliance victims and their states, leads to the particular form of decentralized monitoring: private producers detect noncompliance and their governments bring it to the GATT/WTO forum.

MONITORING BY VICTIMS AND NGOS

In both types of regimes discussed above, states participate in monitoring because they have incentives to protect noncompliance victims, while their specific role, in terms of either detecting noncompliance or bringing it to light, varies according to whether victims can cheaply detect noncompliance. In many other treaty regimes, however, states are much less involved in either detecting noncompliance or bringing it to light. In this section, I discuss one type of such regimes, applying to human rights regimes the theory summarized in Figure 1. I argue that the availability of noncompliance victims as low-cost monitors and the nonalignment of interests between human rights victims and their states give rise to monitoring by victims and NGOs. I then demonstrate empirically that monitoring by victims and NGOs is the most important component of human rights information systems.

To examine the basic incentive structure, I start with the nature of the problem that human rights regimes aim to resolve: states are targets of human rights regulations, while their citizens are usually noncompliance victims. Thus, the interests of noncompliance victims and those of their states are often diametrically opposed. Meanwhile, the regulated behavior in human rights regimes is usually treatment of persons, and thus the effect and source of noncompliance are experienced di-

rectly by the victims. Therefore, human rights victims are in a convenient position to detect noncompliance, even though it may often be costly for them to go public about this noncompliance. Accordingly, the biggest challenge to human rights information systems lies not in the detection of noncompliance but rather in the collection and communication of this information. Given the nonalignment of interests between human rights victims and their states, the task of collecting and communicating noncompliance information is primarily carried out by nonstate actors, generally human rights NGOs. Therefore, the two principal dimensions in my theory determine much of the organizational form of human rights information systems: the victims detect noncompliance and human rights NGOs help collect the information and bring it to light.⁴⁴

Empirically, states delegate little authority to human rights treaty organizations; rather, self-reporting is the primary mode agreed upon by states in collecting compliance information. However, all the problems associated with self-reporting are intensified by noncomplying governments' incentives to cover up their wrongdoings. Thus, self-reporting in human rights regimes tends to be the least satisfactory among international treaty regimes. According to a survey by the UN secretary-general in 1992, of the 164 parties to one or more of the major human rights conventions, substantially all were behind on at least one report and most were behind on several.⁴⁵ Besides the low response rate, states' reports often do not by themselves truthfully or comprehensively reveal governments' human rights policies and practices. The reliability of states' reports depends partially on whether there are external checks by nonstate actors. Compared with reporting in other regimes, for in-

⁴⁴ It is possible that some states may have incentives to protect human rights victims in another country. Thus, two kinds of monitoring arrangements involving states may be possible. One possibility is monitoring by treaty organizations. A major hurdle here is that, for each state, voting for a treaty organization to monitor human rights policies in other countries is at the same time voting for the same treaty organization to check on one's own human rights practice. To the extent that states may care about the former less than they want to avoid the latter, the amount of authority and resources that states are willing to delegate to such treaty organizations may be limited. The other possibility is monitoring by some states of human rights practices in other states. The United States, for instance, unilaterally does annual human rights reports on nations. This, however, does not seem representative among countries. It is also interesting to note that, even in the case where the U.S. monitors human rights policies of other states, it is usually those potential victims in these countries and NGOs who represent the interests of these potential victims—inside those countries or outside—who first detect noncompliance and bring it to light.

⁴⁵ Even for the two principal treaties, the reporting record is not fully satisfactory. While 59 of 113 parties were up to date with reporting obligations under the International Covenant on Civil and Political Rights, 46 of 116 parties were up to date under the International Covenant on Economic, Social, and Cultural Rights. See UN Secretary-General, *Status of International Human Rights Instruments and the General Situation of Overdue Reports*, UN Doc. HRI/MC/1992/3 (September 25, 1992); Chayes and Chayes (fn. 7), 161.

stance, the record of reporting by participating countries in the International Labor Organization (ILO) is among the best.⁴⁶ This reflects a significant feature of the ILO, that its conference committee consists of government, worker, and employer representatives. Essentially, not only do nonstate actors provide independent information to check states' reports *ex post*, but the fact that the external check by nonstate actors is formally institutionalized serves to deter misrepresentation in states' reports *ex ante*.

Most human rights regimes rely much more on independent data generation by nonstate actors and much less on states' reports. The UN human rights regime, for instance, is "virtually completely dependent on human rights data collected and presented by NGOs."⁴⁷ Much of the data generation effort by NGOs is geared toward implementation reviews in human rights regimes. For instance, when Japan submitted its first report to the UN Human Rights Committee in 1980, the committee found it to be overly vague and general. By contrast, forty days before Japan turned in its second report in 1987, twelve Japanese NGOs obtained copies of the report and published counterreports.⁴⁸ Another example is the Moscow Helsinki Group, which prepared documents for the review meetings in the framework of the Conference on Security and Cooperation in Europe (CSCE)—26 documents for the Belgrade review in 1977 and 138 documents for the Madrid review in 1980. Similar monitoring groups in Eastern Europe also targeted review conferences.⁴⁹

Most data generation by NGOs, however, is conducted independently and outside the framework of implementation reviews and is often not included in formal review meetings. The scrutiny of human rights abuses in Nigeria, for example, was initiated by two Nigerian lawyers. In 1987 they founded the Civil Liberties Organization to represent common prisoners held for extended periods without charge or trial. This organization carried out basic fact-finding tasks. Its staff and volunteers visited sixty-five Nigerian prisons and the two lawyers published their comprehensive report.⁵⁰ This report attracted substantial

⁴⁶ Over 80 percent of reports due have been turned in every year of the ILO's existence, except during World War II. See Chayes and Chayes (fn. 7), 157.

⁴⁷ Pieter Hendrik Kooijmans, *The Role of Non-Governmental Organizations in the Promotion and Protection of Human Rights* (Leiden: Stichting Nscm-Boekerij, 1990), 16–17.

⁴⁸ Amy Gurowitz, "International Society and State Inclusion of Non-Citizens: The Changing Debate in Japan and Germany" (Paper presented at the annual meeting of the International Studies Association, Toronto, March 18–22, 1997).

⁴⁹ Ludmilla Alexeyeva, *Soviet Dissent: Contemporary Movements for National, Religious, and Human Rights Regimes* (Middletown, Conn.: Wesleyan University Press, 1985), 344–46.

⁵⁰ Chayes and Chayes (fn. 7), 254.

press attention and some international human rights groups were subsequently drawn to the Nigerian case and served as an effective link to the international human rights regime.

For information systems that depend on victims and NGOs, an effective channel of information from the country in question to human rights regimes is critical. A fluid information flow requires that domestic human rights victims and NGOs collect and document human rights violations and then pass that information on to large international NGOs.⁵¹ However, human rights victims and some domestic NGOs may face a collective action problem. An individual decision by a potential monitor depends on the cost of reporting noncompliance weighed against the protection doing so could induce. This calculation depends, among many factors, on domestic political institutions and human rights practices. For countries with the most questionable human rights practices, networks among NGOs are essential, because domestic victims and NGOs may passively document human rights violations but count on international NGOs to actively bring the information to light. For countries where human rights are better respected, institutional instruments can prove useful. For instance, in the European human rights regime—which in many ways is a strong regime⁵²—the mechanism of individual petition stands out in utilizing and facilitating the information flow from noncompliance victims to the regime.⁵³

In sum, regardless of which cases of noncompliance are brought to light and which decentralized monitors face less of a collective action problem, human rights information systems rely most critically on the

⁵¹ Kathryn Sikkink has demonstrated the importance of information networks among human rights NGOs. For instance, human rights violations in Mexico evaded international scrutiny for a long time, until NGOs both inside and outside began to document human rights abuses and together bring them to the international attention. See Kathryn A. Sikkink, "Human Rights, Principled Issue-Networks, and Sovereignty in Latin America," *International Organization* 47 (Summer 1993); idem, "Nongovernmental Organizations, Democracy, and Human Rights in Latin America," in Tom J. Farer, ed., *Beyond Sovereignty: Collectively Defending Democracy in the Americas* (Baltimore: Johns Hopkins University Press, 1996); and Denise Dresser, "Treading Lightly and without a Stick: International Actors and the Promotion of Democracy in Mexico," in Farer.

⁵² George Downs, David Roake, and Peter Barsboom make the point that the European regime is among those deep institutions; see Downs, Roake, and Barsboom, "Managing the Evolution of Multilateralism," *International Organization* 52 (Spring 1998).

⁵³ Liz Heffernan, "A Comparative View of Individual Petition Procedures under the European Convention on Human Rights and the International Covenant on Civil and Political Rights," *Human Rights Quarterly* 19 (February 1997), 87–88. Arguably, one way that the strength of the European regime is translated into the effectiveness of the monitoring arrangements is via the institutionalized procedure of individual petition, which systematically utilizes and facilitates the information flow from low-cost monitors to treaty regimes. The European regime lends substantial support to the prediction of my theory: even in a resourceful regime such as the European human rights regime, it is the human rights victims who detect noncompliance and, with the enabling assistance of the treaty organization, bring that information to light. This point benefited from the comments of an anonymous reviewer.

detection of noncompliance by victims and the communication of noncompliance by NGOs. This basic organizational form of human rights information systems is determined by the availability of noncompliance victims as low-cost monitors and the nonalignment of interests between victims and their states.

MONITORING BY NGOS

As shown in Figure 1, when states are not interested in information systems and the victims are unable to detect noncompliance conveniently, interested and well-organized NGOs often fill the gap by undertaking the primary monitoring tasks. Empirically, environmental regimes have some similar characteristics, although NGOs are often not the sole monitors. In this section, I argue that the lack of noncompliance victims as low-cost monitors and the partial interest alignment between noncompliance victims and their states give rise to monitoring by NGOs in environmental regimes. I then illustrate empirically that, even though treaty organizations perform some centralized monitoring functions in many environmental regimes, detection and communication of noncompliance is primarily carried out by environmental NGOs.

The basic incentive structure underlying most environmental regimes presents two critical features. First, states have mixed interests in information systems, because many environmental problems are transboundary. That is, citizens in one country may suffer from environmental degradation in their own country as well as in neighboring countries. While a state has incentives to protect its own citizens from other countries' pollution, for instance, it may be reluctant to commit to pollution reduction that might hurt its own business interests. Therefore, states' interests and victims' interests are only partially aligned. The extent to which a state is a good agent of noncompliance victims within its own country varies with the damage from others' noncompliance and the cost of one's own compliance. Second, potential noncompliance victims are often unable to detect noncompliance cheaply, for two reasons. First, the effect of noncompliance in many environmental regimes is latent, for instance, as in the ozone case. Since the effect is not seen or felt directly, ordinary potential victims are not alerted. Second, even when the effect of noncompliance is transparent, the source of noncompliance may be difficult to discern, as in the cases of overfishing and transboundary pollution. In these cases, potential victims can express concern, but it may be costly for them to pin down who is responsible. Although the lack of low-cost monitors points toward the need for centralized monitoring, treaty organizations rarely

receive sufficient resources and authority to do so, for states often have limited interests in information systems. Without the provision of centralized monitoring, well-organized and resourceful NGOs may seek to fill the vacuum, which in turn reinforces the underinvestment by states in any centralized monitoring. In such strategic contexts, therefore, we tend to see monitoring by NGOs at times facilitated, to a limited extent, by treaty organizations.

Not all environmental treaty organizations collect states' reports on national policies.⁵⁴ Those that do encounter pervasive problems with nonreporting and incomplete reporting, as well as with misreporting. This is illustrated in a survey by the U.S. General Accounting Office: under seven environmental treaties, only thirteen of fifty-seven parties (23 percent) filed any report in 1990.⁵⁵ While some treaty organizations review compliance performance, these reviews are usually nothing more than collating and assembling national reports.⁵⁶ Under the ozone accords, for instance, the implementation committee's authority and activities are limited to receiving, considering, and reporting on submissions made by participating countries to the secretariat on non-compliance.⁵⁷ Except twice in its history, the secretariat of the International Maritime Organization (IMO) simply duplicated the national reports as submitted and circulated them at annual meetings without comment or analysis.⁵⁸ Even in the Long Range Transboundary Air Pollution (LRTAP) Convention, whose monitoring system is relatively more comprehensive than most other environmental regimes,⁵⁹ the information reviewed by the treaty organization comes directly from governmental reports. These reports are not interpreted in any way; nor is there any effort to fill in missing information or to correct misleading information.⁶⁰

⁵⁴ Only three out of nine environmental regimes surveyed by Jesse Ausubel and David Victor require formal reporting. See Ausubel and Victor, "Verification of International Environmental Agreements," *Annual Review of Energy and the Environment* 17 (1992).

⁵⁵ U.S. General Accounting Office, *International Environment: International Agreements Are Not Well Monitored*, GAO RCED-92-43, 1992 (Washington, D.C.: GAO, 1992). For the unreliability of fishing data, see also M. J. Peterson, "International Fisheries Management," in Haas, Keohane, and Levy (fn. 23).

⁵⁶ Ausubel and Victor (fn. 54), 20.

⁵⁷ Owen Greene, "Ozone Depletion: Implementing and Strengthening the Montreal Protocol," in John B. Poole and Richard Guthrie, eds., *Verification Report 1992: Yearbook on Arms Control and Environmental Agreements* (London: VERTIC, 1992).

⁵⁸ Ronald B. Mitchell, *Intentional Oil Pollution at Sea: Environmental Policy and Treaty Compliance* (Cambridge: MIT Press, 1994), 134.

⁵⁹ Peter Sand, "Regional Approaches to Transboundary Air Pollution," in John Helm, ed., *Energy: Production, Consumption, and Consequences* (Washington, D.C.: National Academy Press, 1990), 259.

⁶⁰ Marc Levy, "European Acid Rain: The Power of Tote-Board Diplomacy," in Haas, Keohane, and Levy (fn. 23).

Confronted with these difficulties in monitoring compliance in environmental regimes, some may suggest that environmental regimes copy the centralized inspection procedures of some arms control regimes. What is often neglected in this line of argument is the limited level of interest alignment between states and those injured by environmental noncompliance, along with some willingness and ability of NGOs to fill the vacuum of centralized monitoring. Indeed, while most environmental treaty organizations are understaffed and receive insufficient resources from states, some international NGOs have budgets larger than those of the secretariats in many environmental regimes.⁶¹ Although they are often unsystematic, these NGOs report suspected or alleged noncompliance directly to treaty organizations.

Environmental NGOs monitor compliance in several different ways. Sometimes they help check reporting and assess performance. Under the LRTAP, for instance, NGOs began checking for inconsistencies in governmental reports from Greece and the Soviet Union. In the Baltic Sea regime, NGOs such as the World Wide Fund for Nature (WWF) have been nominated as lead parties to review existing national practices by compiling national reports and producing reports on implementation.⁶² Other times, NGOs generate compliance information independent of states' reports. Under the Basel Convention environmental NGOs provide reports to the secretariat on illegal hazardous waste traffic.⁶³ In the climate change regime NGOs have drafted and circulated country-by-country evaluations of policy implementation.⁶⁴ In the whaling regime wildlife groups regularly check and report to the International Whaling Commission (IWC) on the comings and goings of whaling vessels.⁶⁵ Big international NGOs such as Greenpeace, the WWF, and Friends of the Earth (FOE) have collected and provided the secretariats of environmental regimes with "external and independent information regarding compliance and implementation problems."⁶⁶

⁶¹ For example, in 1994 the International Union for the Conservation of Nature and Natural Resources (IUCN) had an annual budget of nearly 57 million Swiss francs and a staff of more than five hundred. For another example, the World Wide Fund for Nature (WWF) is financially supported by over five million contributors. See John Lanchbery, "Long-Term Trends in Systems for Implementation Review in International Agreements on Fauna and Flora," in David G. Victor, Kal Raustiala, and Eugene B. Skolnikoff, eds., *The Implementation and Effectiveness of International Environmental Commitments: Theory and Practice* (Cambridge: MIT Press, 1998), 65–66.

⁶² Owen Greene, "The System for Implementation Review in the Ozone Regime," in Victor, Raustiala, and Skolnikoff (fn. 61), 183–84.

⁶³ Chayes and Chayes (fn. 7), 164–65.

⁶⁴ Kal Raustiala, "The 'Participatory Revolution' in International Environmental Law," *Harvard Environmental Law Review* 21 (Summer 1997), 561.

⁶⁵ Mitchell (fn. 15).

⁶⁶ Kamen Sachariew, "Promoting Compliance with International Environmental Legal Standards:

Most often NGOs spot singular noncompliance incidences. For example, Greenpeace spotted Russia dumping hundreds of tons of low-level nuclear waste into the Sea of Japan, which violated a moratorium administered by the IMO.⁶⁷ Similarly, Greenpeace provided the IWC with detailed evidence against Chile for an illegal catcher-factory ship and against Spain for quota violations.⁶⁸ Greenpeace also exposed Japanese private whaling trade with Taiwan, which led to the shutdown of the Taiwanese industry.⁶⁹ Occasionally, NGOs serve as informal managers of information systems. For example, under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the International Union for the Conservation of Nature and Natural Resources (IUCN) has been so involved that it performed secretariat services for the CITES for a considerable period.⁷⁰ The Trade Records Analysis of Flora and Fauna in Commerce (TRAFFIC) has an extensive network of NGOs working at the domestic level and has been particularly instrumental in tracking wildlife trade.

Compared to treaty organizations, which need to be comprehensive to avoid impartiality, NGOs are not restrained from singling out suspected noncomplying parties. In this sense, treaty organizations and NGOs can be complementary in monitoring environmental compliance. The degree to which they are complementary, however, varies among environmental regimes. It depends on the extent to which treaty organizations encourage and facilitate the monitoring by NGOs. It further depends on how skillfully NGOs utilize the instruments offered by treaty organizations.

However active and capable, NGOs nonetheless remain imperfect monitors. First, monitoring is intrinsically costly when the effect or source of noncompliance is not transparent. Second, because NGOs usually do not check compliance performance of all relevant parties in all cases, their noncompliance detection is rather particularistic. Third, rather than providing exact accounts of compliance to treaty organizations, monitoring by NGOs often seems to aim directly at influencing relevant actors. For example, when Greenpeace spotted a Soviet whaling fleet and confronted it, the organization sought to raise public consciousness by disseminating the image of a Soviet whaler firing a

Reflections on Monitoring and Reporting Mechanisms," in Günther Handl, ed., *Yearbook of International Environmental Law* (London: Graham and Trotman, 1991), 34.

⁶⁷ David A. Sanger, "Nuclear Material Dumped off Japan," *New York Times*, October 19, 1993, A1.

⁶⁸ *Greenpeace Examiner*, "One Step Closer" (Summer 1981), 8.

⁶⁹ *Greenpeace Examiner*, "Taiwan Stops Whaling" (Winter 1980), 4.

⁷⁰ Chayes and Chayes (fn. 7), 267.

harpoon into a sperm whale over a Greenpeace inflatable boat. In these contexts, what matters is not so much how accurate and comprehensive the compliance information is but rather how much political influence such information generates. Overall, compared with other monitoring arrangements, monitoring by NGOs is perhaps the least systematic.

Although its effectiveness varies and is often limited, monitoring by NGOs is common to many environmental regimes. This phenomenon is consistent with the basic incentive structure characterized by two facts. First, the interests of noncompliance victims and that of their states are often only partially aligned and thus states have mixed interests in information systems. Second, potential noncompliance victims are often not in a convenient position to detect noncompliance, either because the effect of noncompliance is not experienced directly or because the source of noncompliance is difficult to pinpoint. As states delegate limited resources and authority to allow centralized monitoring, environmental NGOs take up the slack to some extent by detecting compliance and bringing it to light at their own cost.

IV. CONCLUSION

This article develops a parsimonious theoretical framework to explain the diversity in monitoring arrangements across a wide range of treaty regimes. By conceptualizing the underlying incentive structures in treaty regimes, it accounts for who detects noncompliance and who brings it to light. In particular, two principal factors—the interest alignment between noncompliance victims and their states and the availability of noncompliance victims as low-cost monitors—interact to determine the monitoring tasks of treaty organizations, states, and non-state actors. Consequently, the organizational forms of information systems vary accordingly across regimes. This simple theory sheds considerable light on monitoring arrangements in a wide range of substantively important treaty regimes concerning money, trade, security, human rights, and the environment.

This analysis suggests several implications for future research. First, the pursuit of effective treaty regimes can benefit from a better understanding of the underlying incentive structures in relevant regimes. Because incentive structures vary among regimes, so do efficient and feasible monitoring arrangements. In pursuing effective solutions, policymakers need to understand the conditions under which such arrangements can be sustained.

Second, a more systematic exploration of institutional efficiency is warranted. This study suggests that, while treaty organizations face varying degrees of resource constraints, stakeholders may perform voluntary monitoring in some regimes. Under appropriate circumstances international institutions can facilitate various low-cost monitors and/or voluntary monitors to carry out decentralized monitoring, by providing smooth channels for information transmission. Of course, as always, delegation is a matter of a delicate balance between conflicting concerns, such as efficiency on the one hand and political control on the other. Future work can incorporate these opposing considerations to further theorize about the role of NGOs in international institutions.

To conclude, because this article aims to provide a general framework to account for diverse monitoring arrangements across a wide range of issue-areas, it does not attempt to include all possible relevant factors. However, some of these additional factors clearly merit further consideration. I will briefly discuss power, salience, and neutrality.

First, power is rarely irrelevant for international outcomes. In the context of monitoring arrangements, power matters particularly when there is a need for centralized monitoring: resources and capabilities influence the extent to which states can overcome collective action problems in devising potentially costly centralized monitoring arrangements. One potential alternative hypothesis based on power, for instance, would argue that powerful states design strong institutions when they have a vested interest in upholding them. The underlying assumption is that power allows states to spend resources on monitoring if they see it in their interest to do so. However, this begs for an explanation that goes beyond the confines of power: when and how do states identify their interests in monitoring? One determinant in my theory addresses this important question: interest alignment between noncompliance victims and their states helps explain, for instance, why countries may have an interest in monitoring in the NPT and why countries may not have as much interest in monitoring a fishing regime. Furthermore, my theory also explains additional dimensions in the variations of monitoring arrangements: when powerful states have interests in the regimes, why do nonstate actors perform much of the decentralized monitoring in the GATT/WTO and why does the treaty organization carry out centralized monitoring in the IMF? Likewise, when states have little interest in a regime, what determines whether individual victims are the primary monitors or whether NGOs are the primary monitors? The other determinant in my theory, the availability

of noncompliance victims as low-cost monitors, helps account for these kinds of variations. Overall, therefore, power leaves unanswered some of the key questions regarding monitoring variations that this study aims to address.

Second, the salience of the issue or the perceived costliness of non-compliance is also important. Rather than taking salience as a given, however, this article provides a way to assess the stakes that states hold in a particular issue, by evaluating the interest alignment between non-compliance victims and their states.

Third, considerations of neutrality are relevant in centralized monitoring arrangements, as such arrangements may seem more independent from the influence of some powerful states. It is, however, less clear how neutrality concerns shape decentralized monitoring arrangements where states or nonstate actors act as the primary monitors. Neutrality concerns may call for treaty organizations to verify information furnished by states and nonstate actors, yet neutrality by itself does not explain the source of compliance information. That, however, is the focus of this article.

Unquestionably, future work will layer in such additional contextual variables to generate more refined predictions in specific cases. But from a theoretical point of view it is preeminent to have a simple and yet general theory before studying the additional contextual variables. To this end, this article has provided a theoretically sound account for a broad range of variations in monitoring arrangements, an issue that is central to neoliberal institutionalism and yet until now has not been properly addressed.