

**MONITORING COMPLIANCE:
THE DESIGN OF MONITORING INSTITUTIONS
IN INTERNATIONAL COOPERATION**

by

Hyeran Jo

A dissertation submitted in partial fulfillment
of the degree of Doctor of Philosophy
(Political Science)
in The University of Michigan
2008

Doctoral Committee:

Professor James D. Morrow, Chair
Professor Robert Axelrod
Professor Paul K. Huth
Professor Edward A. Parson
Associate Professor Barbara Koremenos

© Hyeran Jo 2008

ACKNOWLEDGEMENTS

This dissertation is the result of many fruitful exchanges and interactions with other minds over the past five years. I first of all thank my committee members. I thank Professor James Morrow for his advice at every stage of my journey through graduate school, guiding my work step by step from a fledgling idea to a full dissertation project. His continuing willingness to help me develop my research agenda is deeply appreciated. I learned how to conduct research while involved in his projects on *Laws of War* and *Multilateral Negotiations*. The training I have received at Michigan is largely due to him. Professor Robert Axelrod, amid his busy schedule of revising the *Evolution of Cooperation* and during his stint as the President of the American Political Science Association (APSA), somehow made time for extensive meetings and written comments on my work. His perceptive and insightful comments benefited my dissertation tremendously. He provided valuable advice on how to look at this project from a practical policy point of view and helped me think in a conceptually clear manner. Professor Paul Huth with scholarly calm and patience showed me how to do thorough empirical work. I deeply thank him for inviting me to join his projects on territorial disputes and international law, allowing me to broaden my research interests. With his broad knowledge of science, technology and policy, Professor Edward Parson made many practical suggestions during the process of my dissertation writing. He encouraged me to think about the practical implications of my project, not merely its theoretical dimension. Professor Barbara Koremenos—whose first-name friendliness I much appreciate—has always been supportive of my research and has helped me grow professionally. I was fortunate to have her on my committee as my work builds on her research program.

My colleagues and friends at Michigan have contributed much to the completion of this project. Encouragement throughout the years from Michelle Allendoerfer, Grace

Cho, Sean Ehrlich, Ji Kim, Shanna Kirschner, Gaye Muderrisoglu, Leanne Powner, Megan Reif, Thomas Chadeaux, and Johannes Urpelainen is much appreciated.

Outside of Michigan, many people helped me get through this process. I thank Professor Pat Hurley for helping me find a research home at Texas A&M. Professor Xinyuan Dai at the University of Illinois gave me an opportunity to look at my project in a broader context. I also thank her for her enthusiastic and detailed feedback about my project. I thank Professor Jongryn Mo at Yonsei University for cultivating a young scholarly mind. Professor Ken Schultz, Professor Gary Cox, Alex Weisiger, Taehee Whang, and Terry Chapman provided invaluable suggestions at an early stage of my project at EITM 2005 at Berkeley. Leslie Johns, with other Journeys workshop participants at the University of Iowa, provided invaluable comments on my theory chapter. Paul Morsink, my ultimate editor, read every manuscript with unparalleled care. My longtime friend Hyunjung Je at the Korea Trade Association provided helpful hands-on advice on my empirical chapter on regional trade agreements. I also thank my friend Jiyoung Hahn for emotional support and care.

Last but not least, I thank my family for their unconditional support and love. My father has been my main confidant and unwavering supporter of all my intellectual endeavors. He was the one who first ignited my interest in international negotiations (by encouraging me, jokingly, to be the next Carla Hills of Korea). Without my mother's emotional comfort and her contagious zest for life, I would have faltered at many points during the dissertation process. Deservedly, this dissertation is dedicated to my parents.

TABLE OF CONTENTS

ACKNOWLEDGMENTS	ii
LIST OF TABLES	v
LIST OF FIGURES	vii
LIST OF APPENDICES	viii
ABSTRACT	ix
CHAPTER	
I. Introduction: Politics of Monitoring in International Cooperation	1
II. A Theory of the Design of International Monitoring Institutions	14
III. Monitoring Institutions in Regional Trade Agreements	45
IV. Monitoring Institutions in Regional Fisheries Agreements	71
V. Monitoring Institutions in Arms Control Agreements	99
VI. Conclusion: Taking Stock and Policy Recommendations	141
APPENDICES	188
BIBLIOGRAPHY	205

LIST OF TABLES

Tables

Table 3.1	List of Independent Variables	58
Table 3.2	Logit Estimates with Monitoring Systems for Regional Trade Agreements as Dependent Variable	65
Table 4.1	Types of Monitoring Bodies in 73 Multilateral Fisheries Agreements	74
Table 4.2	Milestones: Historical overview of legal instruments for global fisheries management	83
Table 4.3	Summary Statistics of Dependent Variable: Three Levels of Monitoring Systems in Regional Fisheries Agreements	87
Table 4.4	Summary of Variables	93
Table 4.5	Ordered Probit Results on the Choice of Monitoring Institutions in Regional Fisheries Agreements	95
Table 5.1	The Universe of International Security Agreements	100
Table 5.2	The Elements of the Theoretical Model on Monitoring Design in Arms Control	103
Table 5.3	IAEA Budget	109
Table 5.4	Investigation Teams and Related Judgments Regarding the Allegations in Korea, 1951-2	110
Table 5.5	Codes for Dependent Variable	125
Table 5.6	Latent Weapons Capacity: Scales and Sources	130
Table 5.7	Characteristics of Weapons of Mass Destruction	131

Table 5.8	Ordered Probit Results on the Choice of Monitoring Institutions in 34 Arms Control Agreements	133
Table 5.9	Distributional Conflict and the Choice of Monitoring Institutions in Selected Arms Control Agreements	138
Table 5.10	The Design Variables for Each Monitoring System in Arms Control	139
Table 6.1	Summary of Variables	146
Table 6.2	Available Monitoring Options	163
Table 6.3	Summary of Suggestions depending upon Compliance Environments	166

LIST OF FIGURES

Figures

Figure 1.1	Schematic Presentation of Information Systems in International Cooperation	4
Figure 2.1	Stage Game with Asymmetric Compliance Environments and Uncertainty about Normal and Difficult Times	20
Figure 2.2	Verification Accuracy and Types of Errors	26
Figure 2.3	Effect of Epsilon (Probability of Difficult Times Occurring)	30
Figure 2.4A	Larger Defection Risk Scenario	32
Figure 2.4B	Lower Defection Gain Scenario	32
Figure 2.5	Set of Feasible Payoffs and Distributional Conflicts	33
Figure 2.6	Regions of Distributional Conflicts	34
Figure 3.1	Conclusion of Bilateral Trade Agreements by Signature Year	48
Figure 3.2	Distribution of Monitoring Institutions in RTA	57
Figure 3.3	Predicted Probability for the Choice of Centralized Monitoring According to Change in IPR (Import Penetration Ratio) Asymmetry	67
Figure 3.4	Predicted Probability for the Choice of Centralized Monitoring According to Change in Polity Asymmetry	68
Figure 4.1	Predicted Probability of the Choice of Monitoring Institution According to Change in the Asymmetry in Fishing Industries among Member Countries	96
Figure 5.1	The Effect of Threat Level Asymmetry on the Choice of Monitoring Systems Based on Non-linear Model	136

Figure 6.1	Types of Monitoring Systems in Three Issue Areas	148
Figure 6.2	Measures of Asymmetries in Three Issue Areas	151
Figure 6.3	The Linear Effect of Asymmetry on the Choice of International Monitoring System	153
Figure 6.4	The Non-linear Effect of Asymmetry on the Choice of International Monitoring System	155
Figure 6.5	The Ordered Analysis of the Effect of Asymmetry on Monitoring Choice	157
Figure 6.6	Number Effect in Regional Trade Agreements	159

LIST OF APPENDICES

Appendix

A. Technical Supplement to Chapter II	188
B. List of Regional Trade Agreements in the Sample	196
C. List of Regional Fisheries Agreements in the Sample	199
D. List of Arms Control Agreements in the Sample	202
E. Example of Treaty Lineage in Arms Control Agreements	204

ABSTRACT

MONITORING COMPLIANCE: THE DESIGN OF MONITORING INSTITUTIONS IN INTERNATIONAL COOPERATION

by

Hyeran Jo

Chair: James D. Morrow

This dissertation offers a theoretical framework for understanding the choice of monitoring institutions made by nation states under international treaties and agreements. Some international agreements adopt centralized monitoring institutions such as inspection systems, while others rely on decentralized measures such as reporting requirements. To explain the variation, I offer a formal model wherein states can choose a monitoring institution from a menu of options: a) no information-gathering system, b) a self-administered reporting system, or c) a third-party verification system. Using this model, I identify the conditions under which states choose one monitoring system over the others. The model features relevant political, economic, and technological factors that contribute to the choice of monitoring institutions in order to provide a comprehensive and complete picture of regulatory decisions.

I particularly focus on the political and economic conditions that influence the choice of monitoring institutions. One of the main research findings concerns the negative effect of asymmetric compliance environments. Whether the political and economic situation of a potential cooperation partner is favorable or unfavorable for compliance clearly impacts the preferences of other partners in their choice of monitoring institutions. The asymmetry in compliance environments creates a demand for information as well as the opportunity to establish a centralized monitoring institution, but it simultaneously generates sharp distributional conflicts among member states—conflicts that may in turn inhibit adoption of a centralized monitoring mechanism. The theory I develop in this regard revisits the central tenet of received cooperation theory about the informational role of international institutions and shows how and why international institutions may be constrained in performing their informational role.

The theory of asymmetric compliance environments is tested with newly assembled datasets of three issue areas of post-WWII international cooperation: regional trade agreements, regional fisheries agreements and arms control agreements. Empirical findings indicate informational needs as well as distributional conflicts surrounding the design of monitoring systems across the three issue areas. With its theoretical and empirical content, this dissertation contributes to our understanding of the informational role and information-gathering dynamics of international organizations and the politics involved therein.

CHAPTER I

Introduction: Politics of Monitoring in International Cooperation

Monitoring as a Political Issue

The issue of monitoring and oversight is central to every political issue. For example, legislative bodies monitor bureaucrats, and bureaucrats oversee firms with various regulatory means. How to design an institution to achieve each stakeholder's political/economic goals or to attain an idea of overall societal good is a fundamental question to students of political institutions. It is not an exaggeration to say that monitoring is central to the issues of everyday life as much as in regulatory politics. Parents want to monitor children, and employers supervise employees. All these instances of monitoring invariably involve information problems, power relationships, and questions of cost-effectiveness. Although every monitoring issue shares this general structure, each problem involves different dynamics as the stakeholders vary and as the nature of informational asymmetry differs.

This dissertation concerns the design of monitoring institutions in international cooperation. It lays out the political problems and issues in the institutional design process, with a particular focus on the distributional conflicts that may arise due to the informational uncertainty about compliance environments – political and economic conditions that influence states' compliance with international obligations. The effects of other determinants of monitoring systems, such as the types of error of a candidate monitoring system and the risks involved in the consequence of violations, are discussed in the theoretical framework where states choose a monitoring system (or no monitoring system) out of a menu of options.

This dissertation research highlights the characteristics of international politics and lays bare the differences between the informational roles of domestic institutions and

international ones. Despite the similarities in general structure, designing monitoring institutions on the international level is different from other monitoring problems in two major ways. First, one has to recognize that international institutions are established only with the consent of state parties. This means that the considerations of interactions about countries go into the decision-making and transparency may not be the first-best choice for the negotiating parties. Unlike child-parent relationships where parents devise monitoring arrangements by themselves and children become the subjects of monitoring, states both devise the monitoring arrangements and simultaneously operate the institutions to monitor themselves.¹ The fundamental problem of self-regulation marks the key characteristic of the design of international monitoring systems.

Second, as a related problem to the first, the design itself is a complicated political process that involves an *ex ante* understanding of uncertain future interactions. Unlike employer-employee relations where future relationships are controlled by enforceable contracts (backed by domestic judicial institutions) and conditioned salaries (employers design salaries efficiently), states are governed by much more precarious interactive environments, with a lot of uncertainty about others' compliance, or even about their own future commitments due to fluctuating domestic political environments. The fact that the positions of individual nations arise from each country's multi-layered domestic political environment is a particular characteristic of the international political environment. Therefore, the factors that affect the commitment to international obligations in turn influence what kinds of institutions countries support or oppose on the international level. These features – exact overlap in designers and users of institutions, and precarious cooperating environments – produce distinct features of monitoring institution design on the international level.

Defining Monitoring Systems

I define monitoring systems² broadly in this dissertation. In a narrow sense, monitoring activity involves following the development of compliance behavior. In the

¹ For an interesting case study of this problem in the context of French constitutional rule-making, see Elster (2006)

² I use “monitoring systems” and “supervisory mechanisms” interchangeably in this article to refer to oversight activities of international institutions. “International control” also means the same thing in international law literature.

broader sense used in this analysis, monitoring systems include the comprehensive processes of gathering and evaluating compliance information. By *compliance information*, I mean the facts relevant to compliance behaviors as well as compliance environments of particular states. For example, the aggregate information on emissions data provided by the European Environmental Monitoring Programme (EMEP) under the Long Range Trans-boundary Air Pollution (LRTAP) would also produce compliance information, from which one can infer from with respect to compliance behaviors. According to this broad definition, monitoring provisions in international agreements would include dispute settlement provisions, institutional arrangements for decision-making, and exchange of information.

Monitoring in a Broader Institutional Context

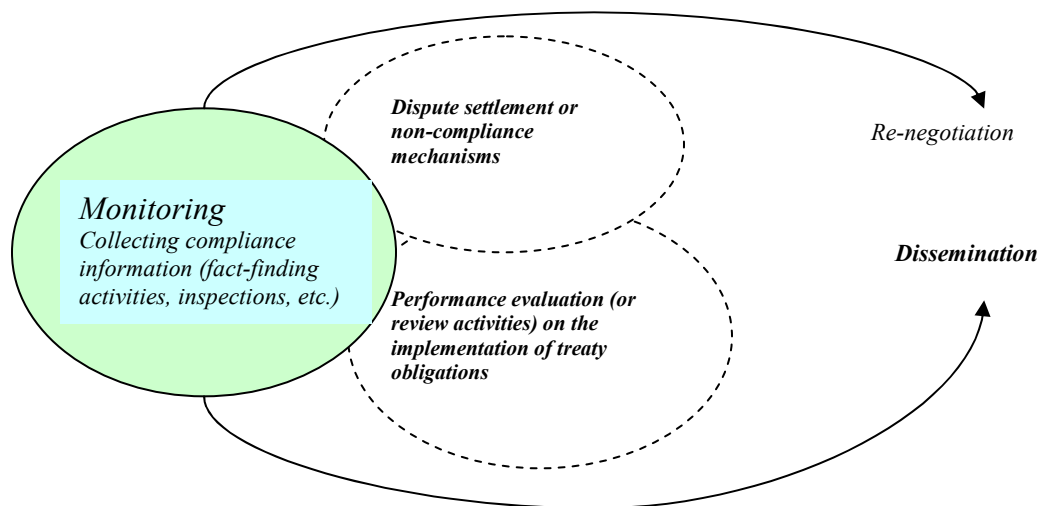
Monitoring institutions are important since they are intricately interwoven with other functions carried out by international institutions in areas such as treaty renegotiation, policy review, and policy-making. The issue of monitoring is related to other important discussions in international cooperation, such as compliance, delegation, dispute resolution, legalism, regime effectiveness, transparency, and accountability.

Monitoring is related to the issues of compliance because the very goal of monitoring is to ensure compliance regardless of whether enforcement occurs or not. The politics of delegation is the central issue in the design of monitoring institutions as the outcome of the resulting negotiation among states is what we have in international treaties. Dispute resolution occurs as a consequence of monitoring as the collected information through monitoring or supervision often results in the initiation of dispute resolution procedures. Because of this nexus between monitoring processes and dispute resolution, we also see the connection with the trend of legalization as monitoring systems often serve as legalized institutions. Monitoring is also related to regime effectiveness. Without monitoring, regime evaluation is impossible and we cannot know whether the regime is effective or not. Lastly, accountability and transparency indirectly require monitoring systems – in order for international organizations to be accountable to principals (i.e. states) or in order for states to be accountable to their citizens with respect

to their international commitments, the compliance records and related performance should be collected, evaluated and assessed. In this way, transparency of decision-making process very much depends on how the monitoring could lead to provision of adequate information. Given this connection to delegation, compliance, legalization, and accountability, the design of monitoring broadly addresses the question about global governance – the sum of legal, social, economic, and political arrangements used to coordinate national policies.

In the proposed definition of “collecting and analyzing compliance information,” monitoring activities encompass dispute settlement as well as diplomatic and communicative activities as schematically represented in Figure 1.1. For example, monitoring systems in preferential trade agreements (PTA) include 1) national focal points (ministries for trade or economy), 2) intergovernmental bodies such as joint committees or association councils, and 3) dispute settlement bodies (arbitration bodies or courts). Figure 1.1 also depicts the relationship between monitoring and other treaty functions. As monitoring function is embedded in a larger institutional context, substantial overlap exists between monitoring activities and dispute settlements.

Figure 1.1 Schematic Presentation of Information Systems in International Cooperation



Empirically it is difficult to separate monitoring systems from other treaty functions such as decision-making. Legislative bodies – usually a group of state representatives – utilize information to manage and re-negotiate agreements. In fisheries

agreements, for instance, a Commission decides on conservation measures based on the compiled data assisted by the Scientific Committee.³ In this sense, the decision-making is not totally separated from information-collection activities. Neither is the implementation stage easily separated from monitoring functions. In general, the majority of compliance information is collected in the process of implementation. Therefore, implementation itself has feedback effects on monitoring. Traditionally monitoring has been considered as a compliance mechanism -- a part of the implementation process and rightly so. The evaluation of compliance and regime environment aids decision-making processes and inevitably affects renegotiation processes.

Among many features of monitoring – decision-making, delegation, and supervision, I specifically focus on the *degree of centralization*. Within the framework of rational design of international institutions (RDII) project, *centralization* is defined as whether institutional tasks are performed by a single focal entity or not. The concept encapsulates many aspects of decision-making and delegation, particularly what kind of informational power a decision-making body has and how much informational power is delegated to international organizations.

Politics of Monitoring in International Cooperation: Research Question and Answer in Brief

Based on the definitive characteristics of international cooperation environments, what emerge are rather weak monitoring institutions compared to domestic ones. We rarely observe centralized monitoring institutions, where centralization is characterized by high informational capacity, by delegated authority, and by subsequent formal legalization.⁴ Even the highly-regarded inspection systems provided by the International Atomic Energy Agency (IAEA) are constrained by prior notification and approval by the inspected country.

Many international agreements, instead of centralized monitoring institutions, present various kinds of monitoring mechanisms. For instance, fisheries agreements

³ Birnie and Boyle 2001

⁴ My definition of centralization is consistent with the definition by Abbott and Snidal 1998; 9 – a concrete and stable organizational structure and an administrative apparatus managing collective activities.

include political commissions as well as scientific committees and less frequently, observer systems. Regional trade agreements present political consultative committees, inquiry points, ad hoc tribunals or standing courts. In arms control agreements, the Biological Weapons Convention (BWC) does not have a monitoring system, while the Chemical Weapons Convention (CWC) has a stringent one, despite the fact that both deal with weapons of mass destruction. What explains this difference between the two conventions? More generally, what explains the design of monitoring mechanisms—mechanisms that range from voluntary reporting requirements to third-party inspection systems—and the variation in states’ preferences for one kind of monitoring mechanism over others?

How states devise monitoring institutions and what kind of incentives and disincentives go into their decision-making is crucial in understanding international political cooperation. This dissertation takes the design of monitoring institutions as its central focus. It broadly concerns how states resolve or decide to live with information problems in pursuing international cooperation. States, having prerogatives of autonomy in their domestic affairs, may choose not to share crucial information with other countries in international cooperation. On the other hand, exchange of information is sometimes essential in assuring commitment and solidifying trust in cooperative relationships.

This balance between informational gains and adjustment costs⁵ is the main emphasis of this dissertation. I specifically argue that international institutions have the potential to provide informational efficiency – more information about compliance behaviors and environments, but that states would be resistant to the establishment of any international or supranational institutions if they have uncertainty about future compliance environments.

Relations to Existing Literature

Since the seminal work of Keohane and Axlerod (1984), recent scholarship in the field of international organization has focused closely on the question of the

⁵ The more popular term is “sovereignty costs” but the word sovereignty has many meanings and to get to the general idea of states having to change their domestic politics or impose constraints on their policies in order to comply with international agreements, I use the term “adjustment costs.”

informational role of international institutions.⁶ This focus has deep roots in the literature on international security affairs (arms control⁷ or peacekeeping⁸), environmental monitoring,⁹ and surveillance systems in human rights agreements.¹⁰ The scholarly attention on the role of international institutions, particularly its informational role, comes in part from the increasing role of international institutions shaping and partaking in the foreign policy decisions, as manifested in the run up to the first and second Gulf war. Johns (2007) considers the conditions under which biased bureaucrats are assigned to generate more information about state preferences. Fang (2006) and Chapman (2007) consider the conditions that lead to the decision to consult international institutions. The scholarly attention partly comes from the establishment of causal mechanisms as to how international institutions matter as opposed to whether international institutions matter.¹¹

The proposed puzzle – the rarity of strong information mechanisms despite their potential informational efficiency – has been indirectly addressed by many scholars. Although scholarly debates were not focused on monitoring institutions *per se*, but more broadly on the international institutions, we can draw related arguments with respect to monitoring institutions. Some scholars emphasize sovereignty costs to resolve the puzzle, but this view does not adequately explain the variation among monitoring institutions because the approach ignores potential benefits. Realists treat international institutions as epiphenomenal – secondary phenomena that merely reflect power relations,¹² but again, this view fails to understand the existing variation in institutional designs. Both approaches merely emphasize why we do not observe strong international institutions but cannot account for why we sometimes observe strong monitoring institutions. The first approach focuses on sovereignty costs while the second view underlines the reflection of power on the international system.

⁶ See Chapman 2007, Fang 2006, and Thompson 2006 for the informational role of the United Nations Security Council, (these models take international institutions as given and examine what channels through which international institutions influence the leaders incentives), and Fortna 2004 for monitoring activities in peacekeeping operations.

⁷ Duffy 1984 and Burns 1993 provide nice summaries of this large body of literature.

⁸ Fortna 2004; Fortna and Martin 2006

⁹ Haas et al. 1993; Weiss and Jacobson 1998; Ausbel and Victor 1998; Victor, Raustiala and Skolnikoff 1998; and Mitchell et al. 2006

¹⁰ Bayefsky 2002; Alston 2000.

¹¹ Martin and Simmons 2000.

¹² Forcefully argued by Mearsheimer 1995.

In contrast, I extend an institutionalist approach and offer an explanation based on an informational theory that highlights uncertainty in domestic compliance environments: domestic political environments pose uncertainty to future partners in cooperation, which creates distributional effects, consequently affecting monitoring institution design. In the model, the preferences over monitoring institutions are induced based on the states' expectation about future cooperation. The theory provides a coherent framework in explaining the design of monitoring institutions, encompassing the variables previously emphasized: adjustment costs are part of costs involving commitment and delegation, and the power relationship is reflected by the economic and political compliance environments states are in. The model explains the costs as well as the benefits involved in creating international institutions while providing an explanation about the variation observed in empirical distribution of monitoring institutions in international agreements.

In discussing the informational role of international institutions, this dissertation builds on to the literature on the rational design of international institutions.¹³ I analyze the antecedents of international supervisory mechanisms in the spirit of rational design projects, with a particular focus on the centralization of monitoring institutions. My analysis not only shows the applicability of the rational design framework but also advances our understanding of institutional complementarities, that is, how monitoring institutions interact with other institutional features. The consideration of how monitoring institutions are designed will provide insights into the limits and possibilities of the system.

This research also speaks to the legalization literature¹⁴ by considering conditions under which monitoring institutions are formalized. My analysis highlights the international politics involved in the legalization process, that is, how states form preferences for different monitoring systems which then result in formal or informal institutions. This focus on distributional conflicts echoes the themes emphasized by Morrow (1994) and Fearon (1998) in their discussions on the distributional aspects of international cooperation and the question of “who-wants-what.”

¹³ Koremenos et al. 2001.

¹⁴ Abbott and Snidal 2000.

Lastly, the design of monitoring institutions is essentially a delegation problem regarding how much states want to entrust international organizations with a more or less autonomous informational capacity. The literature on delegation has recently made progress in defining the concept of international delegation, identifying the dynamics of the international delegation process, and examining the conditions under which delegation occurs.¹⁵ The main theme of the delegation literature is to point out how sovereignty-compromising this process is. This dissertation adds to the literature by demonstrating that sovereignty costs are not uniform across countries and that the costs depend on domestic political environments, which may or may not favor compliance with international agreements.

While speaking to the major themes within the field of international organizations, such as delegation, institutional design, and legalization, and, at the same time, appealing to the general problem of monitoring in politics such as decentralization, this dissertation uncovers the politics of institutional design in international agreements and presents systematic empirical evidence on the process of institutional design as well as on the functions of monitoring institutions.

Contributions

My study is distinct in three ways. First, it makes a conceptual contribution in delineating the role of compliance environments – surrounding political, economic, and institutional contexts – on institutional design. Second, it lays out a theory of distributional conflicts in the design of monitoring institutions. Conflicts of interests may arise due to different compliance environments and attending uncertainty may lead to contractual failures. Third, the proposed theory is tested empirically with the newly assembled data in three issue areas of international cooperation – regional trade, fisheries management, and arms control. The comparative studies of three issue areas render support for the theory while revealing other interesting patterns about international cooperation.

¹⁵ See for example Bradley and Kelley 2007.

Conceptual Contribution

“Compliance environments” is a key concept I develop in this dissertation, both theoretically and empirically. It is defined as political and economic conditions that influence compliance with international obligations and serves as a key factor that impacts the design of monitoring institutions on the international level. Depending on domestic and international political economic environments conducive (or inimical) to international cooperation, different parties may form different preferences toward the creation of international monitoring systems. The decision is made interactively and strategically: the state in question observes the compliance environments of the other potential partners, evaluates the future commitment levels, and decides which monitoring institutions would best fit to resolve the cooperation problem subject to their political constraints.

Theoretical Contribution

This dissertation contributes to the scholarship of international relations by specifying the key determinants of monitoring institutions and by showing the potential distributional conflicts that might arise in the process of creating international institutions. The theory of distributional conflicts identifies the positions of member countries in an international agreement with regard to institutionalization and examines potential conflicts of interests that might arise among them due to uncertainty or asymmetric compliance environments.

Countries could benefit from international organizations that perform informational providers but the creation could be blocked by concerns about non-compliance. The co-existence of informational gains and potential distributive losses during the design of monitoring institutions endogenously arises from a model where states are given a menu of options about various institutional choices, such as reporting, consultative mechanism, or arbitration panels. This model demonstrates conflicting incentives on the part of state parties in negotiation about establishing a centralized monitoring institution.

By considering the elements of regulatory environments both international and domestic, this dissertation makes two related claims about monitoring institutions in international relations. The first claim is that when international organizations autonomously control the information they gather with adequate monitoring capacity to inform compliance behaviors, everyone usually benefits in the long run, but state parties will agree to submit to the system only under specific political, technological, and economic conditions. In order for state parties to accept international monitoring arrangements, political and economic conditions must be favorable for compliance with international agreements among contractual parties. The technological or evaluative capacity of international institutions must be able to create and sustain a cooperative environment by distinguishing reliably between treaty-permitted and treaty-prohibited violations. Lastly, economic conditions must be conducive to the transfer of side payments, either as monetary compensation (e.g. foreign aid) or as a form of concession in other areas of inter-state cooperation, to establish an efficient monitoring system. If these conditions are not met, we are less likely to observe international institutions wielding informational power to promote cooperation, and these conditions may not be easily realizable because economic and technological requirements are often politicized during the process of delegating informational capacity to international organizations.

The second main claim I make is about the sources of state preferences for particular international monitoring institutions over others. I argue that one of the key determinants behind a state's choice of a monitoring system is the compliance environment it faces at home and abroad. Different domestic compliance environments in two or more states—and different levels of access to reliable information about these environments—strongly shape the preferences of states as to international regulatory control. The analysis that follows juxtaposes international regulatory environments and domestic ones and highlights the importance of domestic measures in enhancing the informational power of international institutions. This view bridges the gap between the two camps that have emerged in compliance literature—the managerial camp and the enforcement camp—with their respective focus on domestic and international regulatory environments.¹⁶

¹⁶ Represented by the works of Chayes and Chayes 1995 and Downs and Rocke 1998, respectively.

These two claims sharply qualify the prevailing mood of optimism about the informational role of international institutions. International institutions may in general facilitate information flow, but the kinds of information international institutions can convey is often quite restricted, often excluding crucial information about treaty compliance.¹⁷ The findings presented here raise grave doubts regarding the extent to which international institutions can realistically increase transparency in performing their informational role; they also focus our attention on the question of who wields the informational power in international cooperation. This work is not the first to point out the informational constraints faced by international institutions since empirical records pointing out the constraints abound.¹⁸ My contribution lies in describing how states design and at the same time limit the power of international institutions¹⁹ with a view to specifying the conditions under which international institutions may be allowed to wield informational power.

Empirical Contribution

The purpose of three empirical chapters is to illustrate the theoretical framework and to provide systematic evidence for the theory. I demonstrate the usefulness of the theoretical approach in the empirical investigation of three issue areas of international cooperation while specifying “compliance environments” for three issue areas of trade, fisheries management, and arms control. By doing so, I identify the sources of distributional conflicts and assess the political feasibility of monitoring institutions.

The common structure of compliance environments and attending distributional conflicts highlighted in the theory chapter about the effect of informational asymmetry is discussed in the rich context of international trade, environment and security, with the

¹⁷ In rare cases, states may not want to know compliance information because they are not in a position to retaliate.

¹⁸ See, for example, Weiss and Jacobson 1998 and Breitmeier, Young and Zürn 2006 for the limitations in reporting systems in environmental agreements. Also see Alston and Crawford 2000 in the context of human rights monitoring.

¹⁹ Of course, I am not the first one to point out the weakness of the informational role of international institutions. See Dai 2001, 421 for her discussion of the managed role of international institutions. Also see Snidal and Thompson 2005 for their empirical claim that international institutions have little power in their informational capacity.

samples of regional trade agreements, fisheries agreements and arms control agreements, respectively. In regional trade agreements, compliance environments are characterized by occasional domestic protectionist pressures. In fisheries agreements, they can be measured by potential subsidies to fisheries industry. In arms control agreements, asymmetric compliance environments are generated by the level of domestic intelligence.

The newly assembled data provide systematic support for the theory of distributional conflicts and show that, although the sources of compliance environments differ across three issue areas, the effect of asymmetry produces similar impacts on the choice of monitoring systems: when the asymmetry is severe, states tend not to choose centralized, legalistic, and highly delegated international monitoring systems. This empirical evidence of distributional conflicts over institutionalization makes us re-think the limits and possibilities of the informational role of international institutions.

CHAPTER II

A Theory of the Design of International Monitoring Institutions

This section presents a theory of the design of monitoring institutions. The analysis involves a formal model that specifies political environments that define the choice of monitoring institutions and that induces the incentives for contractual parties to build monitoring institutions. I present political, economic, institutional, and technological conditions that make the delegation of informational capacity to international organizations, with a particular focus on the distributional consequences of delegation processes. By doing so, my analysis uncovers the conditions under which states collectively delegate informational power to international bodies.

I show that situational factors in a country's compliance environment, as well as internal agreement structures, affect the choice of monitoring institutions. Whether a country faces favorable or unfavorable political and/or economic environments ultimately conditions its preference for choosing an international monitoring body or not. I also show that the incorporation of flexible mechanisms into the structure of agreements can discourage overall institutional developments. Although the inclusion of flexibility in the form of allowing escapes helps states manage the risks, it narrows down the scope of agreement, with a consequence of presenting an obstacle to the initial development of monitoring institutions.

Before presenting these findings, I first discuss key elements and concepts that operate as building blocks of the model that follows. Specifically, I discuss what kind of uncertainty hampers international cooperation and how international monitoring institutions could alleviate the uncertainty but then at the same time create distributional conflicts.

Undeterrable Violations and Insincere Opportunists

The fundamental problem in international cooperation—to quote Keohane²⁰—is how to distinguish “insincere opportunists” from inadvertent violators. The related problem is to distinguish insincere opportunism from inadvertent violations. Distinguishing events can be more pernicious than identifying violators due to the difficulty of judging every case whenever a violation occurs. The problem is acute because we have to take into account situational factors as well as the intentions of states. When a state temporarily opts out of its international obligations or withdraws from an agreement, it is often not clear whether the state in question is insincere or not. This kind of uncertainty motivates the theoretical model, and in what follows I examine the conditions under which international institutions can help solve this particular kind of informational problem in international cooperation.

With regard to the kind of uncertainty introduced here, I develop the notion of *undeterrable violation*, which results from the kind of uncertainty or noise that is salient in the contemporary compliance environment. Two kinds of violations, deterrable and undeterrable, are differentiated because each case of violation has differential costs and benefits, thus potentially requiring different monitoring structures. Violations under favorable circumstances are not accepted internationally while violations under unfavorable or extenuating circumstances—violations considered inevitable or involuntary—are typically tolerated in the form of escape clauses or reservations. Violations of this kind are sometimes undeterrable because of the high costs of compliance on the part of the defector and the high costs of punishment on the part of cooperating partner. I therefore name these situations “undeterrable violations”²¹ and define them as stemming from circumstances where states face temporary political incentives not to cooperate and other states do not have the option to retaliate against the

²⁰ Keohane 2002.

²¹ I am not the first one to consider this case of undeterrable violations. Fearon 1998 for example uses the case in the crisis bargaining case. We can also find actual policy discussions about whether a country is deterrable or not in the policy arena. See Slocombe hearing, for example. Testimony of Honorable Walter Slocombe, Under Secretary of Defense Policy, Department of Defense, Hearing before the Subcommittee on International Security, Proliferation, and Federal Services of the Committee on Governmental Affairs, United States Senate one hundred fifth congress first session, February 12, 1997. Accessed at http://www.fas.org/spp/starwars/congress/1997_h/s970212State 2.htm

corresponding defection. Allowing legitimate violations is a defining feature of international agreements in almost every issue area, be it in relation to a provision for potential use of certain weapons for retaliatory purposes in security agreements,²² or in relation to safeguards provisions in international trade agreements.

What makes violations undeterrable? In theory, undeterrable violations can occur either opportunistically or inadvertently when a temporary violation is more profitable than the long-run gain from cooperation. In this situation, cooperation is so costly that a state may choose to violate. Many such scenarios are possible involving economic, political, and other kinds of pressures. First, a state's leadership could face overriding political incentives either inadvertently or intentionally to violate the spirit of a treaty temporarily. Even temporary incentives, particularly during election periods, may cause leaders to ignore international commitments for domestic gain. This point is noted in the theory of international trade as well as international finance. A battery of trade literature finds support for Grossman and Helpman's theory of protectionism where leaders find an excuse for protectionism based on the interest group pressures they face. In the area of international finance, Tomz and Wright in their study of sovereign debts between 1820 and 2000 find that inexcusable sovereign defaults have occurred with particular frequency during times of political upheaval.

Second, violations may be undeterrable when states do not have control over private party behaviors. States may suffer huge costs in regulating private individuals.²³ When states have poor control over individuals regarding compliance behavior, it is not clear whether the violation itself is deterrable or not on the state level because of the difficulty of attributing the violation to the state in question.²⁴ Practically, these putative situations of undeterrable defection are often taken into consideration in agreement texts²⁵ because states tend to hedge their bets rather than accept responsibility for acts of their individual citizens.

²² In the Geneva Protocol, states retained their potential use for retaliatory purposes against non-members which could potentially be states possessing biological and chemical weapons.

²³ For concrete examples of this kind of problem, see Morrow 2001.

²⁴ See the legal theory of state responsibility regarding this issue of violations "in a private capacity." Exemplary references include Crawford 2002; Bodansky and Crook 2002.

²⁵ This phenomenon has been best studied in international trade literature. See Rosendorff and Milner 2001. Also see studies on reservation clauses in human rights agreements. For example, see Simmons 2006.

Undeterrable violations matter in international cooperation because they generate monitoring problems. As the above examples make clear, the first-order problems arise for member states when the prospect for opportunistic behavior arises. States could exploit areas of ambiguity to justify their defections and masquerade as compliers. The second-order problems are then created for the international community regarding the suitable response to the seeming defections. The international community could wrongly or prematurely accuse a country of a violation, or it could err by ignoring an egregious violation. The core problem is not necessarily that states cannot observe the compliance environments of other countries—states in most cases know whether another state is having difficulty during a transitional period—but that monitoring activities may be prone to such errors.

Use of Flexibility Mechanisms as a Response to Undeterrable Violations

In an increasingly legalized international environment, more and more international treaties make an effort to distinguish between inadvertent and intentional violations. States have an interest in building flexibility mechanisms into international agreements so that even if they are not cooperative, they can still be compliant.²⁶ Flexibility mechanisms include escapes from commitments such as withdrawal clauses, sunset provisions, reservations,²⁷ or escape clauses.²⁸ This allowance of flexibility in turn conditions how countries respond to each other when a potential violation is suspected. When an undeterrable violation occurs, the offended states may not have the capacity to retaliate due to the high cost of retaliation, or they may be unwilling to do so. With built-

²⁶ Note that I distinguish the concepts of cooperation and compliance. Compliance is a behavior that conforms to what is prescribed or proscribed in the agreed-upon international agreements. Cooperation is what is ultimately aspired to in the agreement. Based on these definitions, cooperative behaviors are more difficult to measure and observe since we depend on counterfactual scenarios of “what would have happened if the ultimate goal (e.g. climate change) were attained.” On the contrary, compliance behaviors would not be as difficult to measure as projecting the counterfactuals since the agreement texts serve as baseline points for prescribed and proscribed behaviors.

²⁷ The Vienna Convention on Treaties Art. 2(d) defines reservation as “a unilateral statement...made by a State, when signing, ratifying, accepting, approving or acceding to a treaty, whereby it purports to exclude or to modify the legal effect of certain provisions of the treaty in their application to that state.” States often file reservations to their commitments in times of national security or emergency situations.

²⁸ Flexibility mechanisms can also include renegotiation provisions as in Koremenos 2001.

in flexibility mechanisms, on the other hand, countries are afforded some control and leeway in observing international agreements.

At the same time, however, flexibility mechanisms can create legal ambiguity as well as practical political difficulties for cooperation. Uncertainties with respect to international monitoring abound, including such problems as the sheer number of states that protect or conceal information regarding their domestic political and/or economic environments, and the number of private actors within states that are often unobservable.²⁹ Questions frequently go unanswered about who violated an agreement, whether a violation ever occurred, and whether the violation is verifiable or not. Other scholars have already addressed these types of problems³⁰ from a theoretical perspective, and the aim of this model is to focus instead on what is today arguably the foremost informational problem in the context of an increasingly legalized environment, namely, the question of what actually constitutes non-compliance.

Treaty-permitted and treaty-prohibited activities are often difficult to distinguish because the environments and intentions surrounding violations are often indeterminate. Political intentions are often inscrutable and it is important to respond to the *sources* of a violation rather than to actions themselves. A country is not likely to retaliate with sanctions when another member country has suffered through harsh political or economic conditions. There are easy cases and hard cases: dire economic conditions and political upheaval are well publicized in this media-rich, globalized world, but when circumstances are murkier, deciding how to respond to the real cause of a suspected violation is often an insurmountable task.³¹ The following model incorporates this concern and considers its role in determining under what conditions the delegation of authority to international institutions is likely to occur.

²⁹ States may be unsure of past history of play (which amounts to imperfect monitoring problems).

³⁰ See for example Benson and Soskice 2004 on the problem of non-verifiability. It is difficult to consider all the kinds of uncertainties in one model framework for analytical reasons.

³¹ This aspect of cooperation has been duly recognized within the debate between enforcement and management schools.

A Model of Distributional Conflicts in the Design of Monitoring Institutions

I use the repeated prisoner's dilemma setting,³² which has been used to examine monitoring problems in cartels and other forms of long-run partnerships.³³ In this model, states are forward-looking: they design monitoring institutions while being able to project the future in the face of uncertainty as to international cooperation.

Suppose that two negotiating states (or two groups or coalitions in international negotiation) – STATE 1 and STATE 2 – face asymmetric compliance environments. STATE 1 (row player) sometimes faces “Difficult Times” or unfavorable political and economic environments that discourage compliance with international agreements, while STATE 2 (column player) enjoys “Normal Times” or favorable compliance environments that are conducive to compliance with international agreements.³⁴ Further assume that STATE 1 knows its own compliance environments but STATE 2 does not directly observe STATE 1's compliance environments. In other words, it is STATE 1's private information that difficult times occurred. In terms of the world as we know it today, one might think of STATE 1 as representing developing countries and closed societies that are more likely to suffer through political conditions that may not be conducive to compliance with international obligations, and whose policymaking processes are not transparent. STATE 2 can be conveniently thought of as developed countries and open societies that probably face fewer constraints regarding compliance and whose political environments are known through public records and free media. However, one should note the fact that developed countries often face political constraints and can consequently be non-compliant, as well as the fact that open societies sometimes produce murky policies.

³² Other classes of models, such as principal-agent models and spatial models, have been used to study delegation problems. Each model emphasizes different aspects of delegation. The principal-agent model is used to highlight the potential divergence between the interests of states (principals) and international organizations (agents). Spatial models are more adequate in studying potential coalitions. I use the canonical PD to show the formation of preferences among negotiating states in the face of domestic uncertainty.

³³ See Green and Porter 1984, and the series of public/private monitoring problems described in Kandori 2001. For a comprehensive review of perfect/imperfect, public/private monitoring, see Mailath and Samuelson 2006.

³⁴ In terms of empirical references, one can think of STATE 1 as representing developing countries that are more likely to suffer through political conditions that may not be conducive to compliance with international obligations, compared to developed countries. Alternatively, one can think of STATE 1 as a closed, secretive country that retains private information as to its domestic political situation.

Figure 2.1 depicts the described game setup with asymmetric compliance environments and a one-sided uncertainty information structure. It presents a stage game which provides the strategic environment for two players and is infinitely repeated.

Figure 2.1 Stage Game with Asymmetric Compliance Environments and Uncertainty about Normal and Difficult Times

		Normal Times (1- ϵ)	
		C	D
C	1, 1	- β , α	
D	α , - β	0, 0	

		Difficult Times (ϵ)	
		C	D
C	1, 1	- β , α	
D	2α , - β	0, 0	

Where $\alpha > 1$, $\beta > 0$, $(\alpha - \beta) / 2 < 1$ ³⁵

The core cooperation problem for two players is to figure out the true state of the world based on the actions they take, where Difficult Times occur randomly and exogenously. Unfortunately, STATE 2 knows the distribution of negative occurrences of STATE 1's undeterrable defections but does not know *when* they occurred. STATE 2 only observes the previous action of STATE 1 and has to infer STATE 1's compliance environment based on publicly observable signals, namely, the actions of STATE 1, {C,D}. If a cooperative behavior (action C) is observed, STATE 2 would conclude that STATE 1 is experiencing Normal Times, but if a defection (action D) is observed, STATE 2 has to decide whether STATE 1 was experiencing Normal or Difficult Times before it decides what its response will be in the next period.

Many situations that arise in international cooperation resemble this setting, where cooperation levels (the actions of governments) are known, but the cooperation environments at the time of a violation are ambiguous or disputable. For example, in 2001 we saw the United States impose a steel tariff (action), but other countries refrained from determining whether this action was politically motivated or not, that is, whether the United States was truly in Difficult Times and therefore under some constraint to invoke safeguards measures to restrict steel imports, or whether the political leadership had invoked the exception more opportunistically, under Normal Times.

³⁵ This is to eliminate the incentive for alternating between C and D and to make reciprocal enforcement possible.

Difficult Times, abstractly modeled in Figure 2.1, encompasses any situation that makes a violation undeterrable. Difficult Times is modeled as a situation where cooperation is not feasible, even in a repeated setting, because retaliation does not restore cooperation.³⁶ The cost of imposing cooperation is so huge that the violation is inherently undeterrable, as the name “undeterrable violation” suggests, and the best course of action for the cooperating partners is to let-by-gones-be-by-gones and not to punish the party who engaged in the undeterrable violation. These notions are formally reflected in the case specific conditions: $\delta > \alpha - 1$ in Normal Times³⁷ and $\delta < 2\alpha - 1$ in Difficult Times.³⁸ In other words, reciprocal enforcement is possible in Normal Times but impossible in Difficult Times.

The size of epsilon therefore reflects the degree of asymmetric environments between cooperating partners and can be interpreted as the amount of flexibility one party grants to the other party in international agreements. The level of flexibility generally follows the different compliance environments states are in. The special and differential treatment (SDI) under the global trade regime and differentiated commitments under the Kyoto Protocol are perhaps the most prominent examples of states granting some autonomy to other parties.

Among other kinds of uncertainties, I focus on the uncertainty surrounding undeterrable violations for three reasons. Other scholarly works have dealt with other kinds of uncertainties such as misperception and mis-implementation.³⁹ Second, uncertainty regarding undeterrable violations has become more prevalent as agreements have become more legalistic. Third and most importantly, the notion of undeterrable violations abstractly captures one of the most important sources of non-cooperation. The

³⁶ This is assuming retaliation is a single-period punishment. If the punishment is sufficiently severe, parties could restore cooperation but it is not clear why parties would choose to suffer such a big loss in utility.

³⁷ If reciprocal punishments were to be enforceable given Situation A, it should be the case that cooperation should be more profitable than one-time defection, that is, $1 + \delta \geq \alpha + 0$, applying the principle of optimality in dynamic programming (Fudenberg and Tirole, 1991, p.108-10). The principle states that it is sufficient to check one-time deviation. δ indicates how much a player values the future. The larger the value of δ , the more a player appreciates future payoffs.

³⁸ Following the same logic above, if the reciprocity is not enforceable in Difficult Times, it should be the case that defection should be more profitable than cooperation, that is, $1 + \delta < 2\alpha + 0$. In other words, defection is always better for STATE 2 under Difficult Times.

³⁹ Representative works are by Wu and Axelrod 1995 – where they consider different strategies to cope with noise, rather than the function of monitoring systems – and Bendor 1993. For a good review of noise in the prisoners’ dilemma, see Axelrod 2000.

recent trend to provide international treaties with more and more robust legal frameworks produces two conflicting effects.⁴⁰ One is to provide bright-lines,⁴¹ and the other is to obfuscate issues and produce opportunists.⁴² One of the functions of monitoring is to sort out these effects. In addition, the built-in flexible clauses—such as withdrawal, escape or reservation clauses—create monitoring problems. While perfectly legitimate, withdrawals often operate as a pretext for violations, as the case of North Korea’s repeated violations of the Nuclear Non-proliferation Treaty shows.

My model builds on that of several previous authors, most directly that of Rosendorff (2005) and Svulik (2006).⁴³ Rosendorff’s model is designed to show the trade-off between rigidity and stability, while Svulik’s model suggests design mechanisms to ward off the price of escapes. By contrast, my analysis focuses on the design stage of monitoring institutions and asks whether players have incentives to build institutions in the expectation of future cooperation, thereby addressing to the question of distributive politics in the institutional design process.

In what follows I consider the conditions under which participating states delegate informational capacity to an international body. I compare an equilibrium under incomplete information with an equilibrium achieved with the involvement of an international monitoring body. For both cases, I use the Perfect Public Equilibrium (PPE)⁴⁴ as a solution concept.

Cooperation under No Information Systems (Incomplete Information Case)

Consider a baseline case where states interact with no coordinating device, relying on private information only. Given his private knowledge about the situation, STATE 1’s

⁴⁰ Keohane 2002.

⁴¹ Morrow 2001.

⁴² Schwartz and Sykes 2002.

⁴³ The model is similar to Rosendorff 2005 and Svulik 2006. Rosendorff’s model involves one-sided asymmetry of information but a symmetric payoff structure. Svulik’s model involves two-side uncertainty with a symmetric payoff structure in a mechanism design setting. My model involves asymmetric information and asymmetric payoffs. Instead of symmetric game, I present an asymmetric case to highlight distributional consequences.

⁴⁴ PPE represents sequential equilibria in public strategies. Public strategies are the strategies that only depend on the history of publicly observable signals. See Fudenberg, Levine and Maskin 1994 for this solution concept.

strategy is exactly the same as in the complete information case, which is to cooperate or defect under Normal Times and defect under Difficult Times no matter what. By contrast, STATE 2 can no longer condition his response on the nature of violations that occur because STATE 1 can opportunistically violate under Normal Times but still claim that it was experiencing Difficult Times. Given his lack of knowledge about the intention behind STATE 1's violation, STATE 2 simply has to pool his strategy. One possible equilibrium that makes the cooperation possible under Normal Times would be for STATE 2 to play C and continue cooperation unless a defection occurs. If a defection is observed, STATE 2 retaliates against any kind of defection for one round,⁴⁵ regardless of whether the violation is opportunistic or undeterrable. In this cooperative equilibrium, STATE 1 plays C under Normal Times and D under Difficult Times.

What about an off-the-equilibrium situation?⁴⁶ If defection ever occurs under Normal Times, the party that detects the defection employs the strategy of D for one round. Throughout the implementation of the model scenarios, I assume one-round punishment.⁴⁷ The punishment period hurts the overall efficiency of cooperation but is a necessary evil or cost to restore the cooperative equilibrium. In the single punishment phase, I let the defector (STATE 1 in my framework) defect while being punished. The defection of the previous defector in the punishment period makes substantive sense since many inevitably uncooperative environments are sticky and do not change easily. In the retaliation scheme I specified, it takes STATE 1 one period to adjust to cooperation, and STATE 2 permits some recovery time for STATE 1 while punishing. On STATE 2's part, it is a punishing and forgiving strategy at the same time. I call this strategy a "condoning strategy," since a partner to the violator overlooks the defection while retaliating. I use this strategy profile to obtain other institutional equilibria.⁴⁸

⁴⁵ This requirement for a one-period punishment scheme is to make sure that cooperation is not as unnecessarily difficult as it is with the use of grim trigger.

⁴⁶ I need to specify what players would do off-the-equilibrium path in order to support the equilibrium behavior. These off-the-equilibrium behaviors constitute conditions that make an equilibrium sustainable.

⁴⁷ This makes calculation of payoffs easier. If one-round punishment supports an equilibrium, two or more punishments effectively support such an equilibrium condition. However, the reverse would not be true. An equilibrium supported by many punishment rounds may not be supported with a single punishment period.

⁴⁸ Although "grim trigger" is conventionally used as a limiting case for cooperation (e.g. Fearon 1998; McGillivray and Smith 2000; Bueno de Mesquita and Stephenson 2006) with the modeling intention to make it harder for cooperation to arise and therefore to give it a harder test, I think it is too restrictive an assumption that is far from reality. One can think of many rounds of punishment, but "grim trigger" is less

Cooperation/Equilibrium with Reporting Mechanism

Many international agreements stipulate reporting requirements with varying degrees of frequency/periodicity and information content. In general, states are asked to report their compliance behavior voluntarily in a designated time-frame. Under what conditions would the voluntary reports convey any meaning? The consideration of this institution-less environment is important because this scenario provides a standard of comparison for other scenarios involving incomplete information, as well as for cases with an international monitoring body.

In the baseline game presented in Figure 2.1, suppose that STATE 1 and STATE 2 communicate every time a violation occurs. Further suppose that STATE 1, when it defects, would want to send an apologetic signal as a way to claim that non-compliance had happened under extenuating circumstances. It is able to send a signal either 'n' (a signal to indicate that Normal Times had actually happened) or 'd' (a signal to indicate that Difficult Times had actually happened) to let STATE 2, an uninformed party, know its true cooperation environment.

The following strategies could be supported as equilibrium. STATE 1 sends the same signal 'd' all along and STATE 2 does not have any reason to believe the signal. Regardless of the accuracy and honesty of the signal, STATE 2 has to retaliate if a defection occurs. Therefore, *learning from the signal does not occur*, since the signal is not informative about STATE 1's actual defection environment. After a defection period, STATE 1 goes back to cooperation while STATE 2 punishes STATE 1 for a single period. STATE 1 pays the defection cost and this cost gets both players back to a cooperative stage. (The proof of this equilibrium may be found in the Appendix)

The implication of this reporting mechanism is that meaningful communication is impossible to establish given an asymmetrical information structure where an opportunistic defection under the PD payoff structure is not easily distinguished from an

likely to occur in international relations where sanctioning mechanisms are weak. Since cooperation is more difficult under one-round punishment than under the grim-trigger strategy, the conditions for cooperation under a single-punishment scheme are trivially satisfied under a grim-trigger strategy.

undeterrable violation.⁴⁹ The game produces a babbling equilibrium where STATE 1's signal is meaningless and therefore, STATE 2 does not update his belief. This result is consistent with the general result from cheap talk games.⁵⁰

The babbling equilibrium here does not necessarily denounce the value of all the reporting mechanisms built into the majority of international agreements. It is important to note that this seemingly pessimistic view of uninformative reporting mechanisms is the result of the assumptions attached to the model. Since the model concerns static equilibrium, every history is repeated without historical memory. The model clearly shows that without institutional memory or use of reputational dynamics⁵¹ in international cooperation, reporting could lose its value. The model therefore specifies the conditions under which reporting may and may not be valuable. In the appendix, I consider the case where costly signals can induce honest communication.

Cooperation under an International Monitoring Body (Verification Agency Equilibrium)

Cooperation dynamics change when an international monitoring party is involved. In this model, an international agency fills a broad role of providing compliance information, thus operating as a public correlating device.⁵² This international third party

⁴⁹ Reporting may be valuable in issue areas where the incentive to defect is low (e.g. standardization), as Morrow (1994) showed. He found that the high probability of identical interests yields communicative equilibria where players reveal their true cooperation environment. In my model, by contrast, expected self-gain hinders communicative equilibria, and truthful reporting never occurs. Therefore, the result of the reporting case can be compared with and supplemented to Morrow's. His result is pertinent to issue areas where coordination and distribution problems are dominant; mine is more pertinent to deep cooperation cases where preferences are more aligned with the PD structure.

⁵⁰See Farrell and Rabin 1996.

⁵¹ Dynamic elements would make a difference, as in many reputation models. Nevertheless, the model shows how difficult it is to rely on pure communication between states. Reporting mechanisms have dire consequences, especially when no institutional memory exists or reputational losses from violations are not great. As developed in reputation models, cheap talk sometimes carries some value in deterrence settings (Sartori 1998) and reputation itself could serve as an enforcement mechanism in trade-group relationships (Milgrom, North and Weingast 1990). To what extent reputation carries value in international cooperation settings is debatable. Recent works on the bilateral investment agreements (BITs) (Simmons and Elkins 2004; Milner and Buthe 2004) empirically demonstrated that reputational factors influence decisions to join. In the area of human rights, there is some anecdotal evidence showing that states care about their reputations as they lobby to avert bad news from becoming international news. Nevertheless, the extent to which reputation is valued by states is understudied.

⁵² The fundamental informational function is akin to Greif et al. 1994. The key difference from my setting is that I compare other information mechanisms and draw inferences about distributional consequences to predict the choice of monitoring institutions.

embodies several characteristics or features shared by most international bodies, including (1) an independent capacity to collect information, (2) the ability to form judgments, and (3) weak or zero enforcement power. Our theoretical endeavor here is to examine how cooperation occurs in this setting and to determine under what conditions states are willing to accept this kind of information mechanism.⁵³

The game with an international monitoring body proceeds with the following sequence of moves. STATE 1 and STATE 2 start playing an incomplete information game, as described above. If defection occurs, the agency is called upon to verify and inform STATE 2 whether the violation occurred under Normal Times or Difficult Times by sending the signals, n or d ,⁵⁴ corresponding to each situation. Under the uncertainty of undeterrable violations, two kinds of errors could occur, as summarized in Figure 2.2. $1-q$ and $1-r$ are the rates for false alarms and missed hits, respectively. The proposed international agency could cry wolf and mistakenly inform states that a violation was deterrable, when in fact it was undeterrable; or the agency might fail to detect that a violation was deterrable and remain complacent. Two probabilities, q and r , then represent the accuracy level of the verification agency. The agency produces right judgments with probabilities q (the probability that the agency says ‘n’ when Normal Times occurred) and r (the probability that the agency says ‘d’ when the Difficult Times occurred).

	Agency says ‘n’	Agency says ‘d’
Normal Times	q	$1-q$
Difficult Times	$1-r$	r

Figure 2.2 Verification Accuracy and Types of Errors

Qualitatively, verification errors can be technological or evaluative. Technology could produce erroneous evidence in determining the situation, and then errors could

⁵³ Once an international monitoring body is established, it could act as a strategic actor. For this possibility, see Johns 2007.

⁵⁴ The signal is given right after the defection occurs and right before states make their decisions either to continue the cooperation or to punish in the next round. Note that I assume that players follow signals from the agency. If players do not follow agency signals with some probability, then the case is tantamount to a “no information systems” scenario.

stem from wrong or inconsistent judgment.⁵⁵ The consideration of two kinds or levels of error is important in terms of assessing the conditions under which states will accept a proposed third-party mechanism, because the choice depends on the quality and reliability of information the monitoring body can provide.

When considering the costs and benefits of an independent monitoring capability, negotiating states form expectations about the agency. A verification agency equilibrium occurs when states are willing to conform to the prescribed strategy (of initially cooperating and then resorting to a single-period defection in case of treaty-prohibited violations), relying on the signal from the agency. Under this equilibrium, the agency balances the risk of possible errors in such a way as to sufficiently deter future opportunistic violations, and then allocates its remaining resources to aid the identification of politically difficult times. What level of accuracy must be reached for the agency equilibrium to be achieved, and which type of error is more tolerable? Lemma 1 establishes the relative importance of monitoring accuracy.

Lemma 1 (relative value of monitoring accuracy under verification equilibrium) *Predicting violations under normal times (q) better induces cooperation than identifying difficult times (r) correctly.*

Proof. See Appendix.

For the verification agency equilibrium to be stable, the agency must be able to identify normal violations with a moderate to high level of reliability. This is because a small drop in q could dramatically increase the required level of patience for cooperation,⁵⁶ thereby severely discouraging potential participants from joining the

⁵⁵ For a general discussion of such errors, see Guzman 2002, 315-319. In the context of the WTO, Smith and Garrett 2002 discuss the disparities in panel and appellate decisions, which could be interpreted as potential errors within the WTO dispute settlement procedures. Take the example of the *Shrimp-Turtle* and *Tuna-Dolphin* cases where the WTO dispute settlement body has sent out mixed and ambiguous signals with regard to the relationship between environment and trade (the ruling in *Shrimp-Turtle* was environment-friendly while *Tuna-Dolphin* favored trade principles).

⁵⁶ This is the key idea for the proof of Lemma 1. Technically, this is because a small increase in q could dramatically lower the threshold patience level required for verification equilibrium, that is $\frac{\partial \delta^*}{\partial q} < 0$,

$\frac{\partial \delta^*}{\partial r} < 0$, and $\left| \frac{\partial \delta^*}{\partial q} \right| > \left| \frac{\partial \delta^*}{\partial r} \right|$ where δ^* is the upper bound of patience level required for verification equilibrium.

treaty. This also implies that increasing q is a more effective way of lowering the threshold patience level, since this tends to produce a more inclusive treaty with a more diverse set of member countries. Therefore, I conclude that increasing the level of q instead of r can strengthen the deterrent value of the verification agency, thereby stabilizing member participation in the treaty.

The result also has an implication for the general design of the information systems of international organizations. In order to design a monitoring structure that is conducive to compliance, states might want to design the verification agency such that it effectively alerts other interested states of a particular state's illegitimate violations under normal cooperation conditions. This might mean that the agency's capacity to detect random shocks of undeterrable violations will be relatively sacrificed. This is not to argue that revealing the undeterrable violations is not important. As Downs and Rocke⁵⁷ note in the case of arms controls, frequent false accusations without consideration that violations are sometimes innocuous may induce more non-cooperative behavior on the part of a reckless party. Both q and r matter in this respect, but the verification resources do not have to be focused on detecting special cases. Rather, the model demonstrates that priority should be given to detecting illegitimate violations first. A moderate degree of transparency, not necessarily full transparency, may be sufficient for future cooperation as long as the transparency is enough to reveal the true source of non-compliance.

This equilibrium requires an appropriate balance between two types of verification accuracy, but inevitably, a trade-off exists between the two types.

Remark 1 (monitoring capacity as a verification equilibrium condition)

There exist trade-offs between types of monitoring accuracy, q and r .

Proof. See Appendix.

As the verification agency increases its capacity to detect normal situations, it unavoidably decreases its capacity to detect external shocks.⁵⁸ Two types of verification accuracy have separate functions and work differently to ensure cooperation. r makes equilibrium valuable by alerting the parties to situations of undeterrable defections and

⁵⁷ Downs and Rocke 1990, 23.

⁵⁸ This result is analogous to the statistical theory of Type I and II errors where the risk of rejecting a null hypothesis (when it is true) is traded off with the error of accepting a false null.

eliminating unnecessary punishments. In other words, alleviating the risk of false alarms contributes to the treaty's efficiency by building credibility and eliciting more cooperation by avoiding unnecessary punishments. q operates mainly by making enforcement effective because it actually deters potential violations and makes a treaty effective. This is the case because STATE 2 can legitimately punish STATE 1 based on the signal from the agency if the agency confirms that STATE 1 was actually experiencing conditions favorable enough to cooperate.

Comparing Institution-less and Institutional Equilibria

I compare two equilibria—one arising in an institutional-less environment, and the other involving a third party monitoring agency. In comparing different equilibria, one can focus on various aspects of equilibrium conditions, such as joint utility maximization (e.g. Pareto-efficiency) and patience levels. Since my research goal is to examine how the delegation of monitoring function to an international institution involves distributional conflicts among negotiating states, I focus on the individual welfare gains across two equilibrium environments and examine how much a player's welfare improves with the change in institutional arrangements. I intend to show the source of distributional conflicts and their effects on the design of monitoring arrangements by comparing the expected payoffs for each player in the situation under incomplete information with the payoffs in the scenario involving an information agency. I call the increase in payoffs “verification gains.” It measures how much an individual state gains in *extra* utility by having verification compared to the absence of any information systems. I define verification gains formally below.

Definition 1 (verification-gains) *Verification-gains is a measure of the difference in utilities under an incomplete information scenario and a verification agency scenario ($V^{VA} - V^I$).*

If the expected gain is negative (i.e. loss of welfare), a state is more likely to be against centralized monitoring with delegated informational functions to an international body. If the expected gain is positive, that state is more likely to support the

establishment of an international monitoring body. When one player expects to lose from having a verification agency, the state is more likely to oppose the idea of establishing an international body, which decreases the probability of reaching a joint decision of establishing an international monitoring body.

Using this criterion, we can see how the divergence in verification gains between players is likely to result in the breakdown of an institutional setup, as illustrated in Figure 2.3.

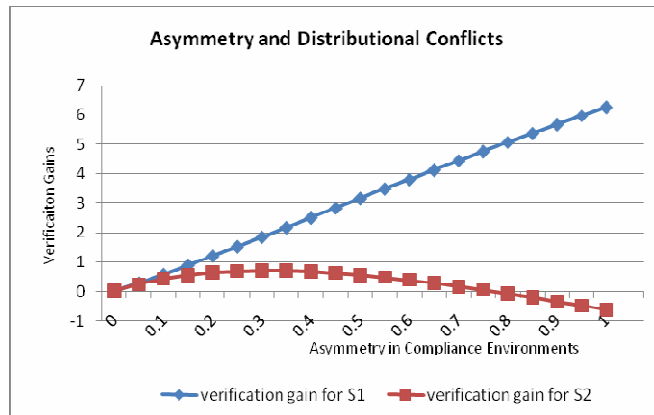


Figure 2.3
Effect of Epsilon (Probability of Difficult Times occurring)
Verification Gains for each state for the parameter values of $r=.6$, $\beta=.3$, $\alpha=1.5$ and $\delta=.9$

In Figure 2.3, I calculate the welfare of each player rather than examining the aggregate welfare, fixing other parameters, including patience level. For plausible parameter values, verification gain for each player is plotted against the change in the occurrence of Difficult Times for STATE 1. This graph has a conservative assumption that an international monitoring body is expected to have an adequate monitoring capability in terms of deterring normal violations and of correctly identifying exceptional circumstances.

Even under the expectation about an adequate monitoring system, note how the relative payoffs diverge for both players. Although both players gain for most of the range of uncertainty with the presence of a verification agency, the informational gains differ for each player. For STATE 2, the agency is useful in aiding the distinction between legitimate and illegitimate violations only up to a certain point ($\epsilon = 0.8$ in this scenario)

and the verification gain becomes negative if STATE 1 is expected to go through many cases of undeterrable violations.

STATE 1, on the other hand, has positive verification gains if verification equilibrium occurs. This is because the verification agency allowed occasional defections that go unpunished. As the informed party, STATE 1 benefits more than the uninformed party (STATE 2) by exploiting the opportunity provided by flexibility mechanisms that allow temporary defections without retaliation by STATE 2.

These relative payoffs to STATE 1 and STATE 2 depend on the probability of undeterrable violations that occur to STATE 1 during its Difficult Times. Surprisingly, the party with no prior information about compliance environments of the other state, namely STATE 2, does not always gain by having a verification agency. STATE 2 as the uninformed party sees an informational gain, with a maximum gain when the uncertainty is the largest (i.e. when difficult times are undistinguishable from normal times), but what it gains from having a verification agency tapers off as the probability of shocks increases. This marginal decline in informational gain for the uninformed party stems from the unintended, negative side effect of flexibility mechanisms. In sum, flexibility mechanisms, in the extreme, can lower cooperation payoffs in the short run, although they carry the benefit of easily absorbing domestic or international political shocks. This condition is summarized in Proposition 1.

Proposition 1 (*distributional conflicts due to allowance of flexibility, ϵ*)
Verification gains become negative for STATE 2 when $\epsilon > \epsilon^$ wherever ϵ^* , the solution for $\frac{\partial(VG_2)}{\partial(\epsilon)} = 0$, exists.*

Proof. See Appendix.

Proposition 1 tells us that the degree of political disagreement over centralized monitoring institutions increases if the asymmetry level is high.⁵⁹ A high asymmetry in compliance environments may discourage STATE 2 from adopting a centralized

⁵⁹ One has to be careful about interpreting the result in empirical analyses. I suggest the possibility of centralization breaks down when the asymmetry increases because one or more party may disagree with the adoption of a centralized monitoring mechanism. because there may be instances where preferences are not directly translated into negotiation outcomes. As Axelrod (1964) suggests, a conflict of interest leads to an active behavioral conflict when “other things are equal”

mechanism. At a certain point, a centralized monitoring loses its value of distinguishing deterrable and undeterrable violations. When it expects a lot of undeterrable violations, a monitoring body becomes a useless tool.

The shape of the verification gains crucially depends on the defection risk (β) shouldered by STATE 2 as well as the defection gain reaped by STATE 1 (α). If the risk is large, its disutility for an international monitoring mechanism hits at a lower threshold than $\varepsilon = 0.8$ for STATE 2 (**Figure 2.4A**). Similarly, if the gain from undeterrable violations is not large, the gain from flexibility mechanisms is moderated for STATE 1 and the distributional conflicts disappear (**Figure 2.4B**). How prevalent this distributional problem turns out to be depends on α and β . If the defection risk is higher for STATE 2 and the defection gain for STATE 1 is large, distributional conflict is more likely and STATE 2 is likely to oppose the idea of having a verification system.

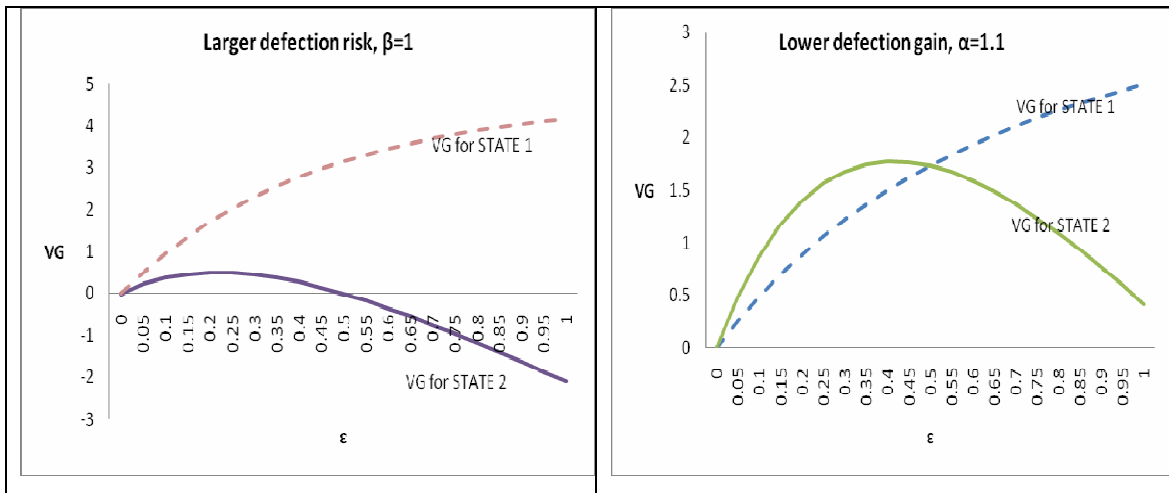


Figure 2.4A Larger Defection Risk Scenario

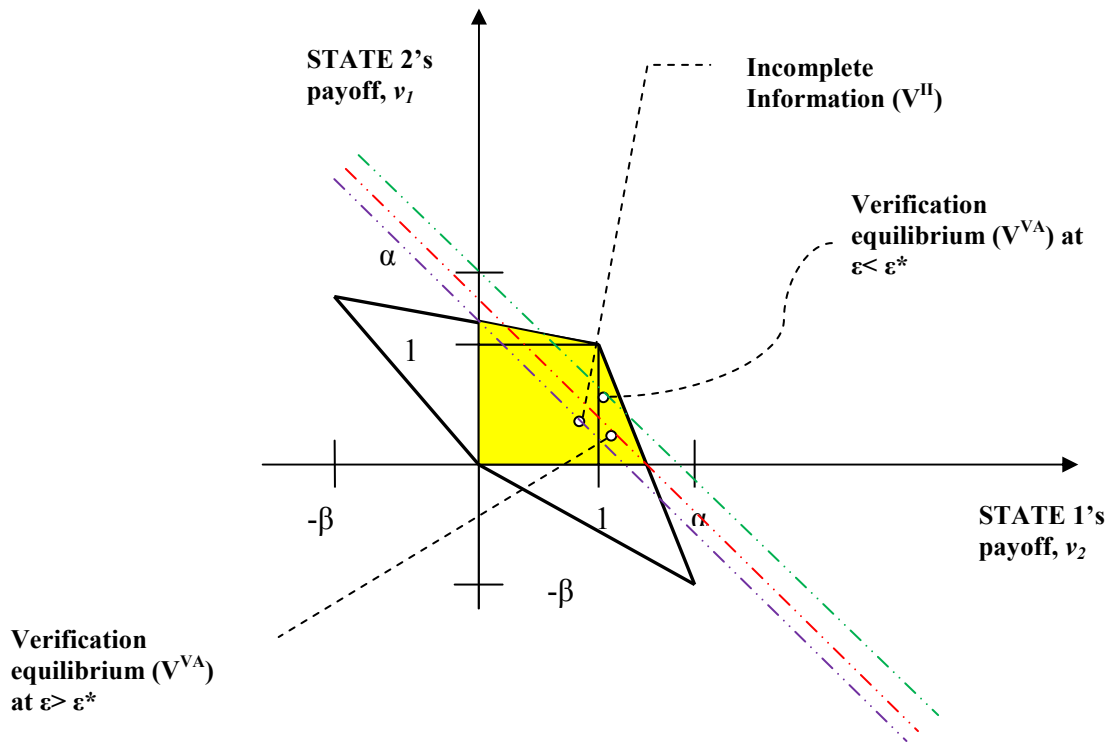
Figure 2.4B Lower Defection Gain Scenario

For a wide range of parameter values, distributional conflicts exist where one player prefers verification and the other player prefers no monitoring institution. Proposition 1 establishes that STATE 2 may not want a verification system even if the system has the desirable effect of deterring violations under normal circumstances. This result has important implications for the design of monitoring systems because it implies that, for a certain number of countries, the benefits of an international monitoring

mechanism may not amount to a big enough incentive to favor such an arrangement when there is the expectation that other states will defect from their international obligations, either opportunistically or inadvertently.

Figure 2.5 shows the distributional conflicts within the feasible payoff sets, $V \ni \{v_1, v_2\}$. Both points of verification equilibrium payoffs (V^{VA} at $\varepsilon < \varepsilon^*$ and V^{VA} at $\varepsilon > \varepsilon^*$, where ε^* is the threshold of v_2 changes from positive gains to negative gains) are Pareto-improving (i.e. farther out to the Pareto frontier) compared to the payoff sets under incomplete information (V^H). However, STATE 2 is worse off when it has to allow STATE 1 much flexibility (i.e. $\varepsilon > \varepsilon^*$) even under a verification system with adequate monitoring capacity.

Figure 2.5 Set of Feasible Payoffs and Distributional Conflicts



The distributional conflict stemming from the asymmetric compliance environments and the allowance of occasional violations raises an important issue about the role of flexibility mechanisms in international agreements. States often set aside thorny issues or include reservations to certain provisions of treaties in order to hedge

their bets. Although flexibility may induce more members to participate, not only does it come with the price of reducing efficiency by reducing the level of cooperation⁶⁰, but it also hinders institutional development by creating a disincentive for certain complier-type members (as Proposition 1 demonstrates). Flexibility may encourage broader participation, but it discourages deeper cooperation.⁶¹

Figure 2.6 Regions of Distributional Conflicts

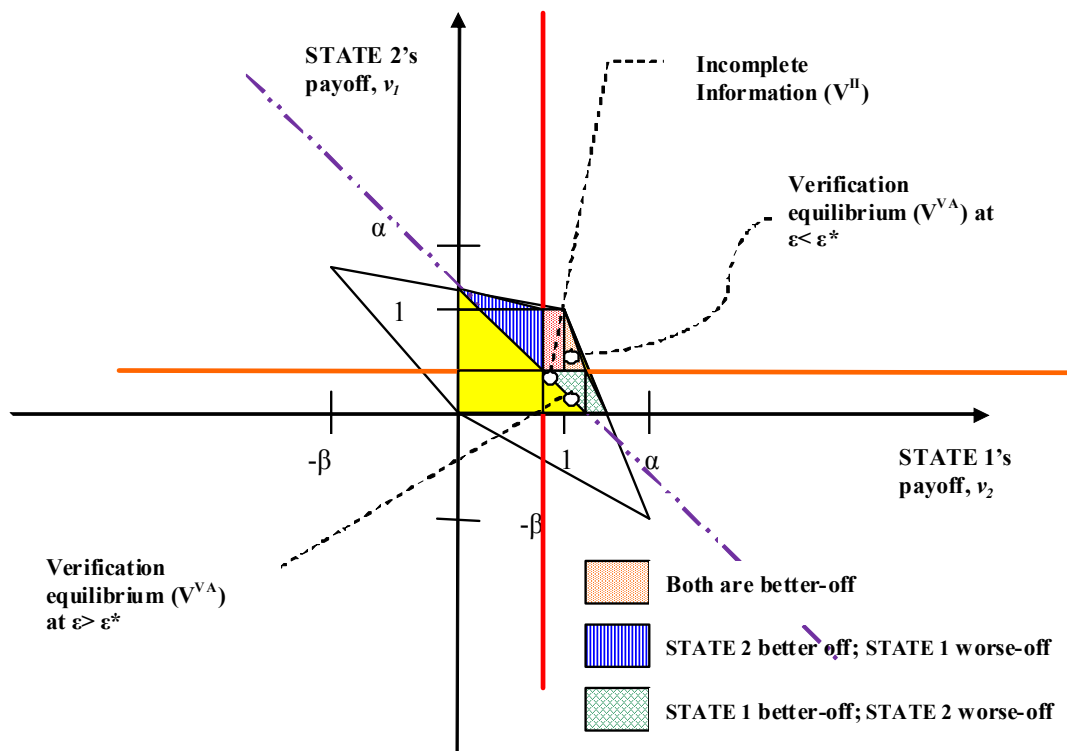


Figure 2.6 specifies the regions for distributional conflicts. Upper-right trapezoid is the region where both parties gain; lower-right trapezoid is the region where STATE 2 loses by having a verification mechanism; upper-left triangle is where STATE 1 loses whereas STATE 2 gains.

⁶⁰ Rosendorff 2005.

⁶¹ In model terms, this means a lower threshold for delta and consequently, the possibility of rejecting a third party monitoring. Gilligan 2004 provides conditions under which this tradeoff does not exist.

The benefit region is larger for STATE 2: the informationally poor certainly benefits by having an international third party. Nevertheless, the informationally rich (the informed party, STATE 1 in the model) also benefits from it. Notice that the state with private information *has* an incentive to establish third-party monitoring. This means that a state that expects difficult times (a hard time cooperating) could favor third-party monitoring. This would be because the state expects to gain from a verification system by demonstrating its compliance and avoiding unnecessary punishments.

This kind of example where the party with more information supports an international monitoring body is not difficult to find. In the international whaling regime, for example, Norway and Japan, traditionally whaling nations, advocated having an observer and inspection system during the negotiation of the Revised Management Scheme (RMS) in the late 1990s. One might have expected the two countries to oppose the idea of subjecting themselves to international monitoring, but their incentives were in fact two-fold. As non-whaling countries claim, the whaling nations expected to end the moratorium imposed by the International Whaling Commission (IWC) in 1982 and resume whaling. Non-whaling nations argue that whaling nations suggested having monitoring mechanisms partly out of self-interest, to establish conditions for a resumption of whaling. Indeed, Japan and Norway argued that they would be able to resume whaling under the quota system and that they would be able to demonstrate their compliance through the observer system. The fact that the bargaining to end the moratorium was linked to the installment of observer systems clearly shows us the divide between potential compliers and non-compliers. From the perspective of non-compliers, the flexibility or relaxation of enforcement may go hand-in-hand with stronger monitoring systems. On the part of potential compliers, in this case, non-whaling nations, informational delegation therefore often comes at a price. They may be able to establish delegated monitoring but have to allow more flexibility and consequently narrow down the scope of cooperation. If non-whaling nations wanted to adopt monitoring mechanisms, they would have to make concessions with regard to the moratorium.

Institutional Interactions: Flexibility and Centralization

The discussion of monitoring schemes in the area of whaling nicely illustrates the tradeoff between flexibility and centralized monitoring. Japan and Russia, by advocating observer schemes was to trade off a stronger monitoring system for weak enforcement. Whaling nations wanted to enjoy flexible mechanisms, namely, a resumption of whaling, at the expense of subjecting themselves to centralized monitoring. They were willing to make concessions on the monitoring scheme front in order to gain flexibility. On the other hand, non-whaling nations pushed for a rigid agreement that would keep the moratorium in place, sacrificing a centralized monitoring setup that would include observer schemes. In the expectation of potentially undeterrable violations, non-whaling nations decided to maintain the status quo and the moratorium, although this path meant living with a lower level of supervision.

As the model suggested and as the example of the whaling regime illustrates, only when enforcement is weak,⁶² and only when there are guarantees of flexibility mechanisms, are countries prone to undeterrable defection likely to submit themselves to monitoring and scrutiny. This dynamic may also have been at play when the United States agreed to the dispute settlement mechanism during the Uruguay Round, despite the likely prospect of Congressional opposition. The establishment of the dispute settlement body within the WTO was only possible with the guarantee of flexibility mechanisms (general exceptions, safeguards, countervailing duties, anti-dumping measures, etc.) that allow for political expediency. These examples indicate that in some situations we may observe a centralized monitoring mechanism take shape without any commitment to deep cooperation (i.e. more flexibility). Procedural centralization and institutional delegation may in fact be accompanied by a substantively *lower* level of cooperation than an institution with a weaker monitoring system.

Flexibility mechanisms in the model have been defined to be the provisions that grant occasional legitimate violations without retaliation. Flexibility essentially undermines deeper cooperation by leaving some politically convenient situations

⁶² In the model, this means no punishment when Difficult Times happens – that is, totally respecting flexibility mechanisms.

unpunished. Flexibility has its good side, too, as Rosendorff (2005) formally shows: it could accommodate a wide variety of participants. In terms of the institutional design of monitoring arrangements, allowing flexibility mechanisms may induce a difficult party to cooperate by granting it a degree of control over its fate when it commits a violation, but at the same time, it has the effect of discouraging the other party from instituting a centralized monitoring mechanism. The consequences of giving a break and granting flexibility mechanisms may be great and may result in situations where international monitoring does not see the light of day, despite its efficiency. More flexibility gives the party experiencing an unfavorable situation ample incentive to institute monitoring mechanisms, but it also gives the other party an incentive *not* to favor monitoring when it expects to suffer through too many legitimate violations by the other party.

The Informationally Rich and Poor

The related point to Proposition 1—that a party with private information may have reasons to demand an international monitoring body—is counter-intuitive and carries policy implications. Even with the inherent distributional conflicts in designing monitoring systems, a party that expects many shocks may be persuaded to accept an international arrangement. This point is summarized below.

Corollary 1 (flexibility and the preference for a monitoring body) *States with private information about compliance environments prefer an international monitoring body if sufficient flexibility is guaranteed.*

In verification equilibrium, even an informationally rich state (that is, a state with private information about its own compliance environments, STATE 1 in the model) prefers verification if it has guarantees of flexibility mechanisms and a sufficiently high patience level. By contrast, an informationally poor state (that is, a state that is in the dark about compliance environments other states face) may not prefer verification when flexibility mechanisms are guaranteed to an extreme degree. Corollary 1 emphasizes the nature of distributional conflicts over monitoring institutions and at the same time suggests the possibility of how the conflicts may be resolved. Even a party with an informational advantage, despite its potential informational rents to be extracted from

occasional exuberance, has incentives to establish centralized monitoring. The reason is that the benefit from verification—the adequate verification which is expected to deter future violations to a certain extent—outweighs the costs of being punished. This benefit is primarily from having flexibility mechanisms where the informationally rich party expects to be exonerated for its occasional defections. This may be a perverse incentive since a party is basically buying itself leeway to enjoy temporary political opportunities to satisfy its domestic political demands.⁶³ Still, this is a driving incentive in the majority of international agreements.

Conventional thinking would also tell us that states that are in the dark about others' compliance environments (i.e. informationally poor states) are likely to prefer third-party monitoring that could provide more information. Corollary 1 shows, however, that informationally poor countries will prefer to be in the dark when the flexibility conditions attached to the agency is excessive.

Possibility of Side Payments

The examination of verification gains demonstrates the possibility of using transfers (or side payments) of one player's future payoff to another player. In the context of the design of monitoring institutions, an example of side payments would include the transfer of civilian-use, nuclear energy technology linked to the bilateral safeguards agreements with the IAEA under the Nuclear Non-Proliferation Treaty (NPT).

The respective preferences for monitoring institutions arising from Proposition 1 also suggest the possibility of side payments in the design of monitoring institutions.

Corollary 2 (Side payments) *STATE 1 has a surplus and could give STATE 2 transfer payments to compensate STATE 2 for its welfare loss ($V^{VA} - V^H$). If so, a verification agency can be established.*

Since STATE 1 in the equilibrium situation benefits from enjoying temporary, unpunished defections, it could choose to compensate STATE 2, thereby persuading it not

⁶³ See Milner and Rosendorff 2001, and Bagwell and Staiger 2005 for the discussion in the context of global trade.

to reject the establishment of an international monitoring body. With regard to the amount of side payments, STATE 1 would be willing to pay as much as the welfare loss of STATE 2 to bring about a third party international body. For instance, STATE 1 can promise to devote its political resources to change its domestic legislation more in line with international agreements. STATE 1's promise to reduce the frequency of undeterrable violations could operate as a transfer to STATE 2, since the negotiators of STATE 2 can mention to their domestic audience STATE 1's resource deployment as the price STATE 1 is paying in order to secure an international agreement with an international monitoring system and future cooperation.

Note that this leaves ample possibility for the use of political rhetoric and other political maneuvers on the part of the informationally rich. For example, a country may object to monitoring institutions in order to get a better deal with regard to enforcement. Monitoring arrangements are subject to distributional conflict in such a way as to discourage the establishment of centralized institutions. This phenomenon can be observed in many negotiations concerning environmental agreements. Developing countries with a high rate of difficult times push the idea of additional funds to promote compliance.

Side payment from STATE 2 to STATE 1 can also occur. STATE 2 can compensate STATE 1 using transfers that help reduce the frequency of undeterrable violations. When the proposed monitoring mechanism exhibits adequate deterrent capability, a country that expects frequent violations may not want to establish a verification mechanism. In this situation, other countries can compensate this party by providing aid that is linked to reducing the frequency of undeterrable violations. This aid, either in monetary form or in some other form, can induce other parties to accept a stringent monitoring mechanism. The Trade Building Capacity (TBC) program of the United States Trade Representative (USTR) does exactly this job. In bilateral agreements concluded recently, the United States provided incentives to partner countries to reduce the frequency of protectionist setbacks. This "aid for trade" initiative encourages countries to accept bilateral agreements that often include some form of monitoring arrangement.⁶⁴

⁶⁴ USTR 2007

In sum, two kinds of transfers exist, one from STATE 1 to STATE 2, and the other from STATE 2 to STATE 1. Which transfer is more likely again depends on the parameter values. If defection gain (α), defection risk (β), and the possibility of undeterrable violations (ε) is low (all conditions for less welfare loss from undeterrable violations), STATE 2 gains and a transfer from STATE 2 to STATE 1 is more likely. If the undeterrable violations benefit STATE 1 substantially, then STATE 1 should give side payments to STATE 1 in order to achieve cooperation with the support of an international monitoring body.

Summing-up: Conditions for Delegation of Informational Capacity

The above analysis reveals two main conditions for states to establish an international monitoring body. First, the level of flexibility admitted in the agreement should be lower than a certain threshold. Too much flexibility creates sharp distributional conflicts and makes international monitoring useless, while a moderate level of flexibility could satisfy all the parties involved and help them reach a verification equilibrium. Second, the quality of monitoring must be such that the proposed monitoring body has an adequate level of deterrent capability under normal cooperation situations. Both the level of flexibility allowed in the agreement and the technological/evaluative capability of the monitoring agency determine the likelihood that states will favor an international monitoring body.

Receptiveness to the idea of an international monitoring body may differ from country to country, depending on what kind of political and economic conditions they face with respect to compliance with international agreements. Some negotiating states may be concerned about the lack of deterrent capability in a monitoring system and its expected failure to correctly identify punishable/actionable violations. The inadequacy of monitoring capability can be an obstacle to the establishment of monitoring institutions, destabilizing the potential equilibrium and requiring more stringent enforcement structures. Some countries that expect frequent difficult times may favor flexibility over centralized monitoring, and in actual international negotiations they may demand flexibility clauses in exchange for accepting a stringent monitoring mechanism. In

response, these proposals may raise objections from other countries that fear the consequences of flexibility mechanisms. The international monitoring body is not beneficial when too much flexibility is allowed.

Taken together, these requirements for creating international monitoring institutions have implications for distributional conflicts during the process of delegating informational powers. Divergent preferences of states can prevent centralized international institutions from emerging and I have analyzed the influence of distributional conflicts over monitoring design. I demonstrate that a state party with a less favorable domestic compliance environment has an incentive to agree to a centralized monitoring system, despite what may be its tendency toward frequent violations. I also show that the convergence of the asymmetric preferences on the choice of centralized monitoring occurs under very restrictive conditions.

The theoretical prediction about distributional conflicts is consistent with what other pertinent theories predict. First, theories of regulation (and decentralization)⁶⁵ as well as bargaining theories⁶⁶ suggest that differences can often lead to less than desirable outcomes. When externalities are large, centralized mechanisms are more beneficial, but with differences in contextual environments that may shape the bargaining positions, decentralized mechanisms may result. Second, the two-level games approach⁶⁷ has highlighted the strengthened bargaining position of the negotiator when he faces domestic opposition. The negotiator can cite domestic opposition as an argument for obtaining a more moderate level of delegation in designing a monitoring mechanism. From other countries' point of view, this negotiation strategy would, of course, pose an obstacle to concluding a treaty with a meaningful monitoring institution, creating distributional conflicts among negotiating parties. Third, the theory of delegation⁶⁸ also supports the theory of distributional conflicts. The key finding of the principal-agent model of delegation is that the conflicts of preferences among principals (in this case, member states to a treaty) often prevent them from delegating to third party bodies.⁶⁹

⁶⁵ See Laffont 2005

⁶⁶ Narlikar and Odell 2006

⁶⁷ Putnam 1998

⁶⁸ Lake and McCubbins 2006

⁶⁹ In her interesting observation of the politics of delegation to the IMF, Martin 2006 notes the opposite logic. Once delegation happens, the already established third party could exploit the divergence of

I conclude with a summary of my main points, while putting my theoretical results in the context of the study of international cooperation. This research makes several points regarding the informational role of international institutions, by opening the black box of states' preferences for one type of monitoring institution over others, and by explaining the nature of relevant political conflicts that might arise during the delegation process. First, employing international institutions is often an efficient way to resolve uncertainties surrounding noncompliance problems, particularly in the current legalistic cooperation environment. Second, despite its efficiency, the informational role of international institutions in overseeing compliance is constrained and the conditions for such institutions are demanding. They have to meet technological, political, and economic requirements, and other obstacles may exist. For instance, political factors stemming from a country's domestic compliance environment could discourage other countries from establishing informative international institutions, and side payments to encourage the establishment of international institutions may be difficult to arrange because of distributional consequences in establishing internationally controlled monitoring systems. Amid this bad news, the good news is that informationally rich countries with private information about their own compliance environments also have incentives to establish verification systems, as long as sufficient flexibility is guaranteed.

This dissertation also established a source of informational constraint on international institutions. Divergent preferences for monitoring institutions are shaped by domestic compliance environments and they decisively affect monitoring problems on the international level. The core implication is that international institutions are best positioned to wield their informational power 1) when domestic compliance environments among involved parties are sufficiently favorable for international cooperation, 2) when the technological/evaluative conditions of the proposed monitoring mechanism are conducive to identifying compliance information, and 3) when the informationally rich are willing to share their compliance information while avoiding misrepresentation of their preferences in order to extract more concessions in other

preferences and promote its own agenda such that the collective principals accept the proposal. However, this logic pertains to a post-institutional-design stage, not to the pre-institutional design stage I am concerned with.

areas.⁷⁰ These three conditions, respectively, highlight the importance of domestic efforts to make compliance environments favorable and transparent, the importance of international cooperation in improving the technological/evaluative capacity of monitoring agencies, and the importance of convincing advantaged countries of the informational value of international institutions.

The extent to which the informational role of international institutions is constrained should not be seen as a closed book because my model only considered the conditions leading to the establishment of monitoring systems, not the course of their development once they are established. Three possibilities exist for the development of monitoring systems that are not considered in my model. The first possibility is emulation. Given the cluster of similar regimes, one successful regime may influence the development of other regimes with similar issue characteristics, as the Montreal Protocol did.⁷¹ The second possibility is evolution. Once a system is established, a monitoring system could take on a life of its own and could be developed over time into a more centralized system. In this case, my theory suggests that initial conflict may hamper this trajectory of regime development.⁷² The third possibility is the involvement of non-governmental organizations. Unlike intergovernmental organizations that are harnessed by states as principals, NGOs could gather and convey useful information, thereby enriching the information flow.⁷³

Given the existence of distributional conflicts, what are the prospects for international cooperation in the near future? The discussion in this research suggests implications for international policy regarding the promotion of transparency. The informational role of international institutions may not be as powerful as some would

⁷⁰ Existing international institutions should therefore consider un-tying monitoring arrangements from financial aid when the recipient is unlikely to accept monitoring arrangements while remaining obdurate about getting more financial assistance. For example, the IMF may take the policy of negotiating monitoring conditions separately from other IMF conditionalities in loan packages, when the financially troubled country delays the deal sufficiently longer than expected.

⁷¹ The use of the Technology and Economic Assessment Panel (TEAP) motivated other regimes to emulate the success of the Montreal Protocol in abating ozone-depleting materials. See Parson 2003.

⁷² Casual observation of several African regional trade agreements (e.g. West African Economic Community) reveals this pattern. Although they start out with formalized monitoring arrangements, they do not last long and die out eventually.

⁷³ This is the key difference between inter-governmental and non-governmental organizations regarding their informational role. While IGOs are constrained by the bargaining of countries, NGOs are free from such constraints.

hope. Policymakers should be encouraged to examine comprehensively the interactive effects of domestic compliance environments, foster international efforts to improve evaluative systems, and broaden their understanding of negotiating dynamics surrounding monitoring arrangements. On a scholarly front, this theoretical analysis stresses the need for further empirical and theoretical analysis of how distributional issues arise in international cooperation and how they affect international cooperation.

CHAPTER III

Monitoring Institutions in Regional Trade Agreements

The following three chapters offer the empirical investigation of the theoretical arguments presented in Chapter 2. Some arguments are tested by way of statistical analyses and other arguments illustrated by case studies. The major argument tested is the effect of asymmetric compliance environment and the resulting distributional conflict. Other potential factors, such as monitoring capacity and consequences of violation, are examined whenever there is a relevance to the issue area in discussion.

The first test case is the design of monitoring institutions in international trade.⁷⁴ The recent bifurcation between diplomatic measures and legal institutions in regional trade agreements demands a theoretical explanation and an empirical examination. While several multilateral agreements march toward legalization, many of the recently proliferating bilateral agreements have adopted diplomatic measures. To understand this variation, I evaluate the theory of asymmetric compliance environments. The theoretical focus is the role of domestic political and economic environments favorable (or unfavorable) to compliance with international agreements. The theory suggests that a country with a favorable trade environment will generally prefer not to be bound by third party monitoring if there is asymmetry in compliance environments between itself and its potential intra-pact trade partner(s).

The theoretical mechanism is two-fold. The asymmetry in compliance environments is likely to reduce the informational gains from third parties when the costs of being bound by third party recommendations increases. In other words, the asymmetry

⁷⁴ In this chapter, I examine regional trade agreements instead of the development of global trade system. Although the evolution of global trade system exhibits interesting observations about the design elements, the regional trade agreements render researchers more empirical variation. I discuss the relevance of global trading system when necessary.

in compliance environments is likely to generate informational problems. These problems can sometimes be ameliorated by adjustments to the third parties' informational role, but the chances of adjustments being made are sharply qualified because they produce distributional consequences by occasionally favoring countries with unfavorable trade environments.

Testing a theoretical proposition empirically requires the imposition of a hidden assumption about how preferences translate into outcomes. I have proposed that the possibility of centralization breaks down when the asymmetry increases because one or more party may disagree with the adoption of a centralized monitoring mechanism. However, one has to be careful about interpreting the result in empirical analyses because there may be instances where preferences are not directly translated into negotiation outcomes. As Axelrod (1970) suggests, a conflict of interest leads to an active behavioral conflict only when "other things are equal." In the empirical analyses, it may not be possible to control for every particulars, such as the process of international negotiations and the compromises or deals states struck in order to reach the institutional outcome.

With this caveat, the statistical results of 123 regional trade agreements between 1950 and 2005 show the working of this tradeoff between informational gains and flexibility costs and indicate the negative impact of asymmetric trading environments. Specifically, the increasing asymmetry in political and economic factors that determine trading environments can decrease the probability of centralized monitoring institutions by as much as 20%.

Background: Monitoring Trade

With the multilateral negotiations at Doha and Cancun facing deadlocks (as of August 2006), economic regionalism seems to be here to stay.⁷⁵ The first wave of bilateral trade agreements in the 1960s was overshadowed by the progress of multilateral negotiations, but subsequently a second wave of bilateralism occurred in the 1980s.⁷⁶ We

⁷⁵ Many trade experts predict this trend will continue. See, for example, Bhagwati, in his series of articles in *The Economist* magazine.

⁷⁶ Bhagwati in De Pameló.

are now experiencing a third wave of economic regionalism, as the United States pushes for bilateral agreements with 12 countries.⁷⁷

Given these shifts in trade patterns, as well as the overall increase in trade and global economic integration, it becomes increasingly important today to understand the role of the mechanisms and institutions that monitor and regulate international trade. At the heart of the web of international trade and trade agreements, monitoring institutions are designed to serve as engines to further trade deals and stabilize trading relations.

Monitoring institutions in regional trade agreements can be broadly defined as systems (1) for gathering and evaluating compliance-related information (information about specific compliance behaviors, but also more generally about compliance environments, where “compliance environments” are defined as political or economic situations that are favorable or unfavorable to compliance with international agreements), and (2) for settling compliance and trade disputes when these arise. The forms monitoring institutions take are not uniform. They range from purely diplomatic measures to highly legalistic measures. States may agree to communicate and negotiate as the need arises through already existing diplomatic channels or newly established intergovernmental bodies, or they may choose to establish permanent institutional forms such as courts or tribunals.

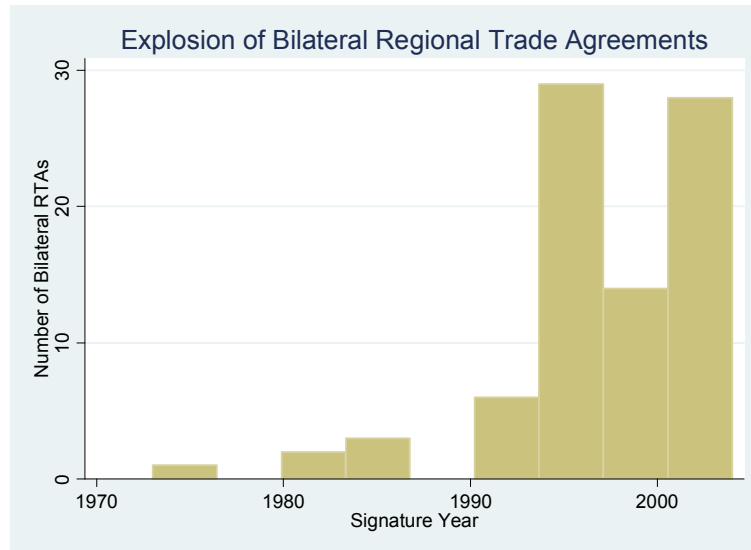
A study of monitoring institutions in regional trade agreements is important and timely for three reasons. First, one of the thorniest issues in contemporary international trade is the tension between regionalism and multilateralism. We would very much like to understand for what reasons states choose different regional monitoring systems in the face of the established global regime, as well as why they prefer specific forms. Second, the practice of monitoring is inevitably linked to policy reviews and decision-making in a broader institutional context. Given the recent proliferation of regional trade agreements with the explosion of bilateral agreements (Figure 3.1), and in light of the fact that many more are being negotiated or have been proposed,⁷⁸ understanding how policies are monitored is crucial in evaluating and forecasting the likely performance of regional trade

⁷⁷ Schott 2004.

⁷⁸ According to the C&M International’s unpublished source, a Washington-based consulting firm for international trade, 110 bilateral agreements are entered into force, 53 are concluded, 65 are negotiated, and 115 are proposed.

agreements. The formation of RTAs and their economic impact is a much-explored topic,⁷⁹ but systematic analysis of their institutional arrangements is relatively scant.⁸⁰ Third, on a more theoretical front, understanding how states design monitoring institutions to monitor themselves in trade matters will contribute to the general understanding of the institutional design of international organizations.

Figure 3.1 Conclusion of Bilateral Trade Agreements by Signature Year



The following are the key components of this chapter. I first put the theory of asymmetric compliance environments in the context of international trade. Second, I discuss the empirical strategies to test my theoretical claims, particularly my claims about the effect of asymmetric compliance environments on the choice of monitoring institutions. I explain the structure of the dataset and the measurement of variables. I then examine my statistical findings and their implications in relation to the existing literature about regional trade agreements and international cooperation.

⁷⁹ Recent representative studies include Frankel 1997; Baier and Bergstrand 2005.

⁸⁰ Among those who at least touch on this topic, see Li 2000; Smith 2000; Pevehouse and Buhr 2005.

Theory of Distributional Conflicts in the Context of International Trade

Chapter 2 presents a theoretical model that explains why countries choose particular monitoring institutions. I specifically consider how country-specific characteristics relating to their strategic environments affect the choice of informational systems for information-gathering, information-sharing and information-reviewing in international agreements.

I demonstrate why different states have divergent expectations about the potential informational roles of international trade institutions and how those expectations influence their decisions to establish (or not to establish) certain kinds of informational systems. One of the key theoretical findings is that the political disagreements stemming from different compliance environments may adversely affect the choice of centralized monitoring institutions and restrict their informational roles.⁸¹ States may gain information by establishing a third party, but that may simultaneously produce distributional conflicts when the compliance environments are asymmetric. This in turn may generate the incentives to choose substitute institutions such as intergovernmental bodies with specialized working groups. In this way, states may lose some informational efficiency but can lessen the distributional conflict.

My theoretical model captures one of the salient strategic problems in recent international trade cooperation: the uncertainty of compliance environments in light of the guarantee of flexibility mechanisms (or legitimate political escapes⁸²) and the practice of imposing non-tariff barriers that are opaque and often unverifiable. The proposed theoretical elements can easily be contextualized in international trade matters. One of the contemporary issues in international trade is the invocation of GATT-consistent but potentially protectionist measures, such as antidumping measures, countervailing duties, and safeguards. Although such measures are often necessary *quid pro quo*,⁸³ they pose informational problems to the states involved because they are left in doubt as to the

⁸¹ Other theoretical implications—on the effect of side payments or the evaluative errors of a third party, for example—cannot be inferred from the large set of agreements but will be examined in the context of actual cases.

⁸² For a study of escape clauses in international trade, see Milner and Rosendorff 2001.

⁸³ See Finger et al. 2005.

legitimacy of the measures—whether the measures are truly necessary, or whether they are in fact non-tariff barriers that deserve retaliation.

How do states cope with this informational problem? Would the establishment of monitoring institutions help? Uncertainty about trading environments existed long before GATT's 1948 inception and the implementation of GATT arrangements, but this uncertainty was typically addressed by unilateral determination of each state, such as the 1988 Super-301 instrument of the United States. Currently, a third-party—either the WTO Dispute Settlement Body (DSB) or other monitoring bodies established by regional trade agreements—can ameliorate informational problems by issuing authoritative rulings or advisory opinions for states to follow. On the other hand, third-party monitoring bodies may be disfavored by some states in a highly asymmetric environment when the monitoring allows legitimate deviations only to a small fraction of partner states. This process may create the collective incentive to choose inter-governmental monitoring bodies as substitutes. The inter-governmental bodies, particularly when they are coupled with specialized working groups or functional sub-committees, can issue alternative advisory opinions without imposing obligations on states to follow their decisions. These political bodies, unlike more legalistic institutions, monitor agreements while allowing policy discretion to the member states.

A casual survey of monitoring systems in regional trade agreements begs an explanation as to why the majority of agreements establish joint committees or joint councils rather than permanent courts, despite the potential benefits conferred by third parties. Even when the WTO provides for a dispute settlement body and states have an available global forum, countries often customize their international monitoring environments by concluding separate bilateral or regional agreements. The theoretical framework presented above attempts to account for such patterns. The statistical results presented in the next section show that demand for centralized informational bodies is replaced by demand for intergovernmental bodies when the asymmetry in compliance environments is high.

This point about the impact of compliance environments on the design of monitoring institutions is the focus of my contribution to the literature on international trade and information. Yarbrough and Yarbrough (1989) first established the role of

WTO Dispute Settlement Body (DSB). Maggi (1999) added that the WTO dispute settlement procedure fulfills additional informational roles in terms of disseminating information to third-party members in a multilateral setting. Rosendorff (2005) weighed the benefits and costs of WTO DSB in the face of flexible mechanisms. Adding to this line of literature and shifting the focus from the global forum, I focus on the design process and investigate how and why legalistic mechanisms may be disfavored by some parties. My model shows that both adjudicatory and political bodies share the fundamental functions of informational roles, but that a state's choice of one over the other depends on compliance environments.

The theory of asymmetric compliance environments therefore speaks to an apparent puzzle arising from the aforementioned study of dispute settlement mechanisms: if a third party arrangement provides superior information, why doesn't every trade agreement employ third party mechanisms? Rosendorff (2005) convincingly demonstrated that agreements with dispute settlement mechanisms are stable,⁸⁴ but my theory suggests that (1) the initial establishment of such institutions may be difficult due to the presence of conflicting incentives in the design process of monitoring institutions and that, unfortunately, (2) we are less likely to observe robust and stable third parties despite the potential benefits conferred by them.

In sum, this chapter contributes to the political economy of regional trade agreements both theoretically and empirically. Theoretically, it provides a micro-foundation regarding informational environments in international trade and how such asymmetric environments impact the design of monitoring institutions. Empirically, it highlights a key explanatory variable that has not been previously emphasized. This variable—the asymmetry in compliance environments—is likely to upset some of the previous results, which will be discussed next.

Empirical Analysis of Regional Trade Agreements

This section provides an empirical test of the theory of asymmetric compliance environments in the context of regional trade agreements. I first present the hypothesis to

⁸⁴ With the empirical support of Pevehouse, Hafner-Burton and Zierler 2002.

be tested, explain in detail how the data is structured to test the theoretical idea of distributional conflicts, and introduce the measurement of key independent variables and control variables.

Hypothesis

Based on the proposed theory of asymmetric environments, I now provide an empirically testable hypothesis in the context of regional trade agreements. The theory demonstrated that the asymmetric compliance environments among involved countries are likely to reduce the likelihood of a choice of a centralized monitoring institution. The following hypotheses translate the theoretical statement to an empirically testable hypothesis in the context of regional trade agreements:

As the intra-pact asymmetry in compliance environments increases, the probability of centralized monitoring institutions decreases.

Sample

The dataset includes 123 regional trade agreements (86 bilateral agreements, 37 multilateral agreements). By region, Africa has 12, Americas 25, Asia 34, Europe 32, and 20 are inter-regional agreements (e.g. Mexico-Japan). Identifying the population of RTAs is not an easy task given the rapid pace of recently signed preferential trade agreements (PTAs).⁸⁵ My dataset draws on data from the WTO (2005), the Tuck Center for International Business (CIB), the International Trade Reporter (various years), and Frankel (1997).⁸⁶ Legal texts are mainly from the International Legal Materials (I.L.M),

⁸⁵ PTAs involve agreements between trading blocs (e.g. EU-Mercosur). I do not include these clusters of agreements in my analysis.

⁸⁶ Appendix in Frankel has a good survey of regional trade agreements up to 1997. This document is also accessible on the web at http://www.iie.com/publications/chapters_preview/72/appaie2024.pdf; for discussion of the development of regional trade agreements in Africa, see Yang and Gupta 2005, Foroutan 1993

USTR⁸⁷, CIB regional trade agreements archive, United Nations Treaty Series (UNTS), and SICE (Foreign Trade Information System).⁸⁸

Independence among observations is a critical issue, which I later deal with by deleting sub-samples and correcting for with statistical techniques. Among the population of RTAs, accession treaties and association agreements (agreements EC or EFTA concluded with individual countries; e.g. EC – Iceland, EC – Norway) are not independent from original agreements.⁸⁹ An accession agreement such as the *Bangkok agreement – Accession of China* rarely changes monitoring systems. Rather, China accedes to the initial condition that is established already in the initial founding agreement. Similarly, association treaties do not exhibit much variation. EFTA agreements (e.g. EFTA – Turkey, EFTA – Romania) take similar forms. I did survey of accession and association treaties and found out there was not meaningful variation.⁹⁰ For this reason, I delete those clusters of agreements from the following analysis.

Data Structure

Similar to hierarchical models, the data presented here has two levels: country-level and agreement-level. While the main unit of analysis is agreement—the choice of monitoring institutions for a particular agreement, to be more exact—independent variables are constructed based on the characteristics of member states.⁹¹ This type of data structure requires a methodology to aggregate the measures on the country-level in order to conduct analysis on the agreement-level.⁹² Depending on the theoretical story of

⁸⁷ http://www.ustr.gov/Trade_Agreements/Section_Index.html

⁸⁸ SICE for short from its Spanish acronym—Sistema de Información al Comercio Exterior—is the information technology arm of the Trade Unit of the Organization of American States (OAS).

⁸⁹ Accession and association treaties make up approximately 25% of the dataset. The number of EFTA association treaty is 20 with 1 accession treaty; the number of EC association treaties is 36 with 5 accession treaties. CEFTA has 5 accession treaties, CARICOM 4 association treaties.

⁹⁰ EC and EFTA association treaties employ different names for intergovernmental bodies, such as Joint Committee, Cooperation Council, and Association Council, but they serve almost identical functions.

⁹¹ The dataset therefore follows the logic of hierarchical models where individual level characteristics as well as higher level characteristics (agreement-level, in my specific analysis) determine the occurrence of outcome variables. See Raudenbusch (2005).

⁹² We cannot directly observe the position of contracting parties with regard to monitoring institutions and therefore, it would be ideal to estimate the effects of proposed structural factors on the positions each state takes. Unfortunately, however, the positions are not known unless a researcher thoroughly examines negotiating materials and interviews government officials to find out the official position of each country.

interests, the asymmetry measure (standard deviation), average, or weakest-link measure⁹³ is chosen. This construction of aggregate variables will be explained in the context of each variable.

Dependent Variable: Typology of Monitoring Institutions in RTAs

Monitoring systems can be easily studied and objectively coded since agreement texts usually specify procedural mechanisms, institutional structures, and relevant principal organs for the implementation of the treaty.⁹⁴ Equipped with a broad definition of monitoring institutions—a definition that encompasses the review of compliance environments, and entails much more than simply “catching cheaters”—I consider various institutions under the umbrella term of “monitoring systems.”⁹⁵

I include dispute settlement systems as monitoring bodies for two main reasons. First, the disputes represent a sample of compliance issues. Although regular trade disputes constitute only the tip of the iceberg of all disputes, those cases are high-profile

Unlike the easily observable bargaining postures in roll call votes in Congressional studies, international negotiations often involve no voting but rely on consensual process. Without such easily observable bargaining positions, I cannot test a specific hypothesis about a predictable bargaining position a country may take. This means that the unit of observation cannot be a bargaining position of a country with regard to monitoring institutions. An analysis can be performed only on the aggregate level (a so-called “aggregate approach”) for each trade pact.

⁹³ In the absence of full disclosure about the bargaining positions of each country, we have to make certain assumptions about bargaining behavior within a trade pact. I borrow from bargaining theory and employ the Nash bargaining solution. The solution states that the final decision of the parties in negotiation is likely to fall back to the proposal from the most recalcitrant party. This is the often used “weakest-link assumption” which specifies that the bargaining outcome is typically dictated by the most recalcitrant party. In the context of my RTA dataset for instance, in measuring the import penetration ratio within a RTA, one could reasonably assume that a country with the highest import penetration ratio would be more likely to dictate terms of monitoring institutions with its bargaining power. This assumption presumes the worst case scenario and therefore provides a harder test. This test has been used in Koremenos (2005) and various conflict studies.

⁹⁴ Most RTAs begin with initial treaty texts (often with annexes), and subsequently, protocols and declarations are added with regulatory details. The structure of RTA legal texts is as follows:

1. Preamble, where members and objectives are defined
2. Institutional arrangements
3. Product details covered by the agreement (e.g. customs duties, agricultural policies, quantitative restrictions)
4. Dispute settlements
5. General/security exceptions, balance of payment difficulties
6. Goods and according tariff rates (usually in annexes)

⁹⁵ There are cases where institutions are developed over time after the treaty is signed. For example, a treaty may mention the establishment of a permanent or *ad hoc* tribunal in the near future but may not directly deal with the matter. These cases are rare (e.g. several bilateral agreements Kyrgyzstan recently concluded).

cases that carry significant economic significance. Dispute settlement bodies have informational power to preside over those key compliance issues. The established court or arbitration panels are the core institutions to follow “disputes arising from implementation of economic obligations envisioned by agreements, [and] decisions of other institutions.”⁹⁶ Subsequent to the reviews, the reports of a panel or rulings by a court serve an informational purpose for regime development. Second, the dispute settlement bodies usually are involved in fact-finding, either directly or indirectly. The bodies of course focus on the legality of the obligations, but in doing so, they must consider relevant facts about compliance environments or hear arguments brought by the respective national authorities.⁹⁷ The bodies have symbiotic relationships with the political decision-making bodies. Political bodies provide information for the arbitration of disputes, and the tribunal delivers in public session a reasoned decision.⁹⁸

The monitoring systems in RTAs broadly include two categories: diplomatic and legalistic measures, parallel to the scenarios provided in the theoretical model. The use of existing national measures or intergovernmental bodies can be classified as diplomatic measures, and courts or arbitration panels as legalistic ones. Legalistic measures are also centralized institutions according to the rational design framework, which defines centralization as whether institutional tasks are performed by a single focal entity or not.⁹⁹ Intergovernmental bodies are also focal entities, but they are relatively decentralized compared to permanent courts that carry specific informational roles with regard to closely examining potential non-compliance cases. More broadly, centralized monitoring institutions are the ones with the delegated authority to issue binding rulings or recommendations and with the informational capacity to (independently) gather and collect information about compliance and the implementation of treaty goals.

Member states in a regional agreement often decide to use existing measures and establish inquiry points or assign coordinating ministries. In a majority of cases, states

⁹⁶ Paraphrasing the language of the CIS agreement.

⁹⁷ Take the example of the U.S.-Chile Agreement, *Article 22.11: Experts and Technical Advice*, where the agreement outlines the information-gathering function of the arbitration panel as follows: “On request of a Party, or, unless the Parties disapprove, on its own initiative, the panel may seek information and technical advice, including information and technical advice concerning environmental, labor, health, safety, or other technical matters raised by a Party in a proceeding, from any person or body that it deems appropriate.”

⁹⁸ Case of EAC 1967, Art.37

⁹⁹ Koremenos 2001.

establish Joint Committees or Councils to deal with implementation issues. Joint Committees are usually composed of public and private sector representatives from each country and in turn operate sub-committees¹⁰⁰ and working groups. Those political bodies are charged with responsibilities to reduce any friction in trade relations, usually with the help of technical bodies specializing in specific areas of trade (e.g. agriculture, technology, transportation, telecommunications, energy, finance, and human resources). The delegations within the Joint Committee possess *technical capabilities* to

- 1) recommend additions or modifications to the list of traded products, determining corresponding percentages in the case of preferential treatment
- 2) propose amendments to the Treaty
- 3) study problems pertaining to export subsidies, dumping, and other unfair trade practices, and propose solutions to such problems, and
- 4) supervise the implementation of the Treaty.

Besides the functions to provide information for compliance environments, the inter-governmental body offers coordinating functions as well. It provides a forum for consultation and conducts regular reviews of the measures taken by the contracting parties. The body facilitates information flow by aiding exchange of information and essentially operates as a quasi-Secretariat.

Permanent courts and *ad hoc* arbitration panels differ in how they obtain information.¹⁰¹ With *ad hoc* tribunals or arbitration panels, procedural matters are negotiated case-by-case, and the parties in this way exert a high level of control over the quantity and quality of the information that is submitted.¹⁰² While *ad hoc* panels can appoint experts or conduct visits, their informational power mainly depends on the political body of the interested parties. Permanent courts or standing tribunals usually have set terms of reference.

The following pie chart provides a percentage breakdown of monitoring arrangements for the RTA dataset according to the aforementioned categories. The

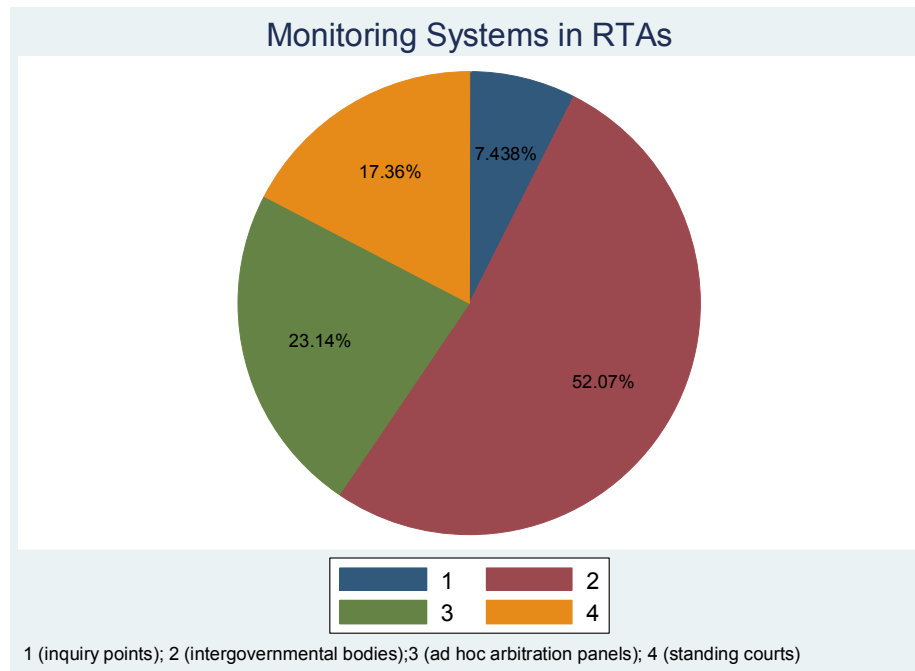
¹⁰⁰ Examples for sub-committees include—to take the example of the US-Chile Agreement—a Committee on Trade in Goods, a Committee on Sanitary and Phytosanitary Matters, a Committee on Technical Barriers to Trade, a Committee on Procurement, and a Financial Services Committee. Other common committees include a Committee on Agriculture, a Committee on Labor Affairs, and a Committee on Environmental Affairs.

¹⁰¹ If the agreement does not specify whether the institution would be *ad hoc* or permanent (e.g. Kyrgyzstan - Kazakhstan), I consider it as *ad hoc* because the court is not clearly established.

¹⁰² Merrills 1998, 88-91.

majority of them (52.9%) employ intergovernmental bodies as main monitoring bodies, while truly legalistic measures for dispute settlement (permanent courts) are chosen only 8% of the time. An empirical investigation follows as to why countries do not overwhelmingly prefer a third party system—a seemingly efficient monitoring system.

Figure 3.2 **Distribution of Monitoring Institutions in RTA**



In this analysis, I dichotomize the dependent variable into diplomatic measures (109 cases) and legalistic measures (14 cases), following the scenarios in the theoretical model.¹⁰³ Diplomatic measures encompass the use of inquiry points, intergovernmental bodies, and the provision of *ad hoc* arbitration panels.¹⁰⁴ Legalistic measures include the establishment of standing courts.¹⁰⁵

¹⁰³ By suppressing the institutional details, one can lose some information, but the presentation of results is much simpler with ordinary logit analysis. In addition, a statistical assumption of proportionality in ordered logit or probit (see Boorah 2002) prevents me from using the ordered version of the analysis. I have run the test of proportionality of ordered logit with the dataset and the results are available upon request.

¹⁰⁴ There may be some disputes as to whether the provision for arbitration panels can be included as diplomatic measures. Many bilateral agreements allow arbitration, but the majority of them do not allow truly independently composed panels. There should be further research on how sensitive the results are to these different measurement strategies (it is also notable that Pevehouse and Buhr 2005 take different approaches in measuring legalism—they use index measures to create a legalism scale). Another issue is whether these written agreements are actually followed in practice. For example, there are many disputes

Constructing Independent Variables

Table 3.1 lists the independent variables and how they were measured. The independent variables comprise both economic and political factors, including import penetration ratio, GDP asymmetry, polity scores, and distance. The first three asymmetry measures (import penetration ratio asymmetry, GDP asymmetry, and polity asymmetry) are the key explanatory variables I want to test and the remaining three variables (distance, regional cluster, and number of members) serve as control variables. This section explains the measurement of the first three asymmetry variables. The inclusion of control variables will be discussed in the model specification and results section.

Table 3.1 List of Independent Variables

Variable name	Measurement	Source
Import Penetration Ratio (IPR) Asymmetry	Standard deviation of IPRs of each signatory within a trade pact one year prior to the signing year	World Development Indicators (WDI)
P/MAX (GDP Asymmetry)	Asymmetry measures for the distribution of GDP within a trade pact	Smith (2000)
Polity Asymmetry	Standard deviation of Polity IV scores of each signatory one year prior to the signing year	Polity IV
Distance weakest-link	The farthest distance between member states	Gleditsch (2002)
Regional Cluster	Five regional categories (Africa, Americas, Asia, Europe, and cross-region)	Based on legal texts
Number of member states	The number of member states	Based on legal texts

Independent Variable I: Intra-pact Asymmetry of Import Penetration Ratio (IPR Asymmetry)

The key theoretical concept is the asymmetry in compliance environments, which I define as the political and economic differences across countries that determine openness to trade. Scholars have identified the economic sources of trade protectionism:

about whether the US really abides by the third party provision in the US-Israel Free Trade Agreement. The extent to which these rules are followed is another question future research should address.

¹⁰⁵ This is to maximize the distinction between the two categories of the dichotomous variable. One could have a division of {inquiry points and intergovernmental bodies} and {*ad hoc* tribunals and permanent courts}, but this distinction is misleading since *ad hoc* tribunals or arbitration panels resemble the working of intergovernmental bodies in many cases.

small economies and economically advanced countries tend to be more open.¹⁰⁶ The work on political determinants of trade protectionism is a rapidly growing literature that has examined the effects of cross-national variations in political institutions on the different level of agreement formation.¹⁰⁷ Note that the dependent variable of the previous work was the formation of regional trade agreements. I later examine whether the explanatory power of those variables hold up to the explanation for institutional arrangements.

The *IPR Asymmetry* is the main explanatory variable, serving as a proxy for the asymmetry in compliance environments. I construct a measure of asymmetry in import penetration ratio (IPR) of countries within a trade bloc or trade pact. I compute standard deviation of the intra-pact IPRs to measure asymmetry. The standard deviation is a measure of how widely values are dispersed from the average value (the mean) and thus provides for a natural formula to calculate the asymmetry.¹⁰⁸ The large standard deviation of IPRs among member countries signifies the high level of disparities in trade environments.

The import penetration ratio captures the basic idea of the aggregate level of demand for and consumption of imports within the domestic economy.¹⁰⁹ IPR is defined as “A measure of the importance of imports in the domestic economy, either by sector or overall, usually defined as the value of imports divided by the value of apparent consumption.”¹¹⁰

¹⁰⁶ See Rodrik 1995.

¹⁰⁷ Mansfield and Busch 1995; Pevehouse and Buhr 2005; Mansfield, Milner and Pevehouse 2007. Political determinants of the formation of trade agreements that have been studied so far include the following: power distribution (Mansfield 1992), international security factors (Morrow, Siverson and Tabaes 1998), parliamentarism (Mansfield and Busch 1993), democracies (Mansfield and Milner), and number of veto players (Manfield, Milner and Pevehouse 2007). See Rodrik 1995 for a brief review of the literature up to 1995 and Milner 1999 for the latest review.

¹⁰⁸ I exclude three observations from the statistical analysis presented in the next section. They are considered to be outliers, outside two standard deviations (1sd: 12.46) away from the mean (14.93). They are China-Hong Kong (86.1), Georgia-Ukraine (49.9), and CEMAC (57.8).

¹⁰⁹ See Vonortas and Auger 2002 for a detailed discussion of the measure.

¹¹⁰ Where the apparent consumption refers to “Production plus imports minus exports, sometimes also adjusted for changes in inventories. The intention here is not to distinguish different uses for a good within the country, but only to infer the total that is used there for any purpose.” These definitions are from Deardorff’s Glossary of International Economics.

$$\begin{aligned}
 \text{IPR} &= (\text{imports})/(\text{gross output})^{111} \\
 &= (\text{imports})/(\text{gross national expenditure})^{112} \\
 &= (\text{value of imports})/(\text{value of apparent consumption})^{113}
 \end{aligned}$$

The measure suffers several shortcomings, however. First, it does not capture the diversity of sectoral or factor-intensity divides across economies, one of the foundations of international trade economics.¹¹⁴ For instance, strong opposition from within the agricultural sectors of some countries—notable examples being Japan, South Korea and EU—is not captured in the measure. The import penetration ratio also suffers from the problem of endogeneity as noted in the literature of trade protectionism.¹¹⁵ A high import penetration ratio may indicate that a country continues to be open to imports but it could also mean that the industrial sector is not competitive enough and that politicians might be subjected to increasing political pressure to protect. Similarly, while a low import penetration ratio is a good indicator of how politicians have kept lid on protectionist pressure, it is precisely countries with a low IPR that may be most susceptible to increasing political pressures. Despite these opposing theoretical expectations, empirical findings are less controversial where statistical analyses find that the higher IPR leads to more protectionism. A higher IPR indicates a lower level of competitiveness of domestic industry vis-à-vis foreign countries, and this scenario often leads to protectionist measures.¹¹⁶

The measure for “asymmetry in compliance environment” can of course be improved. It is a theoretical concept and needs further clarification to be measured empirically. What measures do decision-makers turn to when they want to form their expectations about the asymmetry? Casual observation of negotiating histories of bilateral trade agreements tells us that negotiators look not only at general economic indicators but also at domestic opposition to the sensitive areas and how political

¹¹¹ Madani and Olareagga, 2002.

¹¹² Dark and Hawkins 2000.

¹¹³ Deardorff, Glossary of International Economics; apparent consumption equals production plus imports minus exports; the cross-national apparent consumption is only available for energy consumption (e.g. Banks data archive), so I replaced it with GDP data for now.

¹¹⁴ Ricardo-Viner and Heckscher-Olin theories, respectively, suggest sectoral divide and factor intensity as the sources for distributional consequences and as the basis for trade politics.

¹¹⁵ See, for example, Goldberg and Maggi 1999.

¹¹⁶ See Trefler’s 1993 theory of endogenous protection and its empirical testing.

authorities resolve conflicts with those groups.¹¹⁷ As there is no best single indicator of trade restrictiveness, I plan to consider multiple measures, bearing mind that data availability presents enormous challenges. Potential candidates are the average tariff ratio, non-tariff barriers (quotas, product bans, trade imbalances index,¹¹⁸ and licensing requirements, measured by coverage ratio), and the IMF's Trade Restrictiveness Index (TRI). This set of measures tries to capture the asymmetric trade environments, making inferences from records of trade history and trade structures in each member's economy. The second set of potential proxies includes political organization of industries, effective number of pressure groups, and unionization. Those factors are identified in the literature on the political economy of trade as the factors that contribute to protectionist tendencies on the industrial level. National authorities tend to analyze the institutional or sectoral opposition they face; therefore, the effective number of pressure groups involved (both lobbying and counter-lobbying forces) would be a good indicator.¹¹⁹

Independent Variable II: Asymmetry of GDP (asymmetry of economic power)

Smith (2000) constructed a measure of economic asymmetry, P/MAX , to test his hypothesis that large countries are less likely to prefer legalistic measures. He measures this concept with a P/MAX score indicating the asymmetry in bargaining power within a trade bloc.¹²⁰

$$P = \sum x^2 - 1/N \text{ and } MAX = 1 - 1/N$$

where x is each member's share of total pact GDP

¹¹⁷ I had the opportunity to read several governmental reports before the conclusion of Chile-Korea FTA, and the key concerns are how the conflicts caused by domestic opposition are resolved. This observation is not inconsistent with trade literature that has emphasized the role of opposition groups in the expectation of distributional consequences of opening up the market.

¹¹⁸ The intra-group trade imbalance index is from Foroutan (1997, 248-58). The index for individual countries is calculated as total exports to the group minus total imports from the group expressed as a percentage of trade with the group. The average for the group is a weighted average of each member country's index where weights are equal to the sum of the share of exports and imports.

¹¹⁹ Generalizing the theoretical framework to cross-national settings is problematic due to the lack of reliable measurements of the effective number of pressure groups for protectionism, including both lobbying and counter-lobbying groups. Goldberg and Maggi 1999, Gawande and Bandyopadhyay 2000 have tested the Grossman-Helpman model in the context of US industry-level protection. Unionization data is only available for OECD countries.

¹²⁰ P/MAX score is a variation of standard deviation (or variance) measure that is comparable across trade agreements. For the details of the derivation, see Smith (2000).

P/MAX serves as a competing hypothesis. Its theoretical expectation is that the asymmetry in bargaining power is more likely to lead to non-legalistic measures. According to Smith, it is primarily because the hegemon does not want to submit to legalistic measures due to their superior bargaining power. As my theory suggested, there is no *a priori* reason to expect that larger countries would be reluctant to establish legalistic measures because they also enjoy informational gains from third parties. Rather, I suggested, the preference depends on expectations regarding how monitoring institutions will perform in a variety of trade environments.¹²¹ Smith's dataset includes the RTAs up to 1995 and his argument accounted for multilateral agreements. Whether the inclusion of the scores of bilateral agreements and the recent developments of multilateral agreements makes a difference will be seen in the following statistical test.

Independent Variable III: Polity Asymmetry

Similar to *IPR Asymmetry*, *Polity Asymmetry* is a measure of asymmetric compliance environments in trade relations. Previous studies have provided theoretical mechanisms and empirical evidence as to why different political institutions and democratic/autocratic political characteristics may affect the propensity for open trade.¹²² I calculate standard deviation measures of the polity scores of member countries to see how wide the distribution of political environments is among member countries. The theoretical expectation is that the asymmetry in political environments may hinder the establishment of centralized monitoring systems due to informational asymmetry and resulting distributional consequences.

¹²¹ One might expect that asymmetry in GDP would proxy the asymmetry in compliance environments, but economy size does not directly affect asymmetry in compliance environments since smaller economies do not across the board have less favorable compliance environments than large economies.

¹²² Exemplary works include Bueno de Mesquita et al.'s (2003) selectorate model, and Milner, Mansfield and Rosendorff (2002)'s electoral control model. Briefly, the selectorate theory posits that the leaders in countries with large winning coalitions are more likely to care about public goods (as opposed to private goods doled out to a small winning coalition) and therefore are more likely to be open to international trade. The electoral control model highlights the electoral control over leaders by voters. MMR also report statistical results that democratic countries are about twice as likely as autocratic countries to form preferential trade agreements.

Results of Empirical Analysis of Regional Trade Agreements

Combining the list of independent variables and the measurement of the dependent variable, the following section describes the logit models to be estimated with the dichotomous dependent variable of “centralized monitoring system” and “decentralized monitoring system.”

MODEL 1 (Baseline Model)

$$\text{Centralization of Monitoring Systems} = \beta_0 + \beta_1 \text{ IPR Asymmetry} + \beta_2 \text{ Distance} + \beta_3 \text{ Number of Members} + \beta_4 \text{ Europe} + \varepsilon$$

MODEL 1 considers the main quantity of interests, which is the coefficient and significance level of *IPR Asymmetry*. This estimate will be later contrasted to other measures of asymmetry: the effects of power asymmetry within a trade-pact (i.e. *GDP Asymmetry*) and those of polity differences (i.e. *Polity Asymmetry*).

I control for three other factors that may affect the decision of monitoring institutions: the geographical distance of the intra-pact,¹²³ the number of member states, and the effect of European RTAs. Shorter distance has a potential to produce more legalistic monitoring institutions and is included as a control variable. The number of member states is an important control variable since bilateral agreements do not establish standing or permanent court. For this reason, the number of parties is also included as a control in other specifications. Also note that the baseline model is a fixed effect model that assumes the RTAs concluded by European countries are intrinsically different from those concluded in other continents with respect to the legalization level.

MODEL 2 (Test of Bargaining Story)

$$\text{Centralization of Monitoring Systems} = \beta_0 + \beta_1 \text{ IPR Asymmetry} + \beta_2 \text{ GDP Asymmetry} + \beta_3 \text{ Distance} + \beta_4 \text{ Number of Members} + \beta_5 \text{ Europe} + \varepsilon$$

¹²³ For distance measure, I have chosen the farthest distance between a pair of countries within a particular trade pact. Conventionally, one would think that closely distanced countries are likely to establish legalistic measures. By choosing the farthest distance, I am choosing a harder test for the statement.

MODEL 2 compares the explanatory power of two variables: the asymmetry in compliance environments (proxied by the asymmetry in import penetration ratio, *IPR Asymmetry*) and the power asymmetry (proxied by *GDP Asymmetry*). The *IPR Asymmetry* conveys the information-based story proposed in the theoretical model, while the *GDP Asymmetry* tells the bargaining story. The differences in import penetration ratio within a trade pact would pose informational problems about the likelihood of protectionism in trade relations. In contrast, the large difference in GDP would indicate the relatively asymmetric bargaining power among contracting countries.

MODEL 3 (Other Proxy for the Asymmetry in Compliance Environments)

$$\text{CENTRALIZATION} = \beta_0 + \beta_1 \text{IPR Asymmetry} + \beta_2 \text{GDP Asymmetry} + \beta_3 \text{Polity Asymmetry} + \beta_4 \text{Distance} + \beta_5 \text{Number of Members} + \beta_6 \text{Europe} + \varepsilon$$

The asymmetry in compliance environments comes not only from economic situations but also from political ones. Different political institutions have different expectations about trade environments. Democratic political institutions are more likely to have favorable trade environments for open trade (although they are subject to occasional protectionism) than autocratic countries. Therefore, a theoretical expectation is that a regional trade agreement composed of similar regime types is likely to employ centralized monitoring institutions. *Polity Asymmetry* is therefore another proxy variable for the asymmetry in compliance environments. The significance of this variable will further validate the theory of the asymmetric trade environments in explaining the choice of monitoring institutions.

I report the results of three models in Table 3.2 to examine how well the proposed determinants explain the choice of monitoring institutions in 123 regional trade agreements.

Table 3.2 Logit Estimates

Dependent Variable: Monitoring Systems for Regional Trade Agreements

	MODEL 1 Baseline model with <i>IPR Asymmetry</i>	MODEL 2 Test of Bargaining Theory	MODEL 3 Additional proxy for asymmetry in compliance environment
IPR Asymmetry	-.1281** (.0582)	-.1938** (.0773)	-.2125** (.0897)
GDP Asymmetry		-1.324 (1.653)	-2.361 (2.027)
Polity Asymmetry			-.6276** (.2976)
Number of Members	.3816*** (.0972)	.5630*** (.1500)	.8899*** (.2636)
Distance	-.0381 (.0298)	-.0319 (.0321)	-.0374 (.0354)
Europe	-1.9012* (1.1347)	-2.345* (1.325)	-2.820** (1.4391)
Number of observations ¹²⁴	110	104	103
Pseudo R ²	0.3891	0.5204	0.6089
LR Chi ²	31.10	40.78	47.56
Prob>Chi ²	0.0000	0.0000	0.0000

* p<0.10, **p<0.05, ***p<0.01. Robust standard errors are in parentheses. I report robust standard errors after clustering by region.¹²⁵

MODEL 1 is a baseline specification that tests the explanatory power of the asymmetry in compliance environments, namely *IPR asymmetry*. As the theory suggested, the *IPR asymmetry* has a negative impact on the choice of centralized monitoring institutions.

MODEL 2 tests the bargaining theory proposed by Smith (2000) against the informational theory proposed in Chapter 2. The result suggests that the asymmetry in compliance environments is systematically reflected in the choice of monitoring systems. Bargaining power may influence the terms of agreements (e.g. the number of trade concessions to be made), but it is not a good predictor of the choice of general monitoring mechanisms. Although the sign is negative, indicating that a power asymmetry has a negative impact on the choice of centralized monitoring institutions, the significance level is not high. Smith found the significance of bargaining power for the choice of

¹²⁴ MacFadden's pseudo R², R² for categorical analyses; see Long and Freese 91-94.

¹²⁵ Without clustering on region, *IPR Asymmetry* is not significant. This is because one region (e.g. Africa) has a different pattern from the other (e.g. Europe). If both of them pull the coefficient in opposite directions, coefficients cannot have statistical significance.

legalistic measures in his statistical model of 58 RTAs. The discrepancy may be due to the incorporation of recent bilateral agreements in the sample where bargaining power is not a decisive factor in the choice of monitoring mechanisms as much as in the case of multilateral agreements. In the bilateral agreements, as the results suggest, the discrepancy in compliance environments is a better predictor for the choice of monitoring mechanisms.

MODEL 3 tests the explanatory power of the political differences among the member countries in a regional trade agreement. The significance of *Polity Asymmetry* means that the differences in political environments have an independent effect on the collective decision to choose centralized monitoring institutions. As expected, such political differences negatively affect the choice of centralized monitoring institutions.

In all three models, unlike the gravity models to predict the formation of RTAs,¹²⁶ geographical distance turns out not to be a good predictor of the choice of monitoring institutions.¹²⁷ This suggests that the determinants of agreement formation may be different from the determinants of institutional arrangements, indicating the need for separate investigation of the political and economic sources of institutional arrangements.¹²⁸

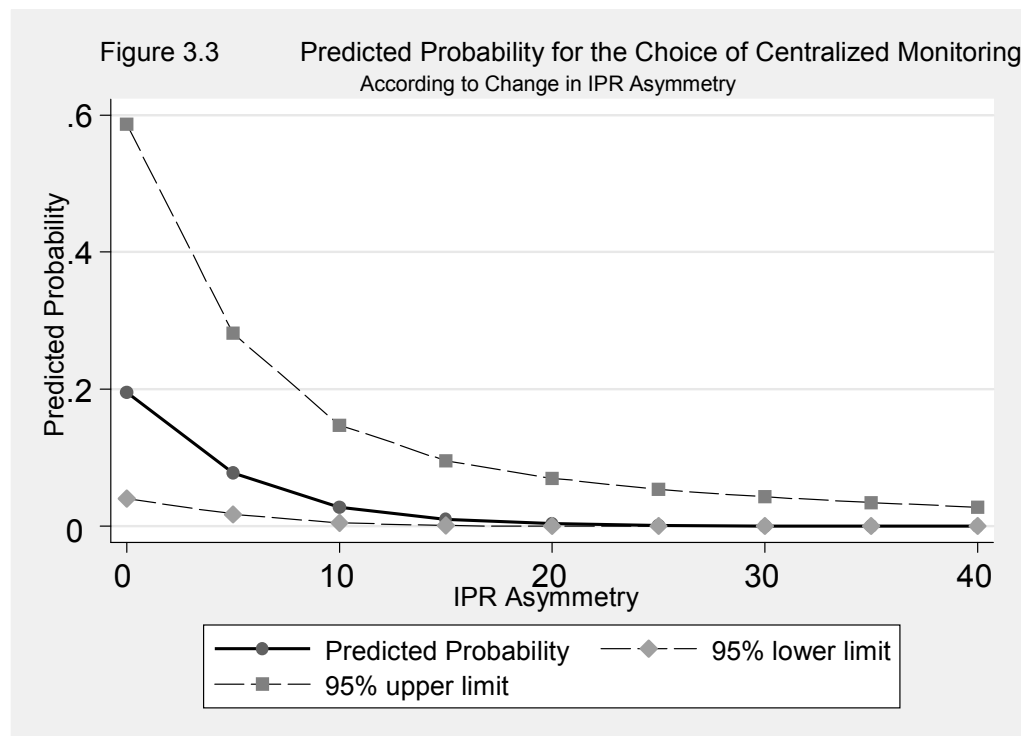
The coefficients reported in Table 3.2 are not directly interpretable as they are estimates from logit analysis, although the sign of the coefficients provides us with the general direction of the impact. The most interesting feature is the effect of *IPR Asymmetry* on the centralization of monitoring systems, raising the question, “How significant is the impact of *IPR Asymmetry* on the choice of monitoring systems?” Figure

¹²⁶ Baier and Bergstrand 2005.

¹²⁷ The casual investigation of actual cases shows mixed support. Czech Republic and Slovakia, two proximate countries, concluded a bilateral agreement with independent arbitration while Canada and Israel, two distant countries, also have concluded an agreement with independent arbitration.

¹²⁸ Other political variables that predict the trade flows are not significant predictors for the choice of monitoring institutions. For example, the determinants of trade flows—the interaction of leadership turnover and regime type (McGillivray and Smith 2004)—are not good predictors for the choice of monitoring system. I also test for the importance of the key political variable “regime type” suggested by Mansfield, Milner, and Rosendorff 2002 and by selectorate model of Bueno de Mesquita et al 2003. In the context of institutionalization on the international level, the average polity score of a regional trade pact is not significant. As Pevehouse and Buhr 2005 suggest, democracies may or may not provide environments favorable to the establishment of international monitoring. Established structures of accountability in democracies may favor the legal model, but on the other hand, democratic governments may want latitude for more policy discretion. This again calls for a separate analysis for institutional arrangements from the analysis on the formation of agreements.

3.3 graphs the predicted probabilities in relation to the change in the *IPR Asymmetry* within the range of the IPR scores in the sample, from minimum 0.15 to maximum 38.¹²⁹ One can easily discern the general downward trend, which indicates that the extreme asymmetry in import penetration ratio dramatically lowers the probability of choosing a legalistic measure. The increase in *IPR Asymmetry* can decrease the probability of centralized monitoring institutions by 20%. Using these numbers, we can also estimate when the asymmetry will become an obstacle to the establishment of centralized monitoring. Approximately when the *IPR asymmetry* score is 20, the probability of obtaining a centralized monitoring institution becomes effectively zero.

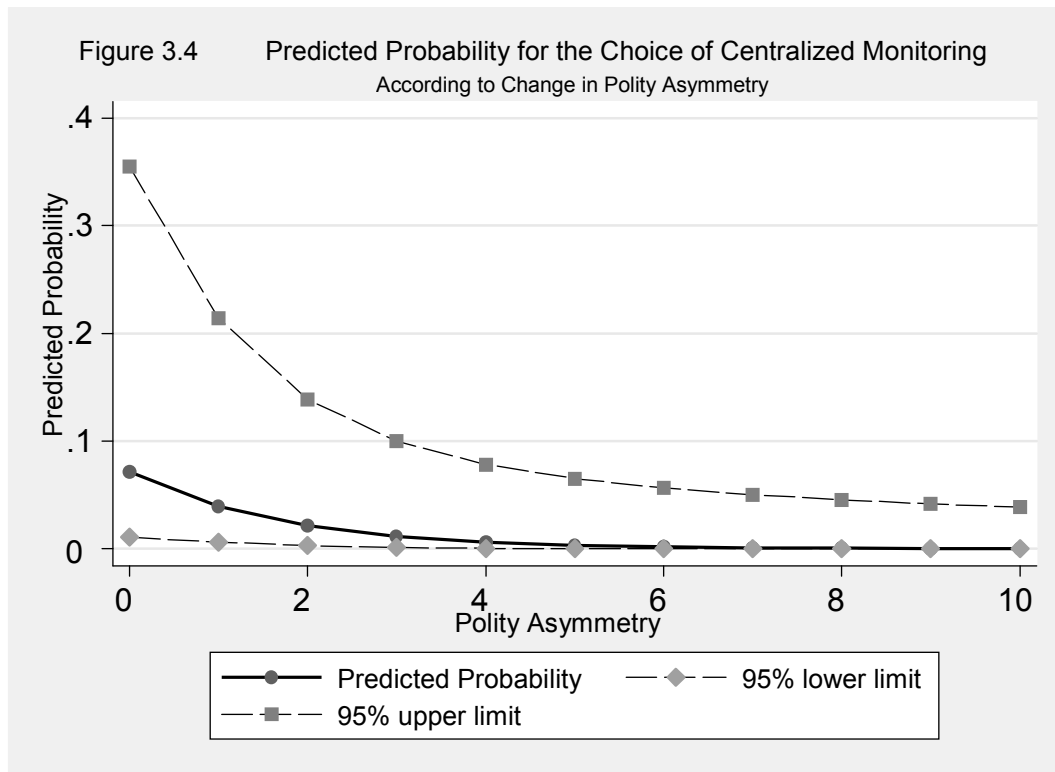


The result suggests that negotiators who want to enhance the informational power of international institutions should strive to lower the effect of asymmetric compliance environments during or before the negotiation. One way to do so is to build transparent conflict resolution mechanisms on the domestic level between government and interest group pressures to reduce the fluctuation of interest group pressures. Such mechanisms

¹²⁹ This is calculated by setting other independent variables at their means.

will assure other trade partners a predictable and visible way to foresee the trade activities while providing political venues for interest groups to express their concerns.

Similar to the negative effect of the asymmetry in import penetration ratio, the asymmetry in polities significantly and negatively affects the choice of centralized monitoring institutions. As the asymmetry increases from minimum to maximum, the probability of centralized monitoring institutions being established decreases by 10%.



The results presented above can be summarized as follows. First, the analysis of 123 regional trade agreements shows a definitive pattern of governments choosing inter-governmental measures rather than legalistic measures, such as *ad hoc* panels or standing courts. Approximately 60% of monitoring systems are diplomatic rather than adjudicatory. Second, the asymmetry in compliance environments adversely affects the choice of centralized monitoring institutions but encourages the establishment of alternate institutions. As the asymmetry (either in import penetration ratio or in polity scores)

increases from minimum to maximum, the probability of establishing standing courts or tribunals decreases by 20%.

Concluding Remark

It is well accepted that international institutions provide information about compliance and regime management. Nevertheless, how monitoring institutions are designed to collect information has been less explored. The variation in monitoring institutions across international agreements begs an explanation and a systematic test. I proposed the following theory of asymmetric compliance environments: the informational problem arising from different compliance environments is certainly abated with the involvement of an information provider but simultaneously produces distributional problems when the disparity in compliance environments is large. This scenario implies that the use of third parties may not always be efficient and provides a potential explanation for why states decide to choose inter-governmental bodies, such as Joint Committees or Joint Councils, to monitor the implementation of trade policies rather than courts or arbitration panels. Preliminary analyses of 123 regional trade agreements between 1950 and 2005 provide support for the theory, indicating the significantly negative impact of asymmetric compliance environments on the choice of centralized monitoring systems.

This analysis of an updated dataset of regional trade agreements is a contribution to the study of political economy of international trade. Adding to the large literature on the formation of regional trade agreements, this study contributes to the literature by identifying the determinants of institutional arrangements, especially monitoring institutions. I provide a broad understanding of monitoring institutions in regional trade agreements including intra-governmental procedures as well as dispute settlement mechanisms. In light of the statistical evidence (although it needs improvements on measurements and further testing), my theory adds to our understanding of the RTA case by looking at available institutional options and by providing a preliminary explanation for why states may prefer less centralized forms of monitoring institutions.

Specifically, I demonstrate that the choice of monitoring systems in regional trade agreements has informational roots. Given the uncertainty affecting global trade environments, states customize their own monitoring systems despite the innovations developed under the WTO dispute settlement systems. This is mainly because of the complex asymmetric environments that exist between different trading nations. The complexity of non-tariff measures and occasional protectionist measures based on political needs generates the need for state-controlled monitoring systems. Many studies have highlighted the value of third-party monitoring systems, but the analysis has shown how incentives arise for states to create their own monitoring systems in regional trade agreements. The theory should be further developed to explain the recent surge in bilateral agreements accompanied by *ad hoc* arbitration measures or diplomatic bodies.

The examination of RTA monitoring institutions yields additional implications for the study of international trade. First, the factors that affect the choice of monitoring systems are different from the traditional predictors for RTA formation or for trade flows. This difference necessitates a separate systematic analysis of the institutional arrangements behind trade agreements. The study also highlights the benefit of looking at the range of institutional alternatives for informational purposes that are not necessarily centralized and delegated to the international bodies. More broadly, this research contributes to the study of international institutions by re-examining their informational capacity. The study suggests that the differences in political and economic characteristics of member states could be an obstacle to the design of centralized monitoring systems. Prospective member states, in the face of informational problems and resulting distributional conflicts, are more likely to opt for the less institutionalized monitoring systems of inter-governmental bodies rather than *ad hoc* arbitration panels or standing courts. This seemingly deterministic conclusion would seem to invite a policy discussion and/or response with a view to reducing such asymmetry in compliance environments while enhancing the informational role of international institutions.

CHAPTER IV

Monitoring Institutions in Regional Fisheries Agreements

Monitoring institutions, ranging from independent scientific bodies to highly intrusive observer/inspection schemes, play a crucial role in fisheries management, with implications for both management and conservation. Collected information during monitoring processes is used for assessing stock levels, setting quota for conservation purposes, and distributing allocations to each member countries.

Regional fisheries agreements provide fertile ground to test arguments about the influence of political determinants on international institution building. Drawing on seventy-three multilateral fisheries agreements generated by the International Environmental Agreements (IEA) database, I examine the factors driving the adoption of monitoring institutions, including nations' often conflicting preferences for one kind of institution over another, with some favoring political consultative mechanisms and others favoring fisheries commissions with scientific subcommittees or relatively intrusive inspection/observer schemes.

I assess and estimate the impact of asymmetric compliance environments caused by factors such as the differing political strength of domestic fishing industry lobbies. I find that asymmetric political environments are inimical to the establishment of monitoring bodies on the international level. I additionally test hypotheses regarding the determining importance of epistemic community and national administrative capacity on nations' preferences for one monitoring institution over another and find partial/mixed support for both hypotheses.

Background: Monitoring Fisheries

Fisheries management has recently received international attention because of its potential social, political, and environmental problems. 50 percent of the world's marine fishery resources are fully exploited, 25 percent are overexploited, and about 25 percent could support higher exploitation rates.¹³⁰

The activity of collecting and analyzing scientific information, collectively termed “monitoring,” is considered necessary for sound management of fisheries. Theories of international relations have analyzed the potential benefits of collecting and utilizing information in governing international environmental agreements. Victor, Raustiala, and Skolnikoff (1998) describe such monitoring institutions as “systems of implementation review (SIR)” and show that they are essential to implementation of regulatory measures. In a similar vein, Jacobson and Brown Weiss (1998) note the importance of transparency mechanisms to foster compliance in environmental agreements. International legal scholarship has also paid attention to the importance of monitoring. Wold et al. (2003), for instance, study the Monitoring, Surveillance, and Control (MSC) systems and argue that MSC systems assist fisheries regimes in a positive way. Throughout these studies, monitoring is an important component of conservation and management measures, alongside enforcement mechanisms such as trade restrictions.¹³¹

However, even as these authors present a compelling case for the importance of monitoring institutions, they fail to address a set of underlying questions. Why are monitoring institutions designed the way they are, and what political conditions contribute to their formation? If it is beneficial and efficient to have such institutions, why do we not observe such institutional arrangements in *all* agreements? Many scholars agree that accurate, reliable information is essential for cooperation, but we also know that formal structures to promote or enforce cooperation are, in actuality, often controversial and contested. We therefore have to recognize that political constraints exist in designing such monitoring institutions. What are the sources of these political

¹³⁰ The Director-General of Food and Agriculture Organization (FAO) of the United Nations Dr. Jacques Diouf at the Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem (1-4 October 2001), re-quoted from Sullivan 2003.

¹³¹ ICCAT implemented trade restrictions with respect to bluefin tuna. See Balton 2004.

obstacles to independent monitoring bodies on the international level? What are the political mechanisms or processes that favor or disfavor the establishment of international bodies? Since the available literature does not provide answers to these questions about the formation of such informational institutions, this research attempts to fill the gap.

The topic of the selection of informational mechanisms during the institution-building or agreement-making stage was first addressed in Downs et al. (1996), where the authors theorize the selection process states go through due to political reasons while negotiating international agreements. The topic was more systematically explored in the project on the rational design of international institutions,¹³² and the topic's empirical relevance was established in Von Stein (2005) in her study of the impact of Article VIII of the IMF agreements on the compliance behavior of member states. The question I propose to pursue—how monitoring systems are established and why they are difficult to create in some cases—is important in the study of international cooperation, because we have to understand not only what factors promote cooperation, but also why beneficial mechanisms are often difficult to obtain politically. By identifying the political obstacles that exist on the international level, I seek to advance understanding of the dynamics of international cooperation and provide an explanation as to why and how cooperation-enhancing mechanisms—such as monitoring mechanisms—are often bogged down in the process of cooperation-building.

The empirical assessment of monitoring mechanisms has also been impaired by the lack of systematic empirical investigations. For example, in their article on verification in environmental agreements, Ausubel and Victor (1992) conclude,

Because international organizations have neither the power nor the capacity to monitor and enforce standards, we tentatively suggest that the most effective standards are those that allow for unilateral action, whether by parties to the agreement or by other actors such as NGOs.

Partly influenced by the fledgling regulatory system in international environmental governance of the time when the article was written, the observation about the lack of information power of international institutions implies that the institutional basis or capacity for monitoring is uniformly lacking. However, this conclusion does not coincide

¹³² Koremenos et al. 2001

with the dominant view proposed by Keohane (1984) that informational institutions in fact perform an important informational role. These potentially conflicting evaluations call for a more systematic and objective empirical investigation to examine the extent to which various international organizations in fact fulfill their monitoring function, performing their task with relevant available measures.

To make this discussion more concrete, we may now consider the monitoring institutions that are part of seventy-three fisheries management agreements.

Table 4.1 Types of Monitoring Bodies in 73 Multilateral Fisheries Agreements

Monitoring Body	Absent	Present	Total
Scientific Committee	51	22	73
Commission	21	52	73
Observer System	66	7	73

Out of seventy-three total agreements, seventeen agreements have dual systems of Scientific Committee and Commission. Commissions are management bodies usually composed of national fisheries regulators. Scientific Committees sometimes speak to Commissions but they are usually established separately.¹³³ Observer systems are scarce – only seven agreements have formal observer systems.¹³⁴ Only one out of the seventy-three agreements has all three monitoring systems.¹³⁵

The variation in monitoring mechanisms—with some agreements adopting scientific committees, others preferring observer systems, and some embracing both—clearly asks for an explanation. Certainly, the statistical summary shows that we cannot conclude that international bodies are inherently weak. The institutional variation also suggests that conventional arguments to the effect that states are reluctant to delegate monitoring authority due to sovereignty concerns do not readily hold up. We therefore have to seek alternative explanations to understand the institutional variation.

¹³³ The following agreements for instance establish scientific committees but do not have commission: 1) Convention for the Conservation of Antarctic Seals (1972), and 2) Constitution of the Center for Marketing Information and Advisory Services for Fishery Products in Latin America and the Caribbean (1994).

¹³⁴ Examples include 1) Convention For The Conservation Of Anadromous Stocks In The North Pacific Ocean (1992), 2) Convention On The Conservation And Management Of Pollock Resources In The Central Bering Sea (1994), and 3) Federated States Of Micronesia Arrangement For Regional Fisheries Access (1994).

¹³⁵ It is the Convention on the Conservation and Management of the Highly Migratory Fish Stocks of the Western and Central Pacific Ocean (2000).

This chapter addresses the theoretical lacuna about the design of monitoring systems and provides a theory for the design of monitoring systems in regional fisheries management. In what follows, I present my argument as to why differences in domestic political factors are likely to negatively affect the adoption of international monitoring institutions. After the theoretical discussion, I provide empirical evidence to examine the effect of the political differences.

Theory of Distributional Conflicts in the Context of Regional Fisheries Management

To bring home the theoretical framework presented in Chapter 2 in the context of fisheries management, it may help to picture two states or groups of states entering into fisheries negotiations in a multilateral setting. The participating states will weigh the available monitoring institutions. Their choices include, but are not limited to, 1) an independent scientific committee that could advise and recommend catch allocations to a political body, 2) a political body such as a commission charged with collecting information from member countries, or 3) a more stringent inspection mechanism designed to independently collect information that can be cross-examined later.

One commonly encountered international cooperation environment is such that one state allows the others some latitude for “escapes” from the terms of the agreement when their domestic political situations are not very favorable.¹³⁶ Such leniency, under special circumstances, is a common feature of international cooperation. In fisheries management, this might take the form of country *A* allowing country *B* to delay the scrapping of its over-sized or over-capacity vessels. As new technologies develop, over-fishing has become a problem, and the livelihoods of many fishermen are now threatened as governments restructure and regulate their fishing industry so as to ensure that fishing continues at a sustainable level. International cooperation in fisheries management is in this manner intertwined with domestic politics. Introducing reforms in the fishing industry requires the political consent of relevant stakeholders, particularly fishermen; jobs may be lost or changed, and people may have to transition to other sectors of the

¹³⁶ See Milner and Rosendorff 2001 for the discussion of escape clauses (safeguards, antidumping, etc.) in trade relations.

economy. In such a relatively non-mobile sector, national governments may prefer to provide subsidies and protect the industry rather than committing to the cause of sustainable fisheries. Judging whether a neighbor's violation of a fisheries agreement may be considered "legitimate," and therefore be left unpunished, is a difficult exercise, but states still have to manage cooperation given this uncertainty.

In these political circumstances, and given these uncertainties, on the international level, reciprocal punishment (e.g. denying access to one's territorial waters) is usually suspended when other parties are seen to be experiencing "special circumstances." If these special situations do not occur frequently, both parties could benefit from having an institution that can produce objective scientific information about catches along with recommendations for catch limits and get its advice on whether domestic restructuring and stringent management are necessary.¹³⁷ If these situations are too frequent¹³⁸ and asymmetrically benefit one party over the other, participating states may not favor establishing a third party international institution such as a scientific body. If one state party tries to exploit its "special circumstances," using them as a pretext for circumventing its duties for sustainable management, distributional conflicts tend to arise. The asymmetry in different domestic political environments therefore can be harmful to the establishment of international monitoring bodies.

Domestic political concerns impact institutional design on the international level because they create uncertainties for other states with regard to future credibility. Fishing GDP, the portion of GDP deriving from the fishing industry, is in most cases miniscule (1-5%).¹³⁹ However small the impact of fishing on the economy may be, the political factors at play in each member state are taken into account during the institutional design process, as they affect the perception of the other involved states about how future cooperative relations would play out. If one state signals that it may want to deviate from cooperation to accommodate its domestic political difficulties, other states' willingness to invest in monitoring institutions may dissipate. In those cases of asymmetric compliance

¹³⁷ See Jo 2006 for formalization of the idea of domestic compliance environments and their impacts on the institutional design.

¹³⁸ The threshold for this frequency level is determined in the theoretical model by the level of stakes involved. If the stake is high for the party that expects other party invoking these special circumstances, it is more likely to oppose to stringent monitoring mechanisms.

¹³⁹ See Fishery Country Profile at <http://www.fao.org/fi/fcp/fcp.asp>

environments among member states, monitoring institutions may lose their value as collectors of relevant information and producers of coherent sustainability policies.

This model of institutional design that considers larger domestic and international political contexts in strategic cooperation environments yields a key insight regarding the characteristics of distributional conflicts as these conflicts of interests among member countries contribute to building monitoring mechanisms. The argument ultimately concerns the constraining effect of politico-economic asymmetry among member countries. States need monitoring systems to sustain cooperation, which has been suggested by the functionalist account of international institutions—the demand creates the need for such institutions. However, political differences can and do impose constraints on the development of international monitoring systems. Differences in political and economic environments necessitate the development of monitoring systems but can generate serious political issues regarding future commitment.

In what follows, I present in detail the argument about the political roots of international regulatory measures and explain how compliance problems in fisheries management shape the institutional choice. I first describe monitoring problems in the context of fisheries management and identify problem structures.¹⁴⁰ Next, I examine the compliance environments in fisheries management and explain why domestic political structures or conditions may affect the choice of monitoring institutions on the international level.

Status of global fisheries

As Hardin (1968) trenchantly predicted, the tragedy of the commons problem has manifested itself in international fisheries. In the 1980s, seriously depleted fisheries resources emerged as an international problem, as evidenced by the collapse of northern cod fisheries, primarily as a result of technological developments in catching, coupled with illegal, unregulated and unreported (IUU) fishing. According to the Food and Agricultural Organization (FAO), a major international body within the United Nations

¹⁴⁰ In Mitchell (2006)'s sense. The problem structure involves the inherent uncertainties surrounding the issue, goals of cooperation, and asymmetric (or symmetric) expected benefits or costs.

that regulates global fisheries, almost 70 percent of all fish stocks are either fully to heavily exploited (44 per cent), over-exploited (16 per cent), depleted (6 per cent) or very slowly recovering from over-fishing (3 per cent).¹⁴¹ Dating back to the early twentieth century,¹⁴² many international agreements have been concluded to enact a range conservation measures with respect to diverse marine resources such as dolphins, seals, and whales, with varying degrees of effective implementations and different levels of institutionalization.

Informational and political problems in fisheries management

Informational problems in assessing fish stocks in fisheries management arise primarily because fish do not respect borders. Prominent fisheries scientist John Sheperd cogently states the challenge scientists face:

“Estimating the number of fish in the sea is just the same as counting the number of trees in a forest, except you can’t see the fish and they move.”¹⁴³

Despite the inherent uncertainty that affects the scientific modeling of fish stocks, the exchange of information about catches is crucial for sustainable fisheries management, as the annual sustainable yield is determined by weighing the available catch against the caught amount. Reliable assessments of fish stocks are crucial for implementing fisheries agreements. Since many fisheries agreements involve sharing “surplus stocks,” the estimation of those stocks is necessary for implementing the agreement with the objective of sustainable development.

Fisheries are impure public goods that have characteristics of both private and public goods, which complicates the regulatory process. Coastal countries have their own EEZ of 200 nautical miles with special rights over the exploration and use of marine resources. Areas outside EEZs are virtually unregulated, with the exception of some

¹⁴¹ <http://www.un.org/ecosocdev/geninfo/sustdev/fishery.htm>

¹⁴² According to the International Environmental Agreements (IEA) database, the earliest international fisheries agreements include Convention Between Alsace-Lorraine And The Two Initial Parties To The Convention Between Baden And Switzerland Concerning Fishing In The Rhine And Its Influxes As Well As In Lake Constance (1877) and Convention for Regulating the North Seas Fishery (1882).

¹⁴³ Re-quoted in the Full Committee Hearing on Global Overfishing and International Fisheries Management, Thursday, June 12 2003. <http://commerce.senate.gov/hearings/witnesslist.cfm?id=808>

global and regional measures. As most measures imposed on fishing vessels are the responsibilities of flag states (states where the vessels are registered), some commercial vessels adopt “flags of convenience” to get around the stringent regulations of some coastal states. Illegal fishing activities therefore cause informational problems in verifying catch amounts, particularly in high seas where regulation is lax or virtually non-existent.

Another informational problem in fisheries management is that states do not necessarily want to share information and, indeed, have some incentive to hide or distort information in the interest of their domestic commercial fishing industries. Besides the high profile cases of underreporting by Russia in the 1980s¹⁴⁴ and over-reporting by China in the 1990s,¹⁴⁵ national reporting has been a chronic problem.¹⁴⁶ An ADE study notes that “figures used for negotiating and implementing the fisheries agreements, seem to be more the result of a commercial bargain than of scientific studies.¹⁴⁷” In many cases, because of pressure to adhere to allocated quotas, fishermen have also resorted to the practice of releasing “discards” (dead fish) into the ocean, which upsets the ecological balance.¹⁴⁸

These informational problems of hiding information about catch statistics or getting around existing regulations usually go in tandem with other political problems that may affect the international negotiation of fisheries agreements. With respect to fisheries management, development goals often conflict sharply with the goal of sustainability. Member states to a fisheries agreement have to weigh these often-competing objectives. With respect to development, and the choice between maintaining subsistence and developing the fishing industry, national governments have to consider the domestic political ramifications of supporting international measures that could influence the status and economic viability of their fishing industry.

Although typically miniscule as a portion of the overall national economy, national fishing industries involve both economic and social aspects. Employment in

¹⁴⁴ Documented in Weiss and Jacobson 1998

¹⁴⁵ Watson and Pauly 2001 in Nature; a response by FAO Fisheries Department

¹⁴⁶ See Jacobson and Weiss 1998 for empirical records of state reporting to international environmental agencies or bodies.

¹⁴⁷ ADE-PwC-EPU, p.57

¹⁴⁸ Bounds, Andrew. 2007. “EU Fisheries Commissioner: Dumping of dead fish is immoral, says Borg” *Financial Times*, Feb 20, 2007

fishing generally does not allow mobility, since the industry involves huge sunk costs as well as adjustment costs. At the same time, the fisheries sector is inherently vulnerable to economic changes. Because of these industry characteristics, traditional fishermen in industrialized countries are subsidized at an average of 17%.¹⁴⁹ Fishing subsidies take many forms, from direct financial transfers to assistance in development projects.¹⁵⁰ The extent of fishing subsidies has been increasing against the backdrop of the decreasing competitiveness of traditional fishing sectors. In the case of the EU, targeted compensation to the fisheries sector has recently increased¹⁵¹ compared to untargeted compensation that is provided to national governments.

Private stakeholders (fishermen, ship-owners) in many developed countries are constituents with political power. The potentially harmful effects of fishing subsidies are well documented—they contribute to oversized fishing fleets and overcapacity¹⁵²—and recently, making matters worse, big deep-sea trawlers have been subsidized by many major fishing nations with \$150m a year. These deep-sea trawlers are otherwise economically unviable, and they have been shown to disrupt deep-sea ecosystems that exhibit slow growth compared to ecosystems in shallow waters.¹⁵³ This subsidy problem is not limited to developed countries. In developing countries where the people rely on fish for subsistence, fisheries-dependent communities are often important constituents for politicians. Local communities dependent on fisheries also often demand exclusive fishing rights. Because of the political prominence of fishing lobbies in many developing countries, direct or indirect fishing subsidies are common in these countries as well as developed ones.

Clashes among different compliance environment countries

Purely scientific problems, in tandem with political conditions, may work against compliance with the central tenet of fisheries agreements: sustainable fisheries

¹⁴⁹ ADE-PwC-EPU 2002

¹⁵⁰ Westlund 2004

¹⁵¹ ADE-PwC-EPU 2002

¹⁵² Milazzo 1998, Cox and Schmidt 2002

¹⁵³ Cookson, Clive. 2007 “Scientists Warn Deep Sea Trawling Strips the Ocean” *Financial Times*. February 20, 2007. Largest payers are Japan, Russia, South Korea, and Spain.

management. These scientific and political difficulties, I argue, may ultimately block the institutional building process, especially when parties to an agreement experience divergent domestic political conditions.¹⁵⁴ In what follows I define the domestic political situations that may favor or disfavor compliance with international obligations as “compliance environments.”

How do domestic political considerations and compliance environments affect international negotiations regarding monitoring arrangements in the fisheries management case? Fisheries-dependent countries (mostly distant water fishing nations) expect more flexibility and therefore may seek flexible measures or weak regulations in monitoring mechanisms. They will approve centralized monitoring mechanisms only if flexibility mechanisms (e.g. fishing allowed for research purposes) are included in written agreements. In contrast, coastal states would want to strengthen the regulation because of their interest in protecting their own resources within their EEZ. But monitoring would not help those coastal states if other states enjoy flexibility.

To illustrate these arguments about strategic considerations that guide institutional creation among related parties, I rely on the Fish Stock negotiation between 1995 and 1997. I chose this global negotiation episode because negotiation materials for smaller-scale treaties are difficult to come by.¹⁵⁵ In the Fish Stocks negotiation, the different compliance environments of fishing nations yielded different bargaining positions regarding the kinds of monitoring systems that were preferred. Each member country belonged to one of the following categories:

- Distant water fishing nations (DWFNs): states that possess many vessels or fleets operating for extending periods far from their home base
- Coastal states: to which the Law of the Sea conferred exclusive economic rights, including the right to fish within 200 miles off their shores
- Port states: states with national ports that foreign ships temporarily embark
- Flag nations: states that register vessels

The major divide was between coastal states and “distant water” fishing nations (DWFNs) on the high seas. Coastal states that worried about their domestic harvest

¹⁵⁴ The political and scientific problems influence each other. For example, political differences color scientific evaluations and rhetoric involved in discussion of scientific facts.

¹⁵⁵ Peterson 1993 provides some episodes of distributional conflicts related to regional fisheries commissions.

included Argentina, Australia, Canada, Chile, Iceland and New Zealand. DWFNs that were responsible for 90 percent of distant water fishing included Russia, Japan, Spain, Poland, the Republic of Korea, and Taiwan province of China.¹⁵⁶

The major areas of contention over management schemes during the negotiation illustrate the political tensions that arise when countries experience divergent compliance environments. The central debate opposed distant water fishing nations (DWFNs) to costal states. Distant water fishing nations pushed for non-binding guidelines for the detailed regulatory measures, while costal states favored a binding treaty.¹⁵⁷ DWFNs also rejected strong enforcement measures, which led to the 1995 *FAO Code of Conduct for Responsible Fisheries*, a non-binding agreement. As in other negotiations, the position of states with unfavorable compliance environments (in this case, DWFNs) was adamant, ignoring the potential benefits that rigorous international monitoring mechanisms can provide. Coastal states complained that their conservation efforts were marred by indiscriminate over-fishing by distant water fishing nations. DWFNs, including the EU, wanted not to strengthen existing inspection measures, so as to avoid the possibility of any use of force on the high seas (that is, claiming the extended level of “special circumstances”), while costal states emphasized their right to board and inspect vessels as part of their enforcement of conservation measures.¹⁵⁸

As the negotiation over the Fish Stocks Agreement demonstrates, the conflicting preferences of member countries stem from their domestic compliance environments, and divergent compliance environments tend to result in disputes that often work against the adoption of strong management measures. In the following section, I examine whether any systematic evidence for this theory exists in regional fisheries agreements.

Dataset of Regional Fisheries Agreements

To test my theory of the design of monitoring institutions, I analyze seventy-three multilateral fisheries agreements. Regional fisheries agreements have various legal

¹⁵⁶ Earth Summit backgrounder, <http://www.un.org/ecosocdev/geninfo/sustdev/fishery.htm> Earth Summit +5: Special session of the General Assembly to Review and Appraise the Implementation of Agenda 21. New York 23-27 June 1997, Backgrounder

¹⁵⁷ Devaney 2005

¹⁵⁸ Earth Summit backgrounder, <http://www.un.org/ecosocdev/geninfo/sustdev/fishery.htm>

provisions ranging from action plans with relatively light obligations to regional conventions underpinned by strong legal frameworks. Associated protocols often deal with specific problems in a manner consistent with the goals stated in the original convention.

Fisheries management is organized in four layers: global, regional, national, and local. On the global level, the UN Convention on the Laws of the Sea (UNCLOS) regulates the fishing behavior of member countries with specific written regulatory details in the FAO Code of Conduct for Responsible Fisheries (FAO-CC), along with its historical predecessors, as summarized in Table 4.2.

Table 4.2 Milestones: Historical overview of legal instruments for global fisheries management

Mid-1970s	Creation of EEZ
1982	United Nations Convention on the Law of the Sea (EEZ regime emerged)
1993	1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (Compliance Agreement)
1995	United Nations Fish Stocks Agreement (entered into force in 2001) FAO Code of Conduct for Responsible Fisheries
2001	International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU)

On the regional level, regional fisheries bodies (RFB) implement the regulations complementary to global rules. On the national level, each nation has its own fishing program and more often than not, local fisheries management influences how the upper levels of national and regional management operate.

The global fisheries regime, like other international cooperation regimes, relies heavily on national level implementation. States are expected to improve their monitoring, control and surveillance systems (MCS), establish mandatory licensing regimes and strengthen legal frameworks.¹⁵⁹ As of 2005, the percentage of FAO member states that had adopted vessel-monitoring systems (VMS) to some degree had increased from 26 percent in 2001 to 70 percent.¹⁶⁰ Today, global regulation continues to depend on voluntary national implementation.

¹⁵⁹ COFI/2005/2

¹⁶⁰ Vessel registration is the easiest method; states rarely monitor by-catch and discards.

Although the development of the global fisheries regime is well worth studying, not least for the light such analysis can shed on the political conflicts that complicate the building of fisheries regimes, it is a much-studied topic¹⁶¹ and does not give much leverage for large-N statistical analysis because it varies with time but exhibits little variation. In order to tackle a less-studied area that exhibits great variation, I chose to examine regional fisheries agreements, for which good data is available”¹⁶² My decision to focus elsewhere reflects that the examination of regional fisheries agreements presents itself as an analytically fruitful exercise due to the large number and wide geographical distribution of these agreements. Certainly global and regional arrangements interact with each other, mostly in a coherent manner: regional systems aid the implementation of globally agreed rules while at the same time influencing the adoption of rules on the global level. Ultimately, the interaction between global, regional, and national levels should be studied,¹⁶³ and this research contributes to the discussion by providing the first cut to examine the variation in regional fisheries agreements.

Besides providing a sufficiently large dataset to allow me to estimate the effects of political differences among member states, other benefits of looking at regional agreements include the ability to sort out “problem features”—characteristics of problems that cooperation purports to solve—that may otherwise impair inference, if they are uncontrolled for. As Mitchell (2005) notes, regional fisheries agreements share the goal of addressing the issue of over-harvesting, a fact that allows an analyst to control issue characteristics that might otherwise weaken his/her research design. Controlling for the aims of agreements is important, since different goals tend to generate different motives among parties as they choose among various possible monitoring institutions.

To control for the end-goals of treaties, I have ensured that every agreement in the sample addresses the issue of over-harvesting or common pool resource (CPR) problems,

¹⁶¹ See Kaye 2001 for recent work on the global fisheries regime.

¹⁶² It would be ideal to have the dataset of local fisheries management regulatory measures, but this does not yet exist. Besides, my goal in this paper is to examine the domestic political roots of international regulatory measures.

¹⁶³ See the collection of papers from the Nested and Overlapping Institutions Conference at Princeton University, February 24, 2006, for recent theoretical efforts to explain different levels of cooperation. Available at http://www.princeton.edu/~smeunier/conference_nesting.htm (accessed on December 22, 2006)

committing to the protection of certain stocks, for example.¹⁶⁴ Some agreements specifically target the problem of sustainable management of fisheries while other agreements address this as a secondary goal, instead focusing on the problem of free passage, conferring rights to fish. If an agreement did not state these sorts of goals and interests in its Preamble or in the provisions that outline convention objectives (e.g. conservation of marine environment, optimum utilization of fishery resources), it was left out of the sample.

Sample and Data Source

To identify an adequate sample for testing the aforementioned hypotheses regarding the institutional design of monitoring systems, I first cast my net over the entire universe of multilateral fisheries agreements by consulting the International Environmental Agreement (IEA) database¹⁶⁵ The IEA database contains 200 multilateral and 570 bilateral fisheries agreements. The agreements pertain to pacific salmon, northeast Atlantic fisheries, Baltic Sea fishing, international whaling, and a host of other issues.¹⁶⁶ As explained before, I excluded global-scale agreements, such as the agreements related to the UN Convention on the Laws of the Sea (UNCLOS).¹⁶⁷ These global-scale agreements may influence arrangements on the regional level, which will be later briefly explored in the statistical analysis. I currently also exclude bilateral fisheries agreements, since the majority of these agreements deal with the issue of access rather than the issue of collective management and conservation.¹⁶⁸ Many bilateral agreements

¹⁶⁴ One caveat here is that I do not control for the characteristics of fish species, which could be potentially important. For example, tuna and swordfish are classified as “highly migratory stocks” while cod and pollack are classified as “straddling fish stocks”—fish that live between different EEZ jurisdictions. See Munro et al. 2004 for more information regarding the classifications. Their characteristics may well affect the monitoring mechanisms, although it is unlikely the characteristics would determine the centralization of monitoring institutions.

¹⁶⁵ Available at <http://iea.uoregon.edu/>

¹⁶⁶ The sample covers different species, including tunas, salmons, seals, and whales.

¹⁶⁷ Ron Mitchell organized the database such that the related agreements are linked by “lineage.” So, the Laws of the Sea lineage includes the original convention in 1982 as well as the 1995 Fish Stocks agreement.

¹⁶⁸ This claim is currently under investigation. Bilateral agreements involving shared seas (e.g. the Yellow Sea between China and Korea) concern conservation and management measures, while bilateral agreements involving distant fishing nations (e.g. African countries and the EU) express less concern for sustainable fishing.

pertain to conferring fishing rights to the other party, usually one country granting access and the other providing financial assistance in return. Since I am mainly interested in the initial design of agreements rather than subsequent institutional changes, I additionally exclude further amendments and protocols.¹⁶⁹

This elimination process leaves only about 100 multilateral agreements. Unfortunately, some legal texts are unavailable or in a language other than English, so the current sample contains a total of 90 agreements. Some explanatory variables are limited in time and scope (for example, catch data may be available for a 50-year period with respect to species and areas, but environmental governance indicators may be available only for 2005 and 2000), which finally leaves 73 agreements that can be usefully analyzed. The independent variables are collected by Earth trends,¹⁷⁰ the Environment Sustainability Index (ESI),¹⁷¹ the Environment Vulnerability Index (EVI),¹⁷² and the FAO fishery country profile.¹⁷³

Dependent Variable: Aggregate Measure of Monitoring Institutions

The dependent variable is the aggregate measure of monitoring institutions. The variable takes the value of zero when an agreement employs none of the following three available monitoring institutions in fisheries agreements¹⁷⁴: 1) Commission, 2) Scientific

¹⁶⁹ This omission leaves further room for future research on the evolution and development of monitoring systems. The theory of institutional change has to be developed first, or one has to examine whether the theory of institutional design can be transplanted to explain institutional change. Empirical testing can be done using hierarchical linear models.

¹⁷⁰ Earthtrends is from the World Resources Institute and their research topics include 1) coastal and marine ecosystems, 2) water resources and freshwater ecosystems, 3) climate and atmosphere, 4) biodiversity and protected areas, 5) environmental governance and institutions. Available at <http://earthtrends.wri.org/>

¹⁷¹ The Center for International Earth Science Information Network (CIESIN) with the World Economic Forum, provides a composite index tracking a diverse set of socioeconomic, environmental and institutional indicators that characterize and influence environmental sustainability at the national scale. Available at <http://www.yale.edu/esi/>

¹⁷² Developed by the South Pacific Applied Geoscience Commission (SOPAC), the United Nations Environment Programme (UNEP) and their partners, the index provides 50 'smart indicators' to capture the key elements of environmental vulnerability. Available at <http://www.vulnerabilityindex.net/>

¹⁷³ FAO's Fisheries Department prepares and publishes Fishery Country Profiles (FCP) with economic and demographic data, including structure and characteristics of the fishing industry. Available at <http://www.fao.org/fi/fcp/fcp.asp>

¹⁷⁴ Wold et al. (2003) in their study on ten fisheries agreements identify six categories of monitoring, surveillance and monitoring systems: 1) vessel registration, 2) vessel monitoring systems (VMSs), 3)

Committee, 3) Observer or Inspection System. Among the available institutions, such as Secretariats or sub-committees, these three sub-bodies are directly related to monitoring activities. I exclude *ex ante* monitoring measures such as licensing and vessel registration because these measures do not directly monitor compliance behaviors but rather serve as measures to prevent illegal fishing in advance.

**Table 4.3 Summary Statistics of Dependent Variable:
Three Levels of Monitoring Systems in Regional Fisheries Agreements**

Number of Monitoring Institutions (Commission, Scientific Committee, Observer and Inspection System)	
None (no monitoring institution specified)	15
One (either Commission, SC, or OS)	36
Two (e.g. Commission and Scientific Committee)	21
Three (all three institutions) ¹⁷⁵	1
Total	73

The dependent variable is therefore an ordered variable that indicates greater and greater centralization as the number increases. The larger values indicate higher-order monitoring institutions with more independence and information collection capacity on the international level. A Commission typically has the mandate to make political decisions, is often empowered to collect scientific information, and is equipped by the member states with the power to establish a technical committee. Scientific bodies are organs that most often monitor compliance and compliance-related data in fisheries agreements. The respective fisheries institutions in each country’s domestic arena collect key information, but scientific bodies in regional fisheries bodies operate as repositories of information. A Scientific Committee normally reports to a Commission by providing recommendations.¹⁷⁶ In rare cases, the inspection and observer schemes are introduced to monitor compliance in a more objective way by bringing neutral observers on board. In

comprehensive observer programs, 4) catch documentation schemes, 5) inspection, and 6) compliance mechanisms (e.g. trade prohibitions). See their report for the collection of respective legal provisions.

¹⁷⁵ This is the Convention on the Conservation and Management of the Highly Migratory Fish Stocks of the Western and Central Pacific Ocean (2000). In the subsequent analysis, I drop this observation to avoid bias due to limited variation.

¹⁷⁶ An interesting episode that captures the political nature of commission work under fisheries agreements: “scientific advice this year recommended closing the North Sea cod fishery, yet the Commission asked for a mere 25% cut at the annual December quota-setting-meeting. Ministers trimmed that to between 14% and 20%” Bounds, Andrew. 2007. “EU Fisheries Commissioner: Dumping of dead fish is immoral, says Borg” *Financial Times*, Feb 20, 2007.

cases where no formal institutions exist, consultative mechanisms using national contact points within governments serve the purpose of information exchange.

However, one should note that the distance between the four scores is not equal. Adopting observer or inspection schemes is usually a bigger step forward than establishing a commission and scientific committee together. This means that observer or inspection schemes are not usually politically appealing options due to the high level of delegation of authority to international organizations by member states, compared to the combined option of commission and scientific body.

A caveat is in order with regard to using this kind of aggregate measure of institutions as a proxy for the strength of monitoring institutions. The key issue is whether the written legal provisions reflect actual practices. Once international agreements are signed, their implementation is at the mercy of corresponding national legislatures and political realities. The proposed measures may not reflect the extent to which scientific programs are actually conducted by such monitoring institutions. For these reasons, one cannot guarantee that practices on the ground perfectly coincide with what has been written. However, in this research, I am primarily interested in the *ex ante* design of monitoring institutions, so actual practices are less important than they might otherwise be for my analytical purposes. Additionally, a researcher may prefer objective measures to often-subjective assessments of reality. By adopting unobtrusive measure (i.e. just looking at legal provisions), an analyst can avoid the risk of employing subjective assessments and measures of actual practice.¹⁷⁷ Based on these two reasons, I have based my research on the objective coding of information mechanisms written into legal provisions.

Independent Variable I: Fisheries-Related Employment

I have posited that the asymmetry in compliance environments has a negative impact on the development of fisheries management measures. National governments want to appeal to their domestic fishing constituencies while also considering broader

¹⁷⁷ Another practical issue is that coding of written rules is clearly superior in terms of getting inter-coder reliability.

environmental impacts. Amid this tradeoff between domestic political interests and international obligations, each government looks to the other governments. When the parties to an agreement exhibit many differences, national governments are less likely to choose the benefit of soundly managing the environment. The reason is that state parties with widely divergent compliance environments cannot jointly maximize their benefit from an agreement by assenting to an institution that determines members' catch allocations based on scientific evidence. A state party with a small number of people employed in its fishing industry would welcome the prospect of the other state party restraining its fishing activity. On the other hand, a state party with a larger number of people employed in the fishing industry would suffer some temporary political loss, regardless of the benefits of having clear institutional bases for joint monitoring.

A potential political pressure arising from the fishing industry—one of the factors shaping a nation's domestic compliance environment—is proxied by the percentage of its total population employed in fishing.¹⁷⁸ Data on the number of people employed in fishing and aquaculture is available from Earthtrends. To obtain a relative measure, the number was divided by total population to estimate the importance of the fishing industry in the economy of each member country in the signing year. Later, to obtain a measure of asymmetry among member countries, I calculated the standard deviation of the percentage of each country's population employed in fishing. Standard deviation is a standard measure for dispersion, and in order to capture the idea of how diverse fishing populations are among member countries, I used standard deviation measures. The theoretical expectation is that the larger the difference in fishing employment among member countries (i.e. the larger the standard deviation), the less likely states are to adopt a monitoring institution that involves the delegation of authority.

¹⁷⁸ A better alternative measure, I think, is fisheries GDP, an estimate of the contribution of fishing to the GDP and as a part of agricultural GDP. The measure includes the production of offshore fishing, incorporated fishing enterprises involved in processing and services, small-scale commercial fishing, and the contribution of subsistence fishing. This measure is in the process of being incorporated into the dataset by the author. Alternatively, the heterogeneity can be measured by the size of privately owned distant-water fleets since they are usually the ones who exercise their political voices to influence policy.

Independent Variable II: Productivity Overfishing (Degrees of Overfishing)

Countries with overfishing problems at home tend to send their vessels outside their territorial waters, and consequently become distant water fishing nations (DWFNs). Their ecological vulnerability pushes those countries to go overseas. They are usually the ones with efficient fishing technology and low capture-per-unit-effort. Countries with a high level of productivity overfishing are likely to be distant water fishing nations. In terms of the Environmental Sustainability Index (ESI) measure of overfishing with seven-point scale, for instance, Japan scores 7 along with China and South Korea. Most European countries, including Ireland and Italy, score 5 and above. Consequently, these countries are generally classified as DWFNs. As illustrated in the UN Fish Stocks negotiation case, DWFNs tend to discourage the development of stringent monitoring systems. We therefore expect less centralized monitoring institutions when an agreement's membership includes more overfished nations.

Independent Variable III: Polity Asymmetry

Many studies find that democracies are more prone to international cooperation than non-democratic regimes.¹⁷⁹ To control for general political differences, I include the differences in polity scores, conventional measures in political science that measures how democratic (or autocratic) a country, for each agreement. Again, differences are measured in terms of the standard deviation of each signatory in the signing year.

Independent Variable IV: Scientific Knowledge Creation

While the first two variables are based on theories of interests and strategic interactions, the next two independent variables serve as competing hypotheses that are identified in international cooperation literature, namely, the view that focuses on national capacity to comply (an approach called the “managerial thesis”) and the

¹⁷⁹ See, for example, Mansfield et al. 2002 for the international trade context and Lai and Reiter 2000 for the alliance context.

perspective that scientific networks contribute most to international cooperation in environmental governance.

The role of epistemic community in international environmental governance has been documented by many international relations scholars, most notably and comprehensively by Haas.¹⁸⁰ An “epistemic community” is a network of knowledge-based experts or groups with an authoritative claim to policy-relevant knowledge within the domain of their expertise.¹⁸¹

The variable “knowledge creation in environmental science, technology and policy” was constructed by the Environmental Sustainability index (ESI). The variable is an average rank between 1 and 78 of three individual regressions with small values corresponding to above average performance. The reference year I have used is 2003.¹⁸² The methodology of the ESI was to study the publication of scientific knowledge in the top-rated peer-reviewed journals in the fields of environmental science, technology, and policy. Three regressions were carried out as follows and the residuals of each regression were ranked¹⁸³ and aggregated to form an average rank score.

1. Publications per author per million population ~ researchers per million population + R&D spending as % of GDP + publications per area and population
2. Publications about foreign countries ~ log (GDP) + Publications per area
3. Publications per area ~ publications per author + population

I have to admit that this index is not a perfect measure of epistemic community. First, the measure does not entail the core concept of “connectivity” among scientific experts. Second, the measure may proxy for the government effectiveness and capacity of a nation and may be correlated with it.¹⁸⁴ Despite these limitations, if the epistemic community serves a role in establishing international monitoring bodies, we would expect it to have a significantly positive impact.

¹⁸⁰ Haas 1992

¹⁸¹ Haas 1992, p.3

¹⁸² This variable is only available for 1993, 1998 and 2003, and the rankings do not change much over time.

¹⁸³ Regression residuals are often used as performance measures. If a model predicts y_{hat} but actual outcome is y , the difference (y minus y_{hat}) serves as the measure for performance. See Wang and Jamison (1998) for their discussion of the methodology and actual practice of using residuals as performance measures.

¹⁸⁴ Indeed, in my dataset, there was a moderate level of correlation (.2) between knowledge and capacity variables with some significance (.06).

Independent Variable V: Government Effectiveness

Managerial views of international cooperation have emphasized the administrative and bureaucratic capacity of a nation. According to Chayes and Chayes (1995), national capabilities—or the lack thereof—may constitute critical obstacles to compliance. We should therefore see a significant “mirror image” effect when we consider the influence of national capabilities on domestic politics. Countries that rate higher in terms of government effectiveness will tend to favor better international coordination and the building of centralized monitoring institutions.¹⁸⁵

To see how national environments contribute to institutional coordination on the international level, and to examine how national measures translate into international politics, I also include the variable “government effectiveness,”¹⁸⁶ constructed by the World Bank.¹⁸⁷ The Bank aggregates 25 resources of information on governmental effectiveness to produce comparable indicators including “quality of public service provision, the quality of bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government’s commitment to policies.”¹⁸⁸

Control Variables

For control variables¹⁸⁹, two agreement features are included in the model: 1) the number of member countries and 2) the binary variable that specifies whether a specific agreement was concluded before or after the United Nations Convention on the Laws of

¹⁸⁵ It could be that effective measures at home might cancel the need for any international measures. The aforementioned “managerial perspective” does not directly address institutional design issues, so I am drawing a hypothesis based on the implications of the managerial thesis.

¹⁸⁶ The data reference year is 2002; I checked later for endogeneity in order to examine whether global monitoring institutions in turn affected government effectiveness. It is unlikely but possible that global measures may enhance a national government’s effectiveness.

¹⁸⁷ <http://info.worldbank.org/governance/kkz2005/pdf/ge.pdf>

¹⁸⁸ ESI codebook

¹⁸⁹ Ideally, the kind of species (turtles, tunas, salmon, seals, whales, or dolphins) should be controlled, as different species could pose different problems for fisheries management depending on their mobility or attached commercial values. Seals can be found on the coastal line whereas straddling stocks create more complex situation, which could create more contentious policy processes due to their distributive implications.

the Sea Agreement (UNCLOS) of 1982. The number of countries is included because of the concern that a smaller number of countries may be conducive to easier bargaining. To control for the size-effect in collective action, I include the number of state parties to each agreement in the sample. The UNCLOS variable is included to address the concern that the global regime that specified the EEZ regime may have impacted the kinds of arrangements considered on the regional level. As discussed before, this variable is helpful when examining the interaction between global and regional regimes, specifically when assessing whether a change in the global regime drove a change in the regional setting as well.

Table 4.4 Summary of Variables

<i>Variable</i>	<i>Source</i>	<i>Note (reference year, scale, etc.)</i>
Dependent variable		
Aggregate measure of monitoring institutions	Author	4 point scale of centralization of monitoring institutions for each agreement in the sample
Independent variables		
Asymmetry of Fishing-related Employment	Earthtrends	Percentage of population employed in fishing and aquaculture
Average of Productivity Overfishing	ESI	Average for 1993-1998; 7-point scale
Polity Asymmetry	Polity IV	Standard deviation of policy scores among member countries in an agreement
Average of Scientific Knowledge Creation	ESI	Ranked score of 1-74 the publication of scientific knowledge in the top-rated peer-reviewed journals in the fields of environmental science, technology, and policy; Available only 1970, 1980, and 1990 ¹⁹⁰
Average of Government Effectiveness	ESI	Standardized score (z-score) with high values corresponding to high levels of effectiveness; Average of government effectiveness scores of member countries; Reference year: 2002
Control Variables		
Number of Membership United Nations Convention on the Laws of the Sea Agreement (UNCLOS)		Number of signatories to a given agreement Binary variable (0 for pre-UNCLOS, 1 for post-UNCLOS)

¹⁹⁰ I recoded such that pre-1975 measures use 1970 measure, 1975-85 use 1980 measure, 1985-95 use 1990 measure.

Results of Empirical Analysis of Regional Fisheries Agreements

To summarize, the sample considered here consists of seventy-three regional fisheries agreements, each with its own member characteristics or agreement features, as summarized in Table 4.4. The main unit of analysis is therefore a regional fisheries agreement. Based on the theoretical framework, member characteristics might include differences in the size of the fishing industry, political regime type, and environmental conditions contributing to overfishing. Additionally, I include two variables to estimate the effect of epistemic community and of national governmental capacity on the institutional arrangements on the international level.

The dependent variable is an ordered – multiple and ranked discrete variable, so I use the estimation method of ordered probit. Table 4.5 provides the estimation results of two ordered probit models of institutional choice. The results suggest that greater asymmetry in fishing industries among member countries, higher polity scores, and higher levels of overfishing are all associated with decreased centralization of monitoring institutions.

Table 4.5 Ordered Probit Results on the Choice of Monitoring Institutions in Regional Fisheries Agreements

	Model 1 Baseline Model	Model 2 Testing the influence of the global regime
Fishing Employment		
% of population in fishing and aquaculture industry (asymmetry among members)	-.496 ** (.233)	-.471 ** (.238)
Degree of overfishing (average among members)	-.649 *** (.246)	-.504* (.263)
Polity asymmetry	.169 * (.088)	.131 (.092)
Government effectiveness (average among members)	.035 (.248)	.097 (.257)
Knowledge creation (average among members)	-.044 ** (.021)	-.043** (.021)
UNCLOS		.423 (.347)
Number of member countries		.027 (.025)
cut 1	-5.389 (1.567)	-4.243 (1.727)
cut 2	-4.140 (1.523)	-2.959 (1.696)
cut 3	-2.052 (1.489)	-.840 (1.698)

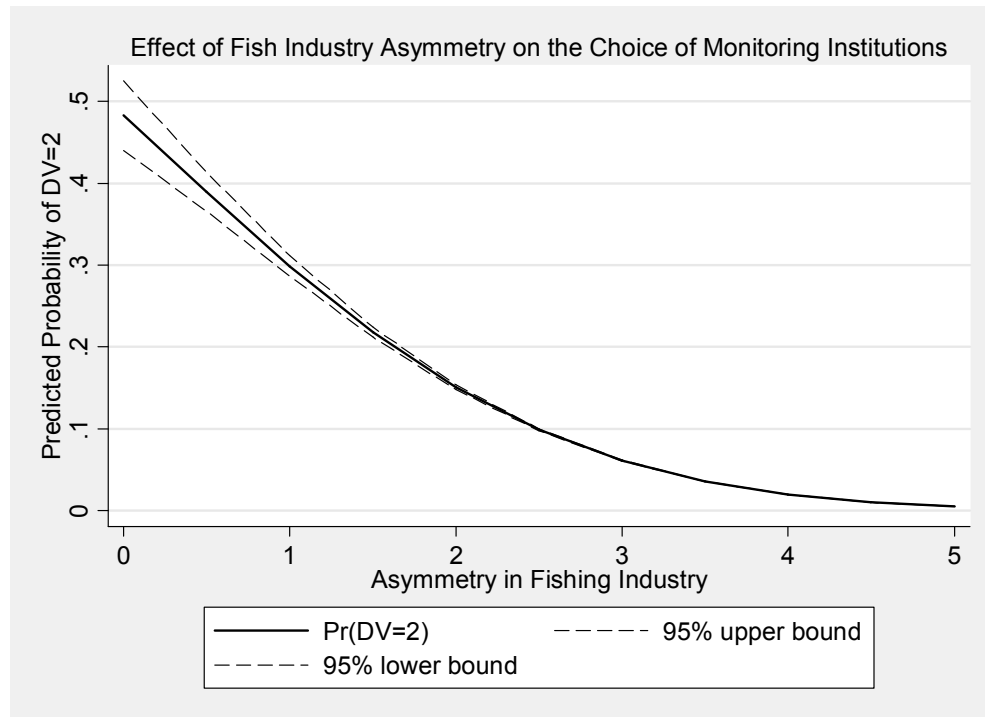
* p<0.10, **p<0.05, ***p<0.01. Robust standard errors are in parentheses.

The results generally support the theoretical discussions, and at the same time, yield interesting observations about the determinants driving the institutional choice of international monitoring systems in regional fisheries agreements.

The difference in domestic compliance environments, measured by the differences in fishing industries, decreases the probability that centralized monitoring systems will be adopted. Figure 4.1 shows the estimated effect of the asymmetry in fishing industries on the choice of international monitoring systems. As the asymmetry increases, the probability of a relatively centralized monitoring institution (Level 2, such as the combination of scientific body and commission) decreases. The effect is as large as

50%.¹⁹¹ This means that the asymmetry in compliance environments can reduce the probability of adopting a centralized monitoring institution by as much as half.

Figure 4.1 Predicted Probability of the Choice of Monitoring Institution According to Change in the Asymmetry in Fishing Industries among Member Countries



I return to the interpretation of other results presented in Table 4.5. The significantly negative sign for the degree of overfishing confirms our casual empirical observation that overfished nations are distant water fishing nations and therefore more likely to oppose stringent regulatory measures.

It also appears that the knowledge variable reflecting the idea of epistemic community has a negative impact on the adoption of a centralized monitoring institution on the international level. This is a curious result because epistemic community literature would predict that domestic scientific communities have a positive impact on the development of international institutions. The empirical result may suggest an opposite causal mechanism: efficient domestic epistemic communities may serve as sufficient governance mechanisms, and may reduce the perceived benefit deriving from additional

¹⁹¹ The effect is estimated holding other variables at their means and changing the value of the variable of interest, in this case, the asymmetry level in fishing industry, which ranges from zero to five.

regulatory and monitoring mechanisms. Depending on whether we view epistemic communities as substitutes or complements to international regulatory measures, the negative and marginally significant impact of epistemic community discovered in this study might produce a novel interpretation of the relationship between domestic epistemic communities and international regulations.

Finally, government effectiveness does not produce a statistically significant impact on the choice of monitoring systems on the international level. The UNCLOS variable was added to check whether global-level regulations changed the landscape for regional regulations, but the effect is statistically insignificant, although the positive sign means that the signing of the global convention may have had some positive impact on the development of the regional-level monitoring systems.

Summary and Further Research Directions

This chapter started with a puzzle: “Why do states not adopt information mechanisms on the international level in all agreements, if they are deemed beneficial?” I have presented a theory that highlights the distributional issues in establishing monitoring institutions in international fisheries management. I have argued that the sovereignty costs are not uniform across potential member countries. Differences in domestic compliance environments have negative effects on the establishment of monitoring bodies on the regional level, creating conflicts at the bargaining table. To examine this theoretical argument empirically, I have identified the relevant monitoring systems in fisheries management and tested the hypothesis against other prominent hypotheses, such as the epistemic community hypothesis and the so-called “managerial thesis.” The statistical analysis of seventy-three regional fisheries agreements largely supports the theoretical argument that differences in compliance environments tend to harm the development of a stringent international regulatory environment.

However, the results presented in this report should not be taken as conclusive evidence, due to the study’s limited sample size. The full sample, including the development of each lineage (international whaling, pacific salmon, etc.), will bring the present results into even sharper focus. A natural future research direction therefore

would be to examine the development and implementation of particular institutional structures for monitoring fisheries agreements. Some agreements develop scientific or other monitoring programs fairly quickly after the initial agreements are signed, while in other cases there is a lengthy delay. For example, the International Whaling Commission (IWC) instituted a formal mechanism comprising a scientific committee in 1954, almost ten years after the original agreement. The Commission is still struggling to conclude the Revised Management Scheme, which could include more conservative measures relating to the determination of quotas.¹⁹² The International Commission for the Conservation of Atlantic Tunas (ICCAT), on the other hand, developed their institutional structures for monitoring within a much shorter timeframe. Comparing the development of various agreements and attending institutions will provide a wealth of data that will, in turn, advance an examination of the political strategies and associated conditions that contribute to resolving political differences among member countries. In addition to tracing the development of various fisheries cases, the exact causal mechanisms that shape negotiations of regional fisheries agreements should also be carefully examined, not least to find out how states negotiate past their differences and how negotiators themselves perceive the political obstacles they face in establishing international regulatory measures.

¹⁹² Obertur, 1998

CHAPTER V

Monitoring Institutions in Arms Control Agreements

Monitoring mechanisms in international agreements are probably most studied in relation to arms control agreements, due to the experience of the Cold War. Although the workings of international supervisory mechanisms recently have been studied in other areas such as human rights, the arms control literature is by far the most extensive, with a large body of studies on issues such as international and domestic political environments.¹⁹³ The literature also includes the studies on the role of technology¹⁹⁴ in shaping the design of monitoring systems. The general conclusion from the literature has been that monitoring mechanisms should be commensurate with the associated security risks, and that technology has been a necessary but not a sufficient condition in predicting monitoring outcomes.¹⁹⁵

Building on the existing literature, this chapter tests the central theoretical implication regarding distributional conflicts in the context of arms control agreements governing weapons of mass destruction (WMD)—nuclear, chemical and biological weapons—as well as conventional weapons. More specifically, I will test the hypothesis that distributional concerns are the primary factor influencing the choice of monitoring institutions. The asymmetric security environments are likely to reduce the possibility of observing international monitoring measures and increase the adoption of domestic or equivalent measures. I define compliance environments in international security cooperation as the situations or circumstances that are related to compliance with international security agreements. Given the definition, I analyze how those security

¹⁹³ On international political environments, see Schelling 1960, and Schelling and Halperin 1961; on domestic political environments, see Morrow 1991 and Knopf 1998.

¹⁹⁴ Krass 1986, Tsipis et al. 1986, CISAC 2005.

¹⁹⁵ Krass 1986, for instance, discusses the interaction between politics and technology; Gallagher 2001 shows the independent roles of political factions.

environments affect the choice of monitoring systems. While testing the key hypothesis about the distributional conflicts surrounding the agreement-making, I will also qualitatively assess other secondary but related factors that may influence the choice of monitoring systems in arms control agreements, such as the role of side payments and the concern regarding different types of possible errors (false alarms and missed hits).

The international regulation of chemical, biological and nuclear weapons comprises the major part of security-related international agreements. Aside from peacekeeping arrangements and alliance agreements, arms control treaties make up most of the security agreements of the past fifty years, as listed in Table 5.1. Nuclear related agreements make up 47% of arms control agreements,¹⁹⁶ with other agreements addressing the issues of chemical, biological and conventional weapons.

Table 5.1 The Universe of International Security Agreements¹⁹⁷

UNTS subject list	Number of documents	Notes
Alliance	22	--
Disarmament	564	--
Nuclear matters	275	Many overlap with “energy” and “environment”
Peace	415	Many involve peacekeeping operations
Terrorism	38	--
War	962	Many related to “war reparations” and “war victims”
Weapons	582	Overlap with “military matters” and “disarmament”

The examination of weapons of mass destruction treaties and their monitoring mechanisms is important in the current security environment, especially in terms of understanding the possibilities and limitations of international cooperation in preventing the use of WMD by terrorists. This chapter will attempt to evaluate the scope of international monitoring (as opposed to domestic monitoring) based on structural factors described in the theoretical framework. Through the prism of history of arms control, the

¹⁹⁶ The United Nations Treaty Series (UNTS) agreement list only includes treaties registered with the UN, which as a result omits a large number of alliances listed in other places, such as ATOP (Alliance Treaty Obligations and Provisions, <http://atop.rice.edu/home>) whose dataset returns 220 post-WWII alliance agreements. The ATOP database includes non-binding agreements such as MOUs, Exchange of Letters, as well as binding agreements and other special types of agreements (both original and subsequent agreements). Although this calculation is based on the number of counts, the number reflects the attention given to the subject list since the majority of significant agreements subsequently include protocols and exchange of notes. [This last sentence is a bit unclear to me. Which “calculation” do you mean, and what do you mean by “the number of counts”? Can you rephrase these things?]

¹⁹⁷ This search was conducted on March 7, 2006 at <http://untreaty.un.org/English/access.asp>. I am assuming here that the number of agreements reflects the salience of the issue subject.

result of this study will shed light on the extent to which we can expect cooperation in building international monitoring systems in the near future.

In the context of arms control, monitoring encompasses various activities ranging from military data collection to on-site inspections.¹⁹⁸ Compliance-monitoring also includes control of the flow of information and the development of the relevant technical and political authorities. The determinants of the choice of monitoring systems have already received extensive attention in the literature, but to my knowledge, statistical evidence of the importance of distributional conflicts in shaping international agreements is presented here, in this dissertation, for the first time.

Conventional wisdom has it that treaty verification procedures have to be commensurate with the magnitude of the threat posed by the weapon or weapon types in question. If this hypothesis is true, we might expect similar monitoring and inspection regimes for biological and chemical weapons, given that they share the characteristics of being dual-use materials and carrying the risk of potential use by non-state actors.¹⁹⁹ However, the Biological Weapons Convention (BWC) contains no information mechanism, while the Chemical Weapons Convention (CWC) contains an advanced verification mechanism, with significant authority delegated to the Organization for the Prohibition of Chemical Weapons (OPCW). Additionally, we should recognize that treaties related to nuclear weapons have undergone a series of changes since 1967 with regard to monitoring institutions. It is generally true that weapons involving huge risks—such as nuclear weapons—generate considerable interest in and discussion about institutionalized international cooperation, yet such interest and discussion does not directly translate into concrete measures and agreements formally adopted by treaty members. In short, the magnitude of the risk of the weapon or weapons at issue is not enough to explain the choice of monitoring institutions in arms control agreements.

¹⁹⁸ Many arms control scholars distinguish monitoring from verification (Krass 1993 and Meyer 1984): monitoring is confined to information gathering activity while verification involves subjective evaluation of the collected data. My definition of monitoring is broader than their definition and includes verification processes, as explained in the introductory chapter. The analytical benefit of this broad definition is to examine the choice in a broader context at the expense of closely looking at the verification itself.

¹⁹⁹ Or some could even argue that the biological weapons create greater risk as they could be manufactured in a small setting while chemical weapons usually require industrial scale production capability. See Tucker 1998a for detailed differences between chemical and biological weapons.

This dissertation takes the view that the choice of monitoring institutions is a problem in a larger political and institutional context with interlocking problems of diagnosis and treatment for non-compliance. In terms of political context, I emphasize the political uncertainties states face in discussing arms control issues as well as the political situations where states do not react to non-compliance due to prohibitive cost of punishment. In terms of institutional context, I examine how monitoring arrangements are related to other legal provisions. The choice of monitoring institutions is a part of larger institutional building process and therefore invariably depends on the development of other institutional mechanisms or sub-institutions. I specifically point out that the flexibility allowed under international agreements causes some degree of uncertainty regarding violations and how these violations will be adjudged, punished, and/or remedied. Violations tend to produce some amount of legal and practical ambiguity and therefore create demand for expertise and/or for collectively made decisions under the auspices of international institutions. However, as is often the case in security agreements, member states typically may invoke military secrecy or national security reasons to obtain an exception or free pass. Such allowances for “strategic breakouts²⁰⁰” may hurt the institutional building process. The guarantee of flexibility may provide stability by making it easier to join, but the inclusion of flexibility may exclude or obstruct other institutional developments.

As Fearon (1998) suggests, issues of verification are a proxy issue in the scene of tough negotiations between involved parties. Krass (1986), an arms control expert, also mentions that concerns about verification are often expressed as surrogates for more substantive objections to agreements. These scholarly observations tell us that monitoring institutions have been developed in a larger institutional context where many competing factors are brought to bear. Monitoring may not be a crucial issue for all agreements, but even in those agreements where monitoring is of secondary importance or a by-product of high politics, it is a revealing issue that brings into focus political relationships among negotiators in the context of other negotiating items. The analysis presented in the next

²⁰⁰ See the use of the term in Becker 1977. Originally, the term was defined as a form of military buildup “breaking away” from an informal strategic accommodation in the context of SALT negotiation. Similarly, I refer to the situations in which states have overriding incentives to violate the spirit of the treaty, if not the letter of it.

section makes this point clear: the political characteristics and security relations of member countries are reflected on the choice of monitoring institutions. The choice also depends on how other negotiating items – such as technological transfers and allowance of strategic breakouts. The possibility of technological transfers often facilitates the adoption of monitoring systems by alleviating distributional problem. The allowance of strategic breakouts on the other hand aggravates the distributional problem and therefore discourages the adoption of international monitoring systems.

In the following paragraphs, I will explain in detail the model elements that are essential in the arms control context (information asymmetry, undeterrable violations, etc.) and show how these elements can be translated into the empirical analysis of distributional conflicts in the design of monitoring systems.

Background: Monitoring Arms Control

The theoretical model in Chapter 2 has identified four main elements in monitoring compliance with arms control agreements, which I explain one by one in the context of arms control, but these elements often operate interactively in empirical examples, as discussed below.

Table 5.2 The Elements of the Theoretical Model on Monitoring Design in Arms Control

Theoretical Element/ Variable	Empirical Parallel
α (alpha)	Incentive to defect
β (beta)	Risk due to other party's violation
ϵ (epsilon)	Possibility of strategic breakouts which may cause uncertainty
q and r	Monitoring errors (false alarms and missed hits)

First Determinant: Incentive to Defect

The first determinant of monitoring systems is the magnitude of incentive to defect. It is the job of any monitoring system to stave off incentives to defect. In this sense, the key to controlling incentives to defect is to set up a system that will deter future violations. This deterrent capability is difficult to acquire in many cases and therefore, in

some cases, states may be allowed some flexibility to defect occasionally in international agreements. Some state behaviors can thus be compliant but not fully cooperative.

The upside of flexibility is that it increases resilience to changing political developments by allowing states to retain their policy autonomy. On the other hand, it can create uncertainty when occasional defections occur, creating demand for information about whether defections constitute violations against international obligations. The flexibility creates legal doubts as to whether some state behaviors are in accordance with international obligations and, at the same time, leaves practical ambiguity as to how states respond to each other. Intelligence gathered by member states through their own domestic institutions might in some cases satisfy this demand. However, the detection and assessment of defections often require some amount of expertise and experience in such matters, which national intelligence-gathering institutions may lack, and detection may depend on access to foreign sites, documents, and personnel. The latter issue weighs more in the adoption of international monitoring bodies since intelligence invariably involves judgment both on the national and international level. Furthermore, findings by independent international institutions typically have less bias as the inspection teams are carefully selected from the pool of diverse nationalities. The decisions usually carry a higher level of legitimacy, as the findings are approved by the relevant parties. For instance, the Board of Directors within the IAEA, composed of 35 Member States, as designated and elected by the General Conference, make resolutions based on the findings of the IAEA inspectorate, by a two-thirds majority of the Members present and voting.²⁰¹ All these factors contribute to the decision to constitute international bodies for monitoring to cater the needs to tame incentives to defect.

The magnitude of incentive to defect is a powerful determinant of monitoring choice because one of the goals of monitoring is to reduce the level of defections. States may have strong incentives to institute monitoring systems when defection incentives are large. Incentive to defect however is not a sufficient condition to observe an international monitoring body because differences among member states could discourage such

²⁰¹ IAEA, "Rules and Procedures of the Board of Governors" Accessed 10/13/07 at <http://www.iaea.org/About/Policy/Board/bgrules1.html>

institutional building process even with large defection incentives. Countries may opt for unilateral moves rather than following the advice of international monitoring bodies.

Second Determinant: Risk

The central concern of arms control is the risk of other parties clandestinely engaging in efforts to upgrade or increase their weaponry. The concept of risk and risk-assessment is therefore at the heart of arms control debates, as Stephen Meyer puts it cogently: “Is the military and political threat posed by undetected cheating greater than the military and political threat posed by unconstrained military activity?”²⁰² This risk is amplified when states try to act unilaterally, producing security dilemma situations.²⁰³ Monitoring systems in part reduce these risks by accumulating positive evidence that compliance has occurred and ultimately by building confidence among actors. In addition to accurate positive signals of compliance, accurate signals of cheating also plays an important role in inducing countries to join international efforts to monitor potential cheaters.

Risk is a part of the design of monitoring systems because how risk is distributed may affect the dynamics of negotiation. Countries with a high level of military risk stemming from violations will have different preferences for monitoring systems than countries with a lower level of risk. The former may prefer a system with a deterrent capability, while the latter may prefer a less sensitive system. In this way, preferences are linked to each country’s concerns regarding the types of error that different monitoring systems could entail.

Third Determinant: Monitoring Errors & Types of Error

Monitoring in the arms control context is a balancing act between reducing the incidence of false accusations and increasing detection rates. If a system is designed to deter violations, it risks being too sensitive and therefore is prone to produce false

²⁰² Meyer 1984, p.126

²⁰³ Jervis 1978

accusations. By contrast, if the system is attuned to avoid false accusations, it may miss opportunities to detect violations. The theoretical chapter characterized an equilibrium where a monitoring agency focuses on its capacity to deter violations in normal circumstances. The second priority was to correctly identify special circumstances to reduce the possibility of unnecessary punishments. This equilibrium feature is consistent with the concept of “adequate violation” propounded by the Nixon and Carter Administrations. The dominant thinking at that time was that, as long as significant military actions (that could alter the strategic balance) are detected, other violations might go unnoticed.

Concerns regarding types of errors have been analyzed elsewhere,²⁰⁴ but how these errors influence the choice of monitoring institutions has not been fully examined. The error types are important not only for determining the technological capabilities of monitoring systems, but also for drawing out political implications and predicting what negotiating positions will be adopted in the expectation of future cooperation.

Types of errors are different across issue areas and therefore have different implications for the choice of monitoring systems. Some nuclear safeguards agreements allow “managed access” and afford some room for manipulation to the inspectee, who may, for example, determine at what particular times inspection visits will take place. Such safeguard systems raise the risk of missing potential violations. Due to potential “hidden information,” the deterrent value of inspections under a “managed access” regime is not large. This design for monitoring systems is optimized to reduce false alarms. Although it may do its best to detect potential violations, the managed access can easily produce a cat-and-mouse game. The longer it takes to develop a certain weapon, the more such a system with managed access is likely to be established. When such weapons present difficulty of detection, parties weigh more on preventing frivolous accusations than on instituting perfect deterrence. However, if parties discover the footprint²⁰⁵ of a secret program of a country, this will prompt the parties to weigh in reducing the type of error that could reduce the possibility of non-compliance.

²⁰⁴ See Axelrod 1979, Meyer 1984, and Schelling 1985. See Carpenter and Ting 2005 on the types of errors in the domestic regulatory setting.

²⁰⁵ In this context, footprint is defined as the outline of area –usually spotted by satellites—where hazardous substances are suspected or known to exist

This act of balancing two types of errors is illustrated by the recent change in the safeguard systems of the International Atomic Energy Agency (IAEA), the UN's nuclear watchdog. The IAEA currently advocates the signing of Additional Protocols appended to comprehensive safeguards agreements,²⁰⁶ which allow access to non-declared as well as declared materials and facilitate short-notice inspections.²⁰⁷ The history of the IAEA illustrates the move from the system that correctly identifies violations in declared materials to the one that purports to cover undeclared materials and increase the chance of potential violations.

The IAEA's safeguards system precedes its cornerstone agreement, the Nuclear Non-proliferation Treaty (NPT). The IAEA, created in 1957, established its first safeguards system in 1961,²⁰⁸ which was revised subsequently in 1965 and 1968 with the NPT.²⁰⁹ The NPT established a comprehensive safeguards system wherein member countries are required to submit their nuclear facilities to the IAEA's safeguards.²¹⁰ The principal aim of the comprehensive safeguards system was to verify peaceful nuclear activities, and the system included such procedures as routine inspections of declared nuclear materials and nuclear related activities,²¹¹ and safeguards visits to check the nuclear cycle.²¹² Since 1968, the member states have concluded bilateral safeguards agreements with the IAEA.

The Zangger Committee of 1971-74 (group of 15 states) established export guidelines, including a "trigger list" of nuclear materials that could be easily diverted to a nuclear program, but the effort did not involve any inspection system and was restricted

²⁰⁶ Fearon 2005, in his report to global task force, also proposes the signing of APs as one of the immediate measures for effective international monitoring and control of WMD.

²⁰⁷ IAEA 2005

²⁰⁸ Federation of American Scientists (FAS) <http://www.fas.org/nuke/control/npt/chron.htm> accessed February 8, 2006; referred as *FAS Chronology* below.

²⁰⁹ Additional provisions to safeguard nuclear material in conversion and fabrication plants. *FAS Chronology*

²¹⁰ Both NWS and NNWS have signed the comprehensive agreement (for the status of the signature, see http://www.iaea.org/OurWork/SV/Safeguards/sg_protocol.html), although the scope of inspections may differ. Nuclear weapons states voluntarily accepted some IAEA monitoring, either on certain civilian nuclear installations or on material or equipment imported from other NPT states (Spector 2002).

²¹¹ Based on material accountancy

²¹² For other activities under the comprehensive safeguards system, see IAEA Factsheet: IAEA Safeguards Overview: Comprehensive Safeguards Agreements and Additional Protocols, available at http://www.iaea.org/Publications/Factsheets/English/sg_overview.html

to reporting.²¹³ Throughout the initial Review Conferences (2nd, 3rd, and 4th), member states expressed their satisfaction with the system, and the potential change in the inspection systems was not entirely separate from the distributional conflicts between nuclear weapon states (NWS) and non-nuclear weapon states (NNWS).

The major breakthrough came in 1997 when the IAEA Board of Governors approved the model of the Additional Protocol (AP) to be added to the existing Comprehensive Safeguards Agreements. The AP included such measures as

- access to declared as well as non-declared materials
- use of remotely operating surveillance systems
- mechanisms to facilitate short-notice inspections

Thus far, 128 countries have signed the AP, and the IAEA is in the process of concluding the AP with remaining NPT members to supplement its comprehensive safeguards system. The monitoring of published sites has not been truly comprehensive or ad hoc, as the cases of Iraq and North Korea showed, but this move will advance the IAEA safeguards system from a conservative system aimed at reducing false accusations to a system that is equipped with meaningful tools to detect violations.

The development of the International Atomic Energy Agency (IAEA) shows that monitoring systems do not necessarily achieve their full deterrent capability right away at the initial design stage; a verification equilibrium may only be reached after a series of step-by-step changes. The scope of IAEA investigation under the comprehensive safeguard agreement has been restricted to declared facilities, which at best prevents the diversion of declared materials only. The previous safeguard system was limited to deterring clandestine violations and was not sufficient to verify whether the member country in question abides by the NPT obligations. The new safeguards of the Additional Protocol (AP) establish agreements to allow inspections of undeclared facilities as well, which may facilitate the detection of many common violations. Instead of aiming to develop a deterrent capability upfront, the NPT safeguards system was developed first to reduce false positives with only a limited capability to deter, and then gradually to incorporate more and more deterrent capability measures. To interpret this development according to the framework of Koremenos (2001)'s learning model, states dealt with the

²¹³ Zangger committee memo (IAEA document INFCIRC/209, dated September 3, 1974): *FAS Chronology*.

uncertainty about inspecting declared materials and then renegotiated the agreement to include the inspection of undeclared materials.

The IAEA's budget allocation numbers show that the majority of the organization's funding is targeted toward not missing any potential violations among declared materials. In the reported IAEA budget in Table 5.3, verification activities make up one third of the organization's annual budget (\$268 million in 2004), totaling approximately € 100m. Verification activities are undertaken to ensure that violations do not go unnoticed within the scope of declared materials. Other activities—nuclear safety and security, nuclear techniques for development and environmental protection—are to ensure peaceful use of nuclear technology with the primary aim of avoiding false alarms.

Table 5.3 IAEA Budget²¹⁴

Regular Budget 2006	Euro
Nuclear Power, Fuel Cycle and Nuclear Science	26, 679, 000
Nuclear Techniques for Development and Environmental Protection	30, 436, 000
<i>Nuclear Safety and Security</i>	<i>22, 272, 000</i>
<i>Nuclear Verification</i>	<i>106, 336, 000</i>
Information Support Services	15, 992, 000
Management of Technical Co-operation for Development	15, 396, 000
Policy and General Management	51, 259, 000
Subtotal	268, 370, 000
Special Appropriation for Security Enhancements	2, 430, 000
Subtotal Agency Programs	270, 800, 000
Reimbursable Work for Others	2, 819, 000
TOTAL	273, 619, 000

In the case of biological weapons, even though states watch out for telltale signs to detect biological proliferation (for instance, the burial of dead animals from tests, advanced air filtration equipment, and so on),²¹⁵ surveillance measures can still fail to detect violations. Some apparent evidence of violations can be caused by natural forces, and this in turn can produce the risk of erroneously identifying non-violations as violations.

²¹⁴ Source: <http://www.iaea.org/About/budget.html>, emphasis added by the author.

²¹⁵ See Smithson 1998 for further discussion of identifying signs of violation.

The difficulty of investigation is illustrated by the allegation of biological warfare in China and Korea, 1951-52 and the resulting work of the International Scientific Commission (ISC) for the Investigation of the Facts concerning Bacterial Warfare in Korea and China.²¹⁶ North Korea and China alleged that the US had waged “germ warfare” and the multilateral investigation team of six nations, including Sweden, France, UK, Italy, Brazil and USSR, was gathered to investigate the field in 1952. In the absence of knowledge about prior ecological conditions, the ISC acknowledged its difficulties in distinguishing between natural causation and military effects. US General Ridgeway rejected the North Korean and Chinese allegations, citing the confusion of military effects with seasonal epidemics.²¹⁷

Interestingly, different international investigation teams reached different conclusions.²¹⁸ The Association of Democratic Lawyers and the ISC reached similar conclusion whereas later organizations left the decision undecided.

Table 5.4
Investigation Teams and Related Judgments regarding the Allegations in Korea, 1951-2

Investigation team	Year	Composition	Conclusion
Council of the International Association of Democratic Lawyers	September 1951	Multilateral team of lawyers with nationalities of Austria, Italy, UK, France, China, Belgium, Brazil, and Poland	“the deliberate dispersion of flies and other insects artificially infected with bacteria...has been perpetrated by US forces in Korea”
International Scientific Commission	June – August 1952	Multilateral investigation team of scientists from six nations, including Sweden, France, UK, Italy, Brazil and USSR	“The peoples of Korea and China have indeed been the objective of bacteriological weapons... employed by units of the USA armed forces...” ²¹⁹
British National Committee of Science for Peace	1953		“complete scientific proof of the charges had not been given” ²²⁰
Report of the UN Secretary General on CBW	1969	The report signed by representatives of Canada, Czechoslovakia, Ethiopia, France, Hungary, India, Japan, Mexico, the Netherlands, Poland, Sweden, the UK, the USA and the USSR	“BW agents have never been used as weapons of war”

²¹⁶ SIPRI 1971, Vol 5. pp.238-58.

²¹⁷ SIPRI 1971, Vol 5. p.253

²¹⁸ Kelley in her study of election monitoring also demonstrates that the reports of various international monitoring bodies are not necessarily consistent.

²¹⁹ SIPRI 1971, p.240

²²⁰ SIPRI 1971, p.258

The method of investigation was confined to the examination of the reports supported by competent authorities, except the Association of Democratic Lawyers that conducted field interviews. China, non-UN member at that time, denied the access of the ICRC and WHO, citing their political bias. This case illustrates the challenge of harnessing divergent opinions in designing a monitoring system to deal with such often-intractable uncertainty. Some countries argue that cases like the aforementioned one are simply unverifiable, while others argue for trying rudimentary verification measures at least.

Signed in 1972, the Biological Weapons Convention (BWC) has come a long way before a consensus was reached to establish a verification system.²²¹ The original text of the BWC lacked formal mechanisms to monitor compliance. Over the course of two decades starting in 1980, five BWC Review Conferences were held mainly to discuss monitoring measures. A group of verification experts (VEREX) first established technical guidelines for the assessment of BWC verification measures, discussing such issues as surveillance by satellite and multilateral information sharing,²²² and then, between 1986 and 1991, the State Parties agreed upon confidence-building measures involving information and data exchanges.²²³ In 1994, the parties established an Ad Hoc Group (AHG) to deliberate on appropriate monitoring measures. However, the effort came to a halt in 2001 when the United States rejected the text proposed by the AHG. The US government position is that the BWC is essentially unverifiable and that, without special provisions, the treaty might have detrimental effects on US industry and bio-defense efforts.²²⁴ In this case, the expected failure of detection prevented an international treaty effort from reaching the stage of verification equilibrium.

The country positions about error types for the monitoring system reflect distributional conflicts. The difference in opinions during the negotiation of the BWC Review Conferences played an important role in the discussion of what type of

²²¹ As of June 2005, 155 states are parties to the Convention. For the list of state parties, see BWC/MSP/2005/MX/INF.5

²²² BWC/CONF.III/VEREX/4; see ACDA website for background <http://dosfan.lib.uic.edu/acda/factshee/wmd/bw/bwcover.htm>

²²³ United Nations Disarmament Yearbook 2003, Chapter II

²²⁴ See for instance the speech of John Bolton, then Under Secretary for Arms Control and International Security, at Tokyo America Center, titled "The U.S. Position on the Biological Weapons Convention: Combating the BW Threat" accessed at <http://www.state.gov/t/us/rm/13090.htm>

monitoring system state parties should adopt. As Tucker observed during the Ad Hoc Group discussion, members' uneven concern about the two kinds of possible monitoring error heavily influenced member states' views regarding the value of challenge inspections:

Those countries most concerned about pursuing violations (e.g. a majority of the Western states) favor a “red-light” approval mechanism, in which a majority or supermajority of the Executive Council (the governing body of the future BWC implementing organization) must vote to block a challenge inspection. Conversely, countries most concerned about preventing frivolous or abusive inspections (e.g. US, Russia, China, Iran, India, and Pakistan) favor a “green-light” mechanism, in which a majority or supermajority of the council must vote to authorize a challenge inspection.²²⁵

The details of desirable monitoring mechanisms were discussed in connection with different voting procedure for initiation of investigations, which reveals the different opinions of states depending upon their compliance environments. The supporters for “green-light approach” wanted to provide a check on frequent deterrents by way of giving the Council sufficient authority to authorize challenge inspections. On the other hand, the supporters of “red-light approach” with concerns for non-compliance wanted to reduce the role of the Council and consequently a strong Protocol. Coupled with the unverifiability argument put forward by the US, the differences in opinions are unlikely to be resolved soon.

Both biological and nuclear weapons treaty regimes show that the balance between two kinds of errors and different standards of accuracy has been a central issue of contention. Some parties prefer a system with adequate detection capability, while others try to delegate investigative power as little as possible. Conflicts over what constitutes an adequate monitoring system, together with arguments about unverifiability, ultimately brought down the treaty, in the case of the biological weapons convention. In other cases, as the NPT case shows, institutions slowly developed into systems that can sound alarms when necessary.

Fourth Determinant: Uncertainty and Undeterrable Violations

²²⁵ Tucker 1998b, parentheses added by this author for readers' reference. The information on country positions come from Littlewood 2005, p.126-8.

This subsection discusses various kinds of uncertainty in the arena of arms control and explains how uncertainty about certain violations generates a demand for information and why the demand may be undercut by a situation where parties allow themselves the leeway to commit occasional violations. I intend to show that one of the main determinants of the choice of monitoring arrangements is the scope and strictness of the treaty at hand (what is allowable and what is not) and the attending distributional conflicts.

Uncertainties in the arms control context are of many kinds. Uncertainty about capabilities, uncertainty about intentions, and uncertainty about behaviors are all part of the calculations that go into strategic cooperation.²²⁶ Uncertainty about intentions is the most difficult to gauge as it involves interpreting the actions and mindsets of foreign policy decision-makers. When violations are detected, the leadership has to decide whether the violation was flagrant and deliberate or was due to extenuating circumstances. Judgments regarding the sources and consequence of violations produce decisions about how to respond to such violations. If the violation is not going to have much effect on the future compliance behavior of the other party, or if punishments are prohibitively costly, leaders may opt not to pursue punishment. In fact, these conditions are often written into international agreements, much as they are in many insurance policies, to protect states in cases where they can point to extraordinary or extenuating circumstances. These provisions are called “flexible provisions.” Although tacit bargaining is usually recognized as a robust response to arms control situations,²²⁷ there exist some situations where states do not and cannot use the treaty in question to obtain redress for a particular violation.

The inclusion of flexibility provisions may produce ambiguous situations and may give other parties an incentive to claim such cases even when they can and should simply comply with the agreement. Adversaries may pretend that an undeterrable violation happened when in fact the violation was deterrable. This excuse may be put forward

²²⁶ For more discussion on the kinds of uncertainty for other areas in international cooperation, see Koremenos et al. 2001

²²⁷ Downs and Rocke 1990.

when a state believes that there is a chance it will go unpunished.²²⁸ Consider, for example, the following incident where Egypt made such excuses:

The International Atomic Energy Agency (IAEA) reports that it has found evidence of past clandestine nuclear activities in Egypt. According to the statement from an IAEA diplomat, Egypt allegedly attempted to produce a number of uranium components and failed to declare its activities to the UN agency, as required by the nuclear Non-proliferation Treaty. *Egyptian officials emphasize that these activities were solely for peaceful purposes and refute any military applications.*²²⁹

Similar excuses may be found in North Korea's withdrawal statement²³⁰ on January 10, 2003 and Iran's repeated official claims.²³¹

The possibility of such strategic breakouts, and their potential impact on the design of monitoring systems, is therefore an important element to consider. Monitoring systems are built to reduce uncertainty, and uncertainty about the sources of non-compliance often leaves adversaries puzzled and undecided about future actions. Informational demands may stop when uncertainty starts to disappear and when one state has to allow more strategic breakouts to the other state. This problem is most acute when the strategic environments of two or more member states are asymmetric or very different. This in turn suggests that asymmetric compliance environments among member states are likely to make states more likely to opt for a more decentralized system, where international regulatory mechanisms are deemed unnecessary or undesirable. As the Biological Weapons Convention (BWC) case shows, when the plan to strengthen the treaty does not work due to the differences in compliance environments, states are more likely to choose national implementation as a default option.

Industrial concerns may also inhibit cooperation by giving states opportunities to make excuses for their national political circumstances. The thorniest issue in the

²²⁸ It is interesting to compare the following cases (North Korea, Iran and Egypt) to the case of South Africa. South Africa was cautious of international pressures, so it decided to neither acknowledge nor deny its nuclear capability. Only after South Africa joined the NPT as a non-nuclear weapon state in 1991, its President F.W. de Klerk announced that South Africa had a nuclear weapons program (Masiza 1993).

²²⁹ NTI, WMD 411 Chronology, 2005. http://www.nti.org/f_wmd411/2005.html, emphasis added by the author.

²³⁰ "a dangerous situation where our nation's sovereignty and our state's security are being seriously violated is prevailing on the Korean Peninsula due to the US vicious hostile policy towards the DPRK." <http://cns.miis.edu/research/korea/nptstate.htm>

²³¹ Iran's official claim is that it plans to produce 7,000 megawatts (MW) of nuclear energy by 2020 in order to meet future energy demands, which requires the presence of all elements of the nuclear fuel cycle (Bowen 2005).

negotiation of the Biological Weapons Convention (BWC) was concern for proprietary information on the part of the pharmaceutical industry and biotechnology firms. Information related to biotechnology has been jealously guarded by the pharmaceutical industry and biotechnology firms, and since these companies constitute one of the most rapidly growing and most profitable sectors of the economy, they exercise increasing political power. In response to industry pressures, the current Bush administration did not approve any expansion of the BWC monitoring regime.²³² The Clinton administration had reviewed the policy proposals favorably but failed to establish any effective monitoring mechanism.

The possibility of strategic breakouts is further complicated by the problem of dual use for most of controlled weaponry. Since WMDs are both offensive and defensive, and since relevant technologies are used both in industry and in the military, they leave considerable room for the claim of undeterrable violations. The NPT allows peaceful uses of nuclear energy, but a nation can exploit this provision as a loophole and enrich uranium to the point where it becomes weapons-grade uranium, as in the case of Iran or North Korea.

The phrase “Atoms for Peace”²³³ clearly captures, in a nutshell, the uncertainty surrounding many compliance problems in the nuclear nonproliferation regime and highlights the technical dimension of undeterrable violations. The dual use of nuclear technology – for energy (the primary peaceful use of nuclear technology) and for weapons – generates an informational problem with regard to undeterrable violations: if a state restricts the IAEA’s access and shows a tendency to develop more nuclear sites, does this signal an outright violation or might this be evidence of innocent efforts expand its nuclear energy program? The nuclear cycle of enriching uranium to a fuel- or weapons-grade makes it difficult to draw a sharp borderline between peaceful and dangerous uses.²³⁴

²³² See Winzski 2006 for her narrative tracking down the influence of the biotech and pharmaceutical industries on the development of the BWC regime.

²³³ First devised by Dwight Eisenhower’s landmark speech to the UN General Assembly on 8 December 1953; also see Carter 2004.

²³⁴ Despite nuclear detection technologies, this line between peaceful use and weapons development is not easy to see for outside monitors. See for reference, Sanger and Broad 2006; Quester 1973.

Similar problem of dual use has been apparent in the case of nuclear testing. The Treaty on underground Nuclear Explosions for Peaceful Purposes (PNE Treaty) allows nuclear tests for civilian purposes, such as the creation of canals, but under the treaty's provisions, similar tests actually conducted for military purposes can be declared to have a peaceful use, too. Between 1965 and 1988, the Soviet Union conducted 239 nuclear tests under a program called "Nuclear Explosions for the National Economy," and many of these tests were suspected of military use.²³⁵

In addition to dual use problems, evasion techniques also add to uncertainties and ambiguities, subjecting arms control agreements to almost endless problems and challenges. States can specify monitoring methods but there exists a possibility that the other party can develop evasion techniques to avoid other parties' monitoring. To cope with this kind of problem, states allow national technical means and explicitly write down non-interference of such measures. Due to this possibility of informational asymmetry, evasion techniques are taken into consideration in the design of monitoring institutions, as the intense discussion in the Carter Administration revealed during the negotiations for a Comprehensive Test Ban Treaty (CTBT) as to whether other countries could use evasion techniques to obstruct the verification process of underground tests.²³⁶

The concept of dual technology also opens up the possibility of non-state actors acquiring WMDs or their components without any straightforward way of ascertaining state responsibility. States, especially failed states, do not always have control over their population. The involvement of sub-state actors therefore opens the door to possibilities of undeterrable defections—compliance problems that cannot easily be arbitrated and punished to prevent future defections. Undeterrable violations that come from sub-state actors are usually not easily verifiable, and this unverifiability can be an obstacle to the establishment of monitoring systems, as the case of the Biological Weapons Convention aptly illustrates.

Informational asymmetry, for its part, is most worrisome to countries dealing with clandestine parties. In cases of closed societies, undeterrable violations are often

²³⁵ US State Department 1986. The report, taking into uncertainty, concludes that "A factor of two uncertainty means, for example, that a Soviet test for which we derive a 'central yield (yield corresponding to the level of nuclear test)' value of 150 kt may have, with a 95% probability, a yield as high as 300 kt or as low as 75 kt."

²³⁶ Krass 1986, p.133.

extremely difficult to judge,²³⁷ and democracies are more likely to be informationally poor about what happens in closed societies. Throughout the Cold War, US government sources—including annual reports from the Defense Department, posture statements of the Joint Chiefs of Staff, Congressional hearings, etc.²³⁸—have been open to the public, but the Soviet system was not open, which compounded the problem of judgment. This information asymmetry between the US and the Soviet Union was a central reason behind the US's determination to establish a verifiable monitoring process in many arms control negotiations.

Together with informational asymmetry in intelligence capabilities and the possibility of dual uses, the informational asymmetry that often exists between countries is easily translated into distributional conflicts. Some type of international body with expertise and with the ability to gather and publish new facts, and then arbitrate violations and disputes, can often help the situation, but such an organization cannot be the remedy if the asymmetry between countries is large and commitment problems overwhelms potential informational benefit. States weigh the available monitoring options,²³⁹ but when externalities are large, they themselves have to regulate the weapons and weapon-making materials collectively. Uncertainties posed by dual-use materials that can be used both for peaceful and military purposes can create distributional consequences. Countries that have a lot of proprietary information of commercial value, and therefore have concerns about intellectual property theft, are likely to object to international measures unless they are guaranteed some other mechanisms to protect the sensitive information. Monitoring institutions are in this way designed to be mindful of these uncertainties and responses to undeterrable violations.

Theory of Distributional Conflicts in the Context of Arms Control Agreements

Among the four determinants of the monitoring design introduced in this chapter, I mainly focus on potential distributional conflicts stemming from uncertainty about compliance environments. This has an important implication for the design of monitoring

²³⁷ This fact is supported by the finding of Rosendorff and Vreeland 2006 who show that democracies tend to be more open.

²³⁸ Krass 1986, p.128.

²³⁹ Dai 2002.

systems in international agreements. Different security environments may generate informational demands, but these demands may in turn also be undercut by the asymmetry among member states.

The theoretical model introduced in Chapter 2 demonstrated the existence of distributional conflicts in the choice of monitoring systems, while demonstrating the importance of the traditional roles of verification, that is, confidence-building and assurance functions. A country with poor domestic political conditions that are not favorable to compliance with international obligations is generally discouraged from adopting a monitoring system, though it might be persuaded to support such a system if the scope of the treaty in question is restricted to some extent, affording it some guarantee of sovereign escapes. However, these adjustments will in turn reduce the incentive for other parties to support a delegated monitoring system. The flexibility afforded to country A, if excessive, erodes the support of other parties for the development of monitoring systems.

A casual look at the history of arms control treaties illustrates the impact of distributional conflicts on monitoring systems each treaty embodies. Treaties with few distributional consequences, such as the Antarctic Treaty, the Outer Space Treaty, and the Sea Bed Treaty, include provisions for unlimited on-site inspection by any party. Those treaties carry limited political significance and present few distributional consequences. On the other hand, many nuclear weapons related agreements, such as the Limited Test Ban Treaty (LTBT) and the Strategic Arms Limitation Talks (SALT), witnessed protracted negotiations with much acrimonious debate about monitoring systems.

The focus on distributional consequences in the arms control context has been empirically suggested and tested elsewhere, although the statistical analysis of monitoring in arms control agreements is new in this dissertation. Knopf (1998) shows how nuclear parity leads to the acceptance of arms control agreements between the United States and the Soviet Union. In his time series analysis, Brown (2006) demonstrates that the heterogeneity of preferences preceded retractions of the delegation of monitoring authority to international organizations in the agreements governing

WMD.²⁴⁰ In a somewhat different arena of international security, namely peacekeeping observation missions, Fortna (2004) also finds similar effects of the heterogeneity of warring parties on the acceptance of international observation missions. Specifically, her analysis of 45 peacekeeping deployment cases shows that peacekeepers are more likely to be allowed when the capabilities of warring parties are roughly equal. All three literatures present a similar finding, that is, heterogeneity among participants reduces the acceptance of international third parties.

Unlike previous studies, this dissertation has theorized a potential mechanism whereby distributional conflicts are created by the scope of a specific agreement. Empirically, the terms of agreements depend on the composition of compliance environments of member countries. States encounter unforeseen events of profitable yet legitimate treaty violations in the course of future cooperation. These events suggest that what is left out of a treaty can sometimes be more important than what has been included. For example, the US maintained its strategic superiority by reserving the right to multiple independently targetable reentry vehicles (MIRV) in the negotiations for the Strategic Arms Limitation Talks (SALT). As these cases suggest, countries often set aside difficult issues or register reservations and understandings that stipulate when a signed treaty will apply or not apply. In many cases, the contract cannot be complete and may miss some contingencies. The existence of such flexible provisions can restrict the scope of cooperation and limit the development of a monitoring system when the asymmetry among member states is large.

The reason why unfavorable compliance environments become an obstacle to the choice of monitoring institutions stems from the combination of information and commitment problems that hamper international cooperation. Informational problems, or the uncertainty about the political contexts of violations, are at the heart of the design of

²⁴⁰ Note the difference in dependent variable. Knopf focuses on the conclusion of arms control agreements while Brown focuses on the issue of delegation. Although my dependent variable is close to Brown's, the independent variable is different from his. Brown draws his independent variable from voting patterns in the resolutions related to WMD, essentially estimating the positions of each country. In contrast, my independent variable asks where the preference comes from. The model shows that the sources of preferences reside in domestic and international political conditions, and therefore, I use proxies rather than using direct preferences. This way, the theoretical mechanism can be more closely tested. Also, I can avoid the problem of endogeneity where the preference for delegation is estimated from the preference for broader institutional arrangements.

monitoring institutions. Compliance environments, whether they are favorable or unfavorable, create uncertainty about the proper response of other member countries when country A commits a violation. If country A's compliance environment is unfavorable, other countries may leave room for immunity, and when a violation is not deterrable, other countries are in any case better off not punishing that violation.

Facing this kind of uncertainty, as neoliberal institutionalism predicts, a third party monitoring arrangement brings with it potential benefits for all parties up to a certain point. However, in order to solve the informational problem and benefit all parties, certain conditions must exist and those requirements may be restrictive in many cases. First, the technological requirements of predicting violations correctly need to be satisfied.²⁴¹ Second, compliance environments must not be disparate among potential member countries. The value of a third-party monitoring body declines as the differences among member states loom large. This is due to the problem of low commitment stemming from unfavorable compliance environments for a certain number of state parties. Unfavorable compliance environments often generate practically and legally excusable violations, and extremely different environments that affect cooperation behaviors therefore render monitoring useless. In short, a low level of commitment discourages the development of monitoring institutions. The inclusion of flexibility provisions is therefore worrisome, as it may discourage other institutional developments, such as tools for compliance monitoring.

In what follows, I briefly discuss the role of side payments as potential solution to the problem in the following section and then examine the statistical evidence of distributional conflicts in the design of monitoring institutions in arms control agreements.

Role of Side Payments

The offer of side payments is one way to solve distributional problems. Side payments in the arms control context consist of technical assistance/transfers or the

²⁴¹ The range of parameter values of q and r (monitoring accuracy) is not wide. q should be high—about .8—and r should be higher than .6 to support verification equilibrium.

provision of security guarantees, such as a nuclear umbrella. Along with other political considerations, side payments also play a role as a determinant of monitoring institutions, although side payments are not used exclusively for establishing monitoring institutions.

Take the example of the establishment of the Organization for the Prohibition of Chemical Weapons (OPCW). The agreement to control chemical weapons provided carrots to the membership by promising technological assistance and lifting previous restrictions on export controls. The club of thirty-four developed countries called the Australia Group (AG) had restricted the trade in chemical precursors before the negotiation, which made the developing nations reluctant to accept a verification regime for fear that it would further restrict their development of chemicals for civilian use.²⁴² Allaying the fear of developing countries, the deal was struck to do away with previous restrictions on export controls and allow limited technological transfers for peaceful purposes among state parties according to the list of schedules.²⁴³

In contrast, the discussion of similar arrangements for side payments can also be found in the negotiations of the Biological Weapons Convention (BWC) but with no success. Developing countries wanted to tie compliance mechanisms to technical assistance, trying to derive some form of economic benefit from security issues. However, states facing threats from biological weapons including the United States did not want to establish a strong connection between technical assistance and compliance measures.²⁴⁴ Rather, those countries preferred mild measures to assist implementation of the Convention in lieu of technological transfers. They wanted to retain propriety information of the fast-developing biological research and did not want to open up the possibility that other countries (dangerous countries in particular) use the critical information for any development of biological weapons. As a result, other issues as well as this issue of side payments have been an obstacle to the implementation of the BWC, leaving it as a toothless convention thus far.

In the area of nuclear nonproliferation, there is also evidence of linkage between monitoring systems and side payments in the form of technological assistance and the

²⁴² See Shah 2001 for the positions of developing and developed nations during the CWC negotiation. The author led the Indian Delegation to the Conference on Disarmament.

²⁴³ See Feakes 2001 on the implementation of CWC export controls.

²⁴⁴ Tucker 1998a.

provision of nuclear umbrella. During the Nuclear Nonproliferation Treaty (NPT) negotiations (1965-68),²⁴⁵ the discussion about safeguards systems was inseparable from technology transfer in the field of nuclear energy. Non-nuclear Weapons States (NNWS) expressed their concerns about a potential technological disadvantage in developing their energy needs, and Nuclear-Weapon States (NWS) for their part focused on the need to ensure non-diversion of nuclear energy into nuclear weapons. Although both NNWS and NWS acknowledged the value of safeguards systems, the two camps differed on the language of the related provision, Article III.

The draft proposal of the United States explicitly linked technological assistance in the area of nuclear energy to safeguards systems, suggesting a compromise point between NWS and NNWS positions.²⁴⁶

1. Each of the non-nuclear states party to this treaty undertakes to accept International Atomic Energy Agency or similar safeguards on all of their nuclear activities.
2. Each of the states party to this treaty undertakes to provide a source of fissionable material, or specialized equipment or non-nuclear material for the processing or use of source or fissionable material or for the production of fissionable material, to other states for peaceful purposes only if such material and equipment will be subject to International Atomic Energy Agency or similar international safeguards.²⁴⁷

Under this agenda, NNWS were required to subject themselves to a safeguards system while NWS were under a partial safeguards system, with the condition of technological transfer. In this way, the series of technical assistance and safeguards agreements came together. Among the safeguards agreements registered with the IAEA, many follow the pattern of starting from a program of technical assistance and building toward a safeguards agreement. For example, Technical Assistance to Hungary was concluded between Hungary and the IAEA in July 1971 and was then followed by the Application of safeguards in connection with the Treaty on Non-Proliferation of Nuclear

²⁴⁵ For the recent distributional conflicts between NNWS and NWS, see Applegarth and Tyson 2005.

²⁴⁶ Reagan's Non-proliferation Policy of 1981 explicitly laid out the U.S. policy to "seek agreement on requiring IAEA safeguards on all nuclear activities in a NWS as a condition for any significant new nuclear supply commitment." This position was reaffirmed in 1983 when Reagan urged other countries to tie comprehensive safeguards to the supply nuclear energy or technical assistance. As a pioneer of this linkage deal between safeguards and peaceful nuclear use, the US has maintained the same policy since then.

²⁴⁷ Floor Statement for Senator John O. Pastore on Non-Proliferation of Nuclear Weapons, 9 March 1967. re-quoted from Kramish (1967, 3)

Weapons in March 1972.²⁴⁸ In conclusion, the examination of biological, chemical and nuclear weapons show that the side payments influenced the development of monitoring systems.

²⁴⁸ Agreements Registered with the International Atomic Energy Agency, Eleventh Edition (entries up to 1993), International Atomic Energy Agency, Vienna 1994.

Empirical Analysis of Arms Control Agreements

Having discussed the determinants of monitoring institutions, I now test my theoretical predictions about the extent to which different compliance environments affect states' monitoring choices by statistically analyzing post-WWII arms control agreements. The theory of distributional conflicts says that there is a demand for information provision, but such demand is conditioned by the level of commitment, which is in turn dependent upon the compliance environments states are in. The appropriate empirical strategy, then, is to find the sources of distributional conflicts in the arms control context and to connect them to the choice of monitoring systems. I first identify the categories of monitoring systems in arms control agreements and then discuss the measurement of a key explanatory variable that captures the distributional conflicts among member states, in addition to other control variables that may simultaneously affect the choice of monitoring systems.

Measurement of Dependent and Independent Variables

Dependent Variable: Monitoring Systems in Arms Control Agreements

I identify six categories of monitoring systems for arms control agreements: no system, notification and exchange of information, consultation, national technical means (NTM), on-site inspection, and establishment of international organizations.²⁴⁹ The dependent variable is a 6-point scale. If an agreement has none of the systems, it is coded as zero; if it involves one of the systems, then it is coded as 1; and so on. The coding procedure was such that several coders had sessions to match their codes²⁵⁰ and then the final code was double-checked with existing categorizations in Krass (1998)²⁵¹ and UNDIR & VERTIC (2003).²⁵²

²⁴⁹ See Crawford et al. 1987 for more detailed classification of monitoring institutions in arms control context.

²⁵⁰ Unfortunately, inter-coder reliability score could not be calculated as the coding scheme went through several changes during the research design.

²⁵¹ Krass 1986 provides the overview of major arms control monitoring systems up to 1982.

²⁵² UNDIR and Vertic 2003.

Table 5.5 Codes for Dependent Variable

Scale	Meaning	Frequency
0	No monitoring system	8
1	One system among notification and exchange of information, consultation, NTM, on-site inspection, or establishment of international organizations	12
2	Two systems among five monitoring systems	10
3	Three systems among five monitoring systems	10
4	Four systems among five monitoring systems	7
5	Five systems among five monitoring systems ²⁵³	1
Total		48

In this conception of delegation, the delegation level is additive. If an agreement employs two systems jointly, it is considered to involve more delegation than an agreement using just one system. The measurement approximately gets to the notion of the level of delegation because it measures how many various informational functions states are willing to write into international agreements. This aggregate measure of various monitoring systems is presumably the best measurement strategy given the small sample size. Retaining each category and running the multinomial analysis is not a viable option due to the small sample size.²⁵⁴ The construction of an ordinal variable is another feasible option, but the dependent variable cannot be exactly ordered in a substantively meaningful way. For instance, a system of notification and exchange of information does not necessarily involve a higher level of delegation than a system relying on national technical means.

As the goal of empirical analysis is to uncover the existence of distributional conflicts, the current aggregation measure serves the analytical purpose well. However, this measure is not without fault for it does not reflect the true extent of delegation. Two agreements that share the same level of delegation, when measured in terms of aggregate points, may be somewhat qualitatively different in some cases. For instance, according to the proposed method of aggregating the number of monitoring systems, Strategic Arms Limitation Talk (SALT) II and Environmental Modification Technique (ENMOD) both

²⁵³ This is Vienna Document of 1994. The following statistical results do not change even if this category is dropped.

²⁵⁴ Since multinomial analysis sub-divides the sample into the category of dependent variables and compares each pair of category, it uses up a lot of degrees of freedom.

receive the same number of points—namely, three—but one could arguably reason that the delegation levels are in fact qualitative different and that the monitoring system in the ENMOD involves more delegation than that in SALT II. The ENMOD involves consultation, on-site inspection, and establishment of international organizations, while SALT II includes notification and exchange of information, consultation, and national technical means. The measurement does not capture the more intricate or subtle details of particular inspection systems, either, primarily because inspection schemes are not created equal. Challenge and on-site inspections contribute to deterrent capability, whereas regular inspections are more aimed toward guaranteeing the peaceful use of nuclear materials, although they try to detect potential diversions. I try to remedy these problems by analyzing different kinds of dependent variables and checking the robustness of the results.

Independent Variables: Security Threats and Latent Capacity

The following empirical analysis aims to find systematic evidence of distributional conflicts in the design of monitoring arrangements in arms control agreements. The sources of unfavorable compliance environments are manifold. Countries can face unfavorable compliance environments either due to international or domestic political situations. In the previous chapter on regional fisheries agreements, I focused on political pressures from countries' domestic fishing industries. Looking at regional trade agreements, I analyzed the effect of protectionist pressures stemming from a large import penetration ratio. Both types of agreements are subject to domestic political and economic factors. In the arms control context, by contrast, international structural factors matter more, as the bottom-up policymaking influence is more or less restricted. This is not to say that arms control issues do not involve domestic political pressures²⁵⁵: international structural factors can often translate into domestic political pressures, as the rivalry between India and Pakistan changed domestic political opinions.

²⁵⁵ Several works show that domestic politics influences arms control decisions. Morrow (1991) for instance finds that domestic political and economic situations affected the bargaining postures of the United States and the Soviet Union during the arms control negotiation. Knopf (1998) finds the effect of domestic protest on arms control negotiation initiation.

The existing literature on arms control, and in particular the literature on nuclear proliferation, has identified two key factors that determine a country's decision to possess arms or start their production: opportunity and willingness.²⁵⁶ Opportunity mainly refers to a country's economic and technical weapons capacity, while willingness refers to the country's level of motivation, as influenced by its security environment, such as security threats from rivals. This opportunity-willingness framework is also applied to the design of monitoring systems because they are the proxies of security environments that could induce the compliance behavior of states. Willingness, in particular, affects compliance behavior more than opportunity does, although a high level of willingness does not necessarily entail a decision to proliferate. Given the current security environment of technological diffusion, opportunity as a pre-condition is prevalent: weapons capability is not difficult to develop if one desires. The motivation is the linchpin of the final decision of weapons-making.²⁵⁷

As emphasized in the theoretical chapter, states may not adhere to international obligations due to overriding political incentives, either domestic or international. This motivation to willingly violate the terms of agreements usually arises when foreign policymakers expect that the short term gains of non-cooperation will be large. Undeterrable violations can also occur inadvertently when states cannot control private actors effectively. Up to a certain point, establishing monitoring institutions is collectively beneficial—both for an inspector who uncovers non-compliance behavior and for an inspectee who demonstrates compliance. However, the value of monitoring starts to go down when the willingness to violate exceeds a certain threshold. This will become especially true when monitoring activity is costly and when violations cannot be deterred and often go unpunished due to the cost imposed on the punishing party. At this point, potential inspecting-states would prefer not to have a third party inspector and would rather remain in the dark.

The theory therefore expects that, when security environments for potential inspectors and inspectees diverge, this difference adversely affects the adoption of a third

²⁵⁶ Siverson and Starr, 1990

²⁵⁷ Interestingly, in their analysis of nuclear proliferation decisions, Jo and Gartzke (2007) find not-so-robust results for opportunity variables (latent nuclear weapons production capability, economic capacity) but robust results for willingness variables (conventional threats, nuclear threats). By robust, I mean the stability of statistical significance across various model specifications.

party. The willingness to violate is proxied by threat levels each country faces. Based on the theory of distributional conflicts, we would expect that asymmetry in threat levels would in general reduce the probability of member states reaching an arms control agreement with substantial delegation of monitoring roles.

To test the theory of distributional conflicts, the empirical analysis presents agreements as the unit of analysis. For each agreement, country characteristics, be it GDP amounts or polity scores, are aggregated either with averages or standard deviations. The choice of average or standard deviation (i.e. asymmetry) measures depends on the theoretical story we are interested in. When the variable of interests is to measure the average effect of an agreement, averages are used to compare across agreements. When the variable of interests is to obtain the effect of heterogeneity within one agreement compared across agreements, the standard deviation measure was used.

Threat Level Asymmetry (disparity in willingness)

Arms control decisions are heavily influenced by security threats posed by rivals. The decision to monitor also takes such threat levels into account as those institutional decisions are made given a broader security environment. Within a bilateral setting, for example, if one party faces a high level of security threat, and the other doesn't, this difference is likely to produce a low level of monitoring. This outcome is because in general, the party that expects to face stochastic violations would not favor stringent arms control monitoring. However, other parties would want a more stringent mechanism because a less stringent system may not be effective in deterring violations. When the agreement is written with flexibility provisions such that some violations may go unpunished, or if it is practically impossible to punish the other party, monitoring loses its value to the potential inspectors. A potential inspectee might still want to establish some kind of monitoring system, but this interest in monitoring would simply amount to a gesture to demonstrate compliance, which might not be valuable to potential inspectors. With non-compliance behaviors that are costly to punish, monitoring loses its core value of reducing uncertainty.

I measure threat levels differently for two types of agreements. Threat levels for nuclear-related agreements are assessed by the dummy variable that tells us whether a state has a rival with a nuclear program or not. The measure was constructed by Jo and Gartzke.²⁵⁸ For conventional and bio/chemical threat levels, I used conventional threats,²⁵⁹ also relying on Jo and Gartzke. Due to scale differences between nuclear threats and conventional threats, I standardized the values using z-scores.²⁶⁰ Once those z-scores are created for each member country in an agreement and the scores are normalized, the measure for asymmetry was created using standard deviation, which tells us how dispersed willingness is among member countries in an agreement.

Latent Weapons Capacity Average (opportunity matters)

Controlling for the asymmetry in willingness and/or motivation fueled by security environments, opportunity or capability can affect non-compliance behavior, which again may influence the preference for third party monitoring. A group of countries with latent capacity may not want to be monitored by a third party, while a group of countries with low latent capacity may be more receptive to the idea. The latter case is illustrated with the case of several nuclear free zone agreements²⁶¹ where the delegation of monitoring authority to the IAEA was not much disputed and Commissions were even created to deal with potential disputes.

To measure weapons capability, the latent capacity variable is created as an amalgamated measure of various weapons capacities: seven indices of nuclear capacity for nuclear related agreements, the existence of bio-chemical weapons programs for the agreements on bio-chemical weapons, and the defense budget as a proxy for the conventional capacity for the agreements related to conventional weapons.

²⁵⁸ Jo and Gartzke 2007.

²⁵⁹ I have to admit that this is a crude measure that fails to capture the threat level of biological and chemical weapons in particular.

²⁶⁰ The use of z-score creates normalized (thus comparable) scores of different scales in nuclear and conventional threats.

²⁶¹ Latin America, South Pacific and African Nuclear Free Zone Agreements.

Table 5.6 Latent Weapons Capacity: Scales and Sources

	Scale/ description	Source
Nuclear capacity	7 point scale of nuclear capacity ²⁶²	Jo and Gartzke (2007)
Bio/chemical weapons capacity	3 point scale of whether a country has a biological or chemical weapons program ²⁶³	Center for Nonproliferation Studies, Monterey institute (2002)
Conventional weapons capacity	Military expenditure	World Development Indicators

Similar to the threat-level variable, due to different scales for each type of capacity, I use z-scores to standardize the measures across different weapons capacities. Once the normalization is done using z-scores, I have calculated average latent capacity for each agreement.

Control Variables

I include four main control variables in the analysis: number of member countries, nuclear dummy, GDP averages, and polity score averages.

Number of Member Countries The number of countries is an important control variable because the sheer number of members can inhibit institutional development. The number of countries has been hypothesized to have a negative impact on institutional development,²⁶⁴ but the opposite logic suggests that the number of countries in an agreement could work favorably toward institutional development. In many cases of international treaty-making processes, the decision to undertake complex negotiations itself signifies a positive attitude toward developing new cooperative institutions. Therefore, once the treaty is negotiated and opened for signature, the number of countries would have a positive effect on the overall institutional development on the

²⁶² Seven components of the index are 1) uranium deposits, 2) metallurgists, 3) chemical engineers, and nuclear engineers/physicists/chemists, 4) electronic/explosive specialists, 5) nitric acid production capacity, and 6) electricity production capacity.

²⁶³ 1) Known (where states have either declared their programs or there is clear evidence of chemical or biological weapons possession), 2) Probable (where states have been publicly named by government or military officials as "probable" chemical or biological weapons possessors or as producing chemical or biological weapons), 3) Possible (where states have been widely identified as possibly having chemical or biological weapons or a CBW program by sources other than government officials).

²⁶⁴ Koremenos et al. 2001

international level because the participants are a selected coalition of the willing. Given these theoretical expectations and considering the fact that most arms control agreements are bimodal in numbers (either bilateral or multilateral with large memberships), we would not expect a significant effect of number on the monitoring choice.

Nuclear Dummy Since the majority of agreements deal with nuclear weapons (34 out of 48 agreements), the characteristics of nuclear weapons should be controlled for. All WMDs have dual-use characteristics, but the regulatory environments are different, as practitioners suggest in terms of clandestine activities and the involvement of private actors, as tabled below. Chemical weapons have long been regarded as the “poor man’s nuclear weapon,” and the threat of biological weapons is in a sense omnipresent because precursor materials are easily available to manufacture, compared to the much more difficult process of acquiring enriched uranium or plutonium.

Table 5.7 Characteristics of Weapons of Mass Destruction²⁶⁵

	Biological	Chemical	Nuclear	Radiological
Complexity of production	2	3	5	1
Cost of production	2	3	5	3
Difficulty of acquisition	2	2	5	2
Difficulty of delivery or dispersal	1	2	4	1
Likelihood of effectiveness	3	3	5	3
Worst-case consequences	5	4	5	4

Note: 1 = lowest or least; 5 = highest or most

GDP Average Controlling for asymmetric environments, an agreement involving rich countries as members may differ from one involving poor countries as members. Rich member countries are often associated with international institutional developments, but the majority of them are at the same time the countries with a latent weapons capability. Therefore, controlling for weapons capacity, we would expect a positive sign for the effect of GDP average, that is, a greater likelihood of choosing third party monitoring. To create the specific variable, GDP was logged for each country and then the logged GDP values were averaged within each agreement.

²⁶⁵ Cole 2006. p.165. Note that he adds “radiological” category to WMD since it poses different danger of creating “dirty bombs” from nuclear radiation. Cole mentions that these numbers are subjective and could differ across a range of agents.

Polity Average This variable is included to see whether there is a meaningful difference between a group of more democratic countries and a group of less democratic countries, controlling for the asymmetry in threat levels and latent capabilities. Following the finding of Rosendorff and Vreeland²⁶⁶ that showed the transparency and information openness of democratic countries, I would expect that having more democratic members in an agreement would increase the probability of the delegation of monitoring authority. The variable was created by having a democracy score (1-10) for each member country from Polity IV and then calculating the average score for each agreement.

Results of the Ordered Probit Analysis on the Choice of Monitoring Systems in Arms Control Agreements

Table 5.8 presents the results from the ordered probit analysis, using the aggregated dependent measure of monitoring systems and the aforementioned independent variables. In general, the results support the theory of distributional conflicts. The asymmetry in threat levels among member countries is likely to reduce the likelihood of collective adoption of a highly delegated system.

One big caveat is in order before I explain the results. Due to data limitations, some variables have not been collected for recent agreements. Since the sample size is very limited (a total of 34 agreements), the results should be taken with caution and regarded as tentative results.

²⁶⁶ Rosendorff and Vreeland 2007.

Table 5.8

**Ordered Probit Results on the Choice of Monitoring Institutions in 34
Arms Control Agreements**

	MODEL 1 Baseline Model with Robust S.E.	MODEL 2 Controlling for the economic and political system effect	MODEL 3 Controlling for power status	MODEL 4 Without latent capacity asymmetry	MODEL 5 Test of commensurate -risk- hypothesis	MODEL 6 Square term for threat level asymmetry	MODEL 7 With latent capacity average
Threat level Asymmetry	-1.503*** (.421)	-3.604*** (.895)	-4.783*** (1.235)	-2.230*** (.814)	-1.926*** (.582)	3.867 (3.517)	-2.411*** (.768)
Threat level average					.405 (.448)		
Threat level Asymmetry squared						-7.296** (3.259)	
Asymmetry in Latent weapons capacity	.661*** (.212)	.938*** (.363)	1.43*** (.450)		.872*** (.339)	1.305*** (.422)	
Average Latent Weapons Capacity							-2.396 ** (1.048)
Number of member countries	-.018 (.012)	.004 (.015)	.0008 (.019)	.016 (.018)	-.0003 (0.016)	-.008 (.021)	.0125 (.0174)
Nuclear-related agreement	-.024 (.418)	-.108 (.484)	.322 (.583)	.097 (.519)	.252 (.482)	1.846** (.779)	1.008 (.654)
GDP average (logged)		.509* (.314)	.997* (.526)	-.362 (.362)		.382* (.219)	.421 (.351)
Polity average			.439** (.205)	.350** (.175)	.357** (.175)	.629*** (.163)	.414** (.177)
Polity Asymmetry		-.460** (.180)					
Major power average			-2.007 (2.131)	.623 (2.00)			

* p<0.10, **p<0.05, ***p<0.01. Robust standard errors are in parentheses.

MODEL 1 through MODEL 5 test the hypothesis regarding distributional conflicts, controlling for other effects. Distributional conflicts among member states are assessed using the measure of threat level asymmetry, and control variables include the economic and political factors as well as agreement-specific characteristics such as the number of members and a dummy for nuclear related agreements. MODEL 6 captures the theoretical concern that the effect may be non-linear. As the heterogeneity grows, delegation of authority is less likely to happen, but there are regions of low asymmetry where states demand some monitoring mechanisms. In contrast to MODELS 1-5 that impose linearity, MODEL 6 presents a statistical model flexible enough to produce an empirical prediction closer to the theoretical discussion that has emphasized both the demand for information and the reluctance to build monitoring systems.

For various specifications from MODEL 1 to MODEL 5, threat level asymmetry produces a negative effect on the choice of monitoring systems. Larger asymmetries in threat levels induce countries to adopt a smaller number of different kinds of monitoring mechanisms as part of an agreement. By contrast, other kinds of asymmetry among members—such as an asymmetry in latent weapons capacity—have a positive impact on the choice of monitoring mechanisms in an arms control agreements. This means that a group of countries with heterogeneous weapons capacity is more likely to establish more monitoring systems than a group of countries with homogenous capabilities. This result is unexpected by the theory and rather puzzling. In those groups with heterogeneous capabilities, side payments may have played a big role where large capability countries providing side payments to small capability countries. Side payments would be certainly easier for reducing technology gaps than for manipulating threat levels. However, without side payments as a control variable, one cannot ascertain what kind of effect this variable makes. Given the evidence, one could only gather that overall, the impact of threat level asymmetry is larger than that of weapons capacity asymmetry.²⁶⁷ This suggests that willingness weighs more heavily than opportunity in states' decisions regarding monitoring institutions.

²⁶⁷ As both asymmetry measures are standardized using z-scores, the coefficients are comparable.

It is also notable that the effect of democratic political regimes is positive, suggesting that democratic regimes are more likely to institute international institutional mechanisms such as monitoring institutions in written agreements. This is consistent with the finding of Rosendorff and Vreeland (2006), which shows that democracies tend to be more open. Such openness could then be reflected in the international bodies they jointly establish.²⁶⁸ Due to the small sample size, some effects were difficult to catch in a reliable way. For instance, the effects of GDP average and nuclear dummy are not stable enough to render any conclusive judgment.

The results presented here are based on robust standard errors. It is important to get robust standard errors in this analysis since the arms control agreements have several clusters of nuclear, conventional and chemical/biological weapons.²⁶⁹ Robust standard errors correct for potential autocorrelation and heteroscedasticity in error terms.²⁷⁰

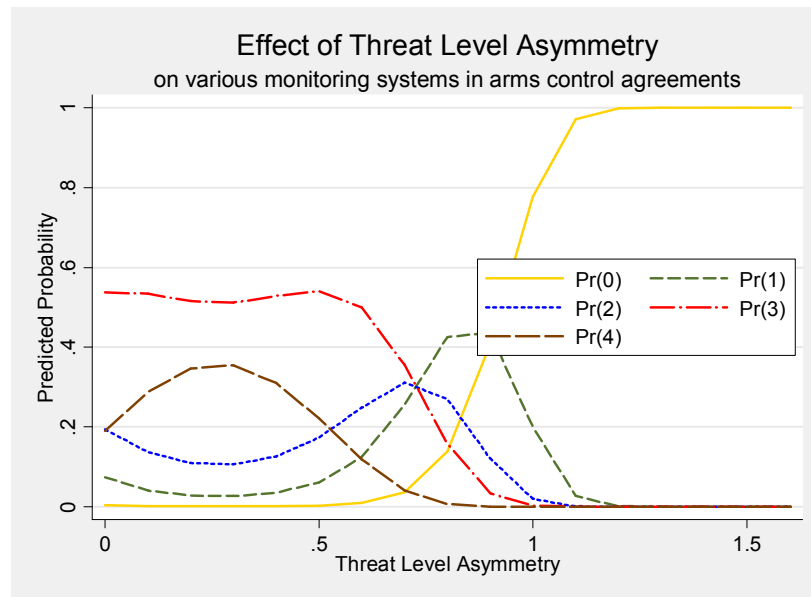
Figure 5.1 presents the predicted probabilities of each level of delegation evaluated at various levels of threat asymmetry based on the non-linear model that includes the square term of threat level asymmetry.

²⁶⁸ The result may be biased toward producing significant results as the sample contains member countries that are mostly democratic, but it nonetheless appears to be robust across various specifications.

²⁶⁹ The sample includes agreements that share a closely knitted historical lineage. Examples include the test ban treaties (LTBT, TTBT and CTBT) and the Commission on Security and Cooperation in Europe (CSCE) agreements (Helsinki Final Act of 1975 to Paris Charter in 1990, to 1994 Vienna Document). Offshoots of the Geneva Convention: CWC, BWC, and CCW. Zangger Committee and Nuclear Suppliers Group (NSG) fall under the IAEA umbrella. The Australia Group (AG) is under the CWC regime. The example of nuclear weapons related treaties is in Appendix II.

²⁷⁰ Fortna (2004) uses the same statistical technique in her analysis of 48 peacekeeping agreements that contain similar clusters of agreements (e.g. peacekeeping arrangements in the Middle East).

Figure 5.1 The Effect of Threat Level Asymmetry on the Choice of Monitoring Systems Based on Non-linear Model



The figure reveals several empirical patterns about the choice of monitoring systems in arms control agreements that are consistent with the theory of distributional conflicts presented in Chapter 2.

First, notice the overall ebbing trend (or a series of receding waves) from predicted probabilities for lower level to higher level delegation in monitoring roles. Five tidal waves show that the probabilities of delegation become smaller as the asymmetry increases. In other words, member states are more likely to adopt a centralized mechanism in an arms control agreement as the threat level asymmetry decreases.

Second, the shape of three waves (Pr(2), Pr(3) and Pr(4)) – predicted probabilities for the delegation-level two, three and four, respectively – show both the demand for information and the reluctance to establish monitoring systems. Up to point, demand for monitoring increases as asymmetry increases. However, after a certain threshold, demand for monitoring institutions decrease as asymmetry increases. The non-linear patterns show that some base-level demand exists for some forms of monitoring systems in international agreements, but the demand declines as the threat level asymmetry increases.

Third, the graph can be meaningfully analyzed in approximately two parts—a first low asymmetry area and a second high asymmetry area. When the asymmetry level is low (between zero and .7), a high level of delegation is more likely. That is, Pr(3) and Pr(4) are larger than Pr(1) and Pr(2). The Threshold Test Ban Treaty (TTBT), the Helsinki Final Act, and the South Pacific Nuclear Free Zone (SPNFZ) Treaty are the agreements in this zone, with low asymmetry in threat levels and consequently moderately high delegation levels. TTBT was signed in 1990 when threat level asymmetry between the United States and Russia was significantly lowered. The negotiation for TTBT was in stark contrast to the LTBT negotiation which lasted for eight years but produced no progress as to institutionalizing any international monitoring mechanism. The Helsinki Final Act and SPNFZ are regional security agreements among countries with similar security levels, European and Latin American countries, respectively. The Helsinki Final Act is coded as delegation level 1, but its notification and exchange of information system is much institutionalized with details of annual exchanges of military force structure and advance notification of military movements. Along with other nuclear free zone agreements, the South Pacific Nuclear Free Zone (SPNFZ) relies on various monitoring systems including the existing international measure of the IAEA, and the treaty negotiation process was without much conflict given the similar security environments among its members.²⁷¹

When the asymmetry level increases above 0.7, delegation becomes much less likely. A one-mechanism system (i.e. Pr(1)) is more likely to occur and the probability of not observing any monitoring system (i.e. Pr(0)) dramatically increases. The Limited Test Ban Treaty (LTBT), the Nonproliferation Treaty (NPT), and the Biological Weapons Convention (BWC) are in this latter category. Characterized by a drawn-out eight-year negotiation, the LTBT specified the use of national technical means with no other monitoring structures. The NPT exhibited a fairly high level of asymmetry (7.23), but its members managed to resolve distributional problems to establish a moderate level of monitoring (DV score 3) by inserting nuclear technology transfers, as discussed in the

²⁷¹ The members include Australia, the Cook Islands, Fiji, Kiribati, Nauru, New Zealand, Niue, Papua New Guinea, the Solomon Islands, Tonga, Tuvalu, Vanuatu and Western Samoa.

section on the role of side payments. Lastly, the BWC is notorious for its failure to make progress on its monitoring regime, as discussed previously.

**Table 5.9 Distributional Conflict and the Choice of Monitoring Institutions
in Selected Arms Control Agreements**

Agreement	Threat level Asymmetry (standard deviation measure of conventional and nuclear threats) as a measure of distributional conflict	Level of Delegation, or the Choice of Monitoring Institutions
TTBT	0	4
SPNFZ	<.01	4
Helsinki Final Act	.69	1
NPT	.72	3
BWC	.94	0
LTBT	1.63	1

Thus far, the analysis was conducted under the premise that the larger number of monitoring systems implies more centralization. Monitoring systems can be analyzed separately. The following table reports the results. They show slightly different decisions enter into the establishment of each monitoring system, although we can spot some regularity. First, major power status explains the choice of monitoring systems that require low level of international coordination, such as national technical means and information exchange and notification systems. Major powers tend to favor the national technical means or information exchange; they clearly disfavor delegation to international organizations. Second, the creation of inspection systems or delegation to international organizations involves the lower level asymmetry in security environments, in this case, similar amount of threats from rival countries.

Table 5.10 The Design Variables for Each Monitoring System in Arms Control

	Notification and information exchange	National technical means	Consultation	Inspection systems	Delegation to international organization
Asymmetry in latent capacity	.569* (.307)	-.178 (.530)	-.101 (.314)	.961** (.490)	-.426 (.815)
Asymmetry in threat levels	-.976* (.556)	.096 (1.239)	-1.959** (.919)	-1.585** (.807)	-3.557*** (1.201)
Polity average	.343*** (.133)	-.051 (.416)	.203 (.136)	.211 (.137)	-.004 (.216)
Major power average	4.155*** (.911)	4.803*** (.934)	1.616 (1.257)	4.115*** (1.535)	-6.068*** (2.370)
Constant	-6.100*** (1.076)	-6.726** (3.106)	-4.225*** (1.354)	-5.035*** (1.294)	-2.071 (1.863)
Pseudo-R ²	0.195	0.365	0.195	0.144	0.162

* p<0.10, **p<0.05, ***p<0.01. Robust standard errors are in parentheses.

Taken as a whole, the results can be interpreted as statistical evidence that, when international agreements are formed, the delegation of an informational role to a third party is conditioned by the heterogeneous security environments among member states. Traditional variables such as major power status matter – major powers choose lower level of international coordination. However, in choosing international monitoring systems such as inspection systems or formal international bodies, the difference in security environments played a significant role. In short, the analysis of 34 arms control agreements suggests that the potential informational role of international institutions is cut short by differences in compliance environments among member states, mainly because these differences influence states’ expectations about future cooperation.

Summary of Findings

I find both strategic and non-strategic elements in the design of monitoring institutions. By strategic elements, I mean features that are the product of interdependent decisions among involved stakeholders. Strategic relationships among member states were empirically assessed in terms of asymmetry in threats levels among member states in an agreement. An asymmetry in threat levels results in an increased incentive to defect and increased risks of defection for some members. This difference produces diverse opinions about which types of error a monitoring mechanism should focus on because

distributional impacts of monitoring systems. This is not to say that the asymmetric environment always produces the least stringent type of monitoring system. The present study also shows statistical evidence that the demand for information tends to increase up to a certain point while asymmetry in threat levels can hurt the demand.

Non-strategic elements also affect the choice of monitoring systems. New agreements employ existing institutions in a cost effective way and we see in many cases considerable continuity of institutional arrangements.²⁷² For example, the Latin American Nuclear Free Zone Treaty (1967) utilizes pre-existing IAEA safeguards. The delegation of information capacity to the Agency for the Prohibition of Nuclear Weapons in Latin America (OPANAL), however, embeds the strategic element, insofar as the heightened difficulty of escapes makes it easier for potential member countries to commit to such an organization. In many cases, states employ whatever pre-existing institutional structures are available. For exchanging data and visits of chemical-weapons related materials under the Wyoming MOU and for scheduled elimination of the missiles under the Intermediate-range Nuclear Forces Treaty (INF Treaty), pre-existing on-site inspection agencies in each country were employed. Another non-strategic element is the tendency of one treaty to be modeled on previous treaties. This mechanism of emulation occurred in the case of the Outer Space Treaty (1967), which was modeled on the Antarctic Treaty (1959), both being “non-armament” treaties.

The statistical evidence shows that, controlling for non-strategic factors, the strategic elements of distributional conflicts manifest themselves in the design of monitoring systems in arms control agreements. When we consider as well the empirical evidence from regional trade agreements and regional fisheries agreements, we can conclude with some confidence that distributional conflicts function as inhibitors of the delegation of authority to international institutions.

²⁷² As explained in the body of the text, this potential temporal effect or possible emulation effect has been dealt with by obtaining robust standard errors.

CHAPTER VI

Conclusion: Taking Stock and Policy Recommendation

This dissertation concludes with a summary of its theoretical arguments, a detailed examination of the empirical results presented earlier across three issue areas, a series of policy recommendations for future negotiators, and some case studies on how monitoring institutions actually operate. My research has sought to elucidate cooperation problems in international cooperation, with a particular focus on informational problems in international cooperation. I have examined the relationship among core problems of international cooperation – enforcement, commitment, distribution and information problems.²⁷³ I have identified the roots of informational asymmetry among states, suggesting that the expectation about distributional consequences emerging from the uncertainty about future commitments result in different kinds of monitoring institutions in international cooperation. It has been shown that the information problems do not exist alone but interact with distributional effects in international cooperation, making it harder for centralized monitoring to emerge.

The main argument of this dissertation is that, in the arena of international treaties and monitoring institutions, the demand for information may be cut short by a low level of commitment. The theoretical model was motivated by the general empirical pattern that international agreements allow states to retain their autonomy to a certain degree. This feature of agreements, which limits commitment levels, has the benefit of affording states a degree of flexibility, but also has consequences in terms of constraining what states can achieve as they design international bodies. Demand for information from international organizations, often based on their neutrality and expertise, is fueled by uncertainties concerning cooperation behavior, but the guarantee of flexibility may undermine such demand. In short, I argue that the combined factors of information and

²⁷³ For the definitions of each cooperation problem, see Koremenos et al. 2001.

commitment are the key to uncovering the causes that drive the choice of monitoring systems in forging international agreements.

Informational asymmetry is ameliorated by instituting a third-party information clearinghouse on the international level, but this informational gain is counteracted by the corresponding distributional consequences of such a mechanism. If the informational clearinghouse provides too much flexibility, the parties compelled to concede their policy discretions to a third party tend to oppose the establishment of such a mechanism at the outset. In other words, these parties may gain informationally by creating a new third party or calling in an existing third party, but risk their policy discretion by binding themselves to an international mechanism. This tradeoff between informational gains and resulting distributional consequences has been modeled by Morrow (1994) and this dissertation has developed his thesis by considering the commitment problems among potential partners in long-term relationships.

More broadly, this dissertation has advanced the conventional argument about the fundamental tradeoff in international cooperation between cooperation gains and adjustment costs. In my theoretical model, cooperation gains are represented by informational gains and adjustment costs by policy concessions following the recommendations of international organizations.

I have argued that this basic tradeoff is mediated by the degree of informational asymmetry stemming from each government's domestic compliance environment. When the informational asymmetry becomes severe, the costs of sovereignty, or the policy concession costs, dominate. When the informational asymmetry is low or medium, states are more likely to choose centralized monitoring with more delegated authority in order to enhance informational gains. My argument about informational asymmetry surrounding domestic compliance environments is not previously been advanced. Previous literature has emphasized the tradeoff but was silent about what factors tilt the tradeoff one way or the other.

The theoretical argument is empirically demonstrated by looking at statistical evidence in monitoring systems of regional trade agreements. Both the informational asymmetry within international trade environment and the uncertainty about protectionist tendencies of potential trading partners – prospective interest group pressures or regime

instability – are likely to be obstacles to substantial cooperation on centralized monitoring. On average, the asymmetry is likely to discourage centralized information mechanisms, lowering the chance of instituting such mechanisms by 10%.

Corresponding case studies selected from the sample of regional trade agreements also render support for the theoretical argument. The negotiating history and its narratives tell us that negotiators in the selected bilateral/multilateral negotiations had concerns about the future commitment of other party (or parties) to the agreement if protectionist tendencies are present. The domestic political and economic environments conducive to protectionist moves within a sensitive sector by the one party were more likely to make the other party take a negotiating posture that pushes for absolute concession on that sector (in order to look for certainty) or for an accompanying weak dispute settlement. The party with a favorable compliance environment for free trade would like to retain its policy options *vis-à-vis* protectionist countries. Although a third party is helpful in generating compliance information, this option loses its attractiveness when the asymmetry is extreme.

The theoretical model also generates a new perspective on the preference for monitoring mechanisms. Contrary to the ordinary expectation that the informationally disadvantaged would resist a dispute resolution mechanism, the party with an unfavorable compliance environment that generates informational asymmetry also has an incentive to establish a dispute settlement mechanism. This incentive arises mainly because this party could restrict the unilateral actions of other parties while also demonstrating its commitment. Many negotiation processes establishing regional trade agreements exhibited this phenomenon where the party that had expectations about their own commitment problems proposed or supported strong dispute settlement mechanisms, as Mexico did in NAFTA negotiations.

The benefits of examining monitoring institutions in a broader institutional context are many. By looking at a dispute settlement process as a broader process of information procedure, we can better understand how states cope with informational demands with the help of supplementary monitoring institutions, such as political bodies or technical subcommittees. More importantly, by studying the design of monitoring

institutions, we gain a deeper understanding of the nature of compliance and compliance environments in such issue areas as international trade, environment and security.

This study of the design of monitoring institutions has several implications for the study of international institutions. It demonstrates the durability of diplomatic institutions, particularly in bilateral agreement settings. Scholarly work on international institutions thus far has focused on salient and centralized institutions for good reason – for their impact on international and domestic politics. This study demonstrates that a more comprehensive perspective on less salient institutions can shed a new light on the operation of salient institutions. By studying both forms of institutions, we are able to predict under what circumstances one form comes into being rather than the other: the context of informational asymmetry in compliance environments determines the prevalent use of political bodies instead of international third parties.

The proposed theoretical argument about informational asymmetry – higher asymmetry leads to less centralized monitoring – may sound deterministic, and thus give the impression that the discussion leaves less room for policy implications. That is not the case because informational asymmetry is not necessarily a fixed element; there are ample factors policymakers may maneuver to reduce informational asymmetry. For instance, policymakers can engineer the kinds of errors a candidate institution may make by emphasizing the informational capacity to distinguish clear violations.²⁷⁴ A third party in question may be able to gain additional political legitimacy, despite informational asymmetry, if the body can be expected to maintain consistency and build credibility for deterring potential violations. Civil society also has the potential to enhance this informational mechanism by improving domestic political environments, and also by providing information to governments and international society that ameliorates informational asymmetry and facilitates information flow. This scenario points to the greater role of civil society in future global governance.

States are increasingly engaged in cooperative tasks in this globalized world. The reduction of informational asymmetry to decrease adjustment costs and to increase cooperation gains will be crucial in the coming decades in forging interactions among

²⁷⁴ One way to do so is exemplified by Mitchell's work on an oil pollution regime where the MARPOL decided to require double-hulled tankers (visible and easier to regulate) instead of catching violators at sea (costly monitoring).

sovereign states. This dissertation suggests ways for negotiators to recognize compliance environments of its own and others' before negotiation and make attempts to improve those compliance environments so that the distributional conflicts would not be a serious obstacle to the establishment of international monitoring institutions when they are in need.

Taking Stock

The empirical results from the three issue areas reveal interesting similarities and differences with respect to the various types of monitoring institutions and the effects of membership characteristics. The three issue areas considered differed in important ways. For instance, results in one issue area were derived from global-level agreements, while in the other two areas the agreements considered were regional. My main task in this section is to examine these results, looking for commonalities in order to test the reach of my theoretical arguments. By comparing and contrasting the empirical results in these different issue areas, my aim is to ascertain to what extent the theory of monitoring designs travels in each issue area. The methods of comparison are simple: I gather the empirical results that have used the same methods and put the evidence from three issue areas side-by-side. Then, I qualitatively discuss the differences and potential causes for the differences.²⁷⁵

The theory presented in Chapter 2 has suggested four determinants of monitoring institutions: asymmetry in compliance environments, consequences of violations, benefits from cooperation and quality of potential verification. In the subsequent empirical chapters, I mainly tested the impact of asymmetry on the choice of international monitoring institutions and occasionally discussed the effect of other variables in a qualitative way. This is because I see that the key theoretical contribution of my dissertation is to provide systematic evidence for distributional conflicts over the design of monitoring institutions. The empirical measures of each variable in three issue areas are summarized in Table 6.1.

²⁷⁵ One can systematically test for the overall effect of variables using meta-analysis and I leave this for future investigation.

Table 6.1 Summary of Variables

	Regional trade agreements	Regional fisheries agreements	Arms control agreements
Determinants of monitoring institutions			
Asymmetry in compliance environments (which determines commitment levels)	Differences in import penetration ratio (IPR)	Differences in the size of fishing industry	Differences in the level of security threats
Consequences of violation/risk	Not discussed	Degree of over-fishing	Security threat from rivalry
Benefits from cooperation ²⁷⁶	Not applicable	Not applicable	Not applicable
Quality of potential verification (monitoring capability)	Not discussed	Not discussed	Monitoring technology, budget allocation for inspection systems
Control variables			
	<ul style="list-style-type: none"> • Number of Parties • Polity asymmetry • GDP asymmetry • Distance 	<ul style="list-style-type: none"> • Number of Parties • Polity asymmetry • Government effectiveness • Knowledge creation 	<ul style="list-style-type: none"> • Number of Parties • Polity asymmetry • GDP Asymmetry • Asymmetry in Latent Weapons Capacity

Gathering the conclusions of the three empirical chapters, the fact that asymmetry in compliance environments has negative effects is, by now, old news. Differences in political and economic structures among member countries tend to impede the development of monitoring arrangements and other institutional structures on the international level. When we compare and contrast our three issue areas, however, we are able to achieve some new insights. Some of the empirical results suggest new research questions and uncover puzzling results not completely consistent with existing theoretical models. Consequently, we are challenged to go back and forth between theoretical and empirical levels. This section aims to do just that, taking stock of the three earlier empirical chapters.

Once placed side by side, the three issue areas reveal several re-occurring patterns. Figure 6.1 clearly shows that, in most agreements, members opt for monitoring

²⁷⁶ This element is actually fixed in the model, so its effect is not tested.

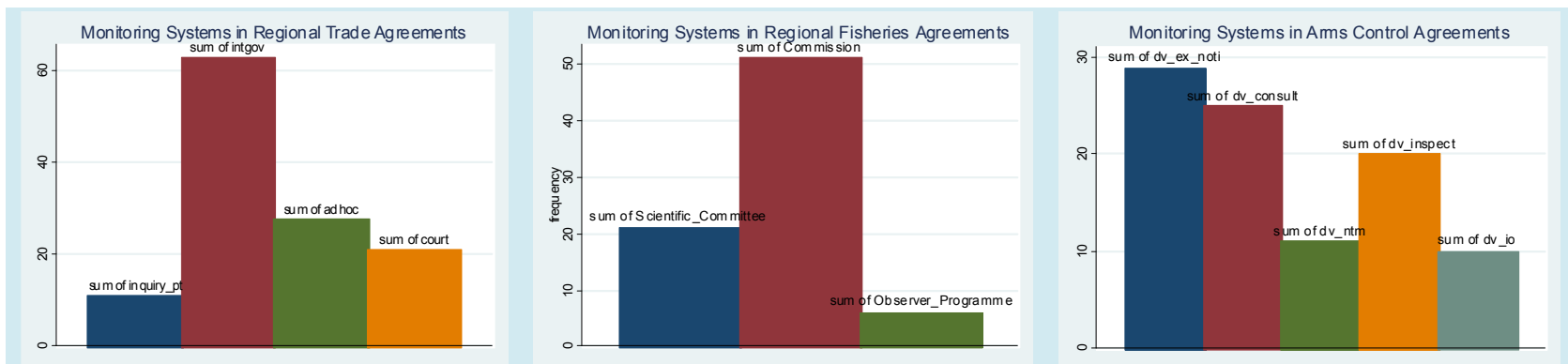
that involves inter-member communication and a relaxed form of monitoring. In regional trade agreements, intergovernmental bodies are the most frequently chosen form of monitoring arrangement; in regional fisheries agreements, commissions are the most favored form; and consultation and notification/information exchanges are the most widely used form of monitoring mechanism in arms control agreements. This preference for informal venues instead of formal institutionalization points to the fact that a centralized form of monitoring is rarely adopted in any of the three issue areas. Arms control agreements may be an exception in that inspection regimes are a well-established and expected component of many control agreements. These patterns prompt us to think about why informal arrangements abound while formal monitoring institutions are rare, and why there is variation across the three issue areas – the topic of this dissertation. In short, this dissertation answers the question by looking at the distributional conflicts and suggests that a larger asymmetry in member countries' compliance environments²⁷⁷ is likely to produce a less centralized form of monitoring. The following discussion collects the evidence for it and explores what the evidence means to a broad conclusion about institutional design and other related theories.

²⁷⁷ Again, compliance environments refer to political and economic situations or conditions that are amenable to compliance with international agreements.

Figure 6.1 Types of Monitoring Systems in Three Issue Areas

TPOLOGY OF MONITORING INSTITUTIONS: THREE ISSUE AREAS OF INTERNATIONAL COOPERATION

Regional Trade	Regional Fisheries	Arms Control
Inquiry points	Commission	Notification and Exchange of Information
Intergovernmental bodies	Scientific Committee	Consultation
Ad Hoc Tribunals	Observer Systems	National Technical Means
Standing Courts		Inspection Systems
		International Organization



The theoretical model in Chapter 2 examined the various elements of monitoring, and the discussion that followed focused on the attendant distributional conflicts. Distributional conflicts are created due to different compliance environments that members face. Some members experience favorable political and economic environments, while others are not so fortunate. Up to a certain point, international institutions help to alleviate the uncertainty that arises when information is scarce or unreliable; at the same time, the flexibility that agreements often allow has a high cost, since it discourages some countries from making a commitment to institutional development. The amount of flexibility allowed in agreements is usually determined by the political and economic conditions states face. If a state expects frequent deviations from international obligations due to capacity limitations, for instance, then the resulting asymmetry in compliance is likely to discourage other states from instituting a strong regulatory mechanism.

Empirically identifying good measures for asymmetry requires taking a further step beyond simply defining a theoretical concept of asymmetry. In the three empirical chapters, I have introduced key asymmetries that influence compliance behaviors. Their distributions are summarized in Figure 6.2. In the area of regional trade agreements, I have suggested the asymmetry in import penetration ratio (IPR) as the key independent variable, based on the empirical record showing that a higher IPR is likely to make states engage in trade protectionism. In the case of regional fisheries, the size of a nation's fishing industry is likely to affect domestic lobbying for fishing subsidies, and therefore, differences across countries in the size of their respective fishing industries approximates the theoretical idea of asymmetric compliance environments in fisheries management. In the context of regulating prohibited weapons, the perception of security threats may be a factor that determines expectations about how likely countries are to be deviant in the course of future cooperation.

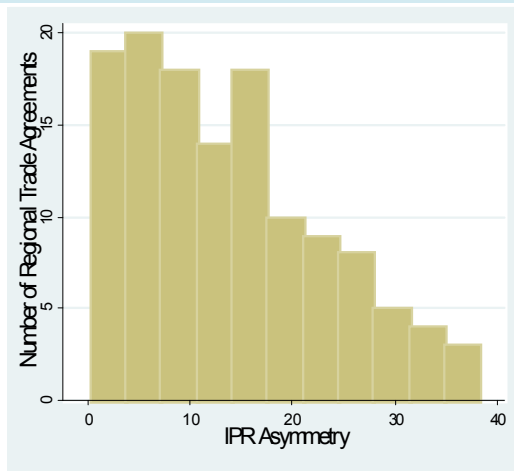
These three issue areas have one thing in common with regard to asymmetry: the member countries in these agreements have mostly symmetric compliance environments. There are only a small number of countries that fall on the highly asymmetric side. Despite this commonality, the key asymmetries in our three issue areas differ with regard

to their distribution. Regional trade agreements present a right-skewed asymmetry level; regional fisheries agreements have primarily symmetric countries; and arms control agreements approximate a normal distribution. These differences in distributions reveal the characteristics of member countries in the sample. Arms control agreements were concluded among countries with a moderate level of asymmetry in terms of their regional threat levels. Fisheries agreements are signed among countries whose fishing industries are of similar size. By contrast, countries are much less picky about choosing partners in the area of international trade – regional trade agreements exhibit a range of different levels of asymmetry profiles in the sample.

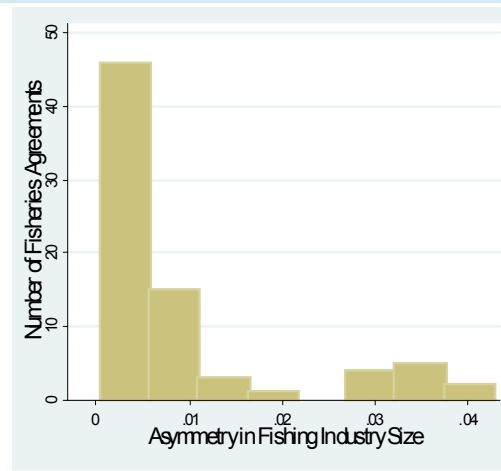
Figure 6.2 Measures of Asymmetries in Three Issue Areas

KEY ASYMMETRIES

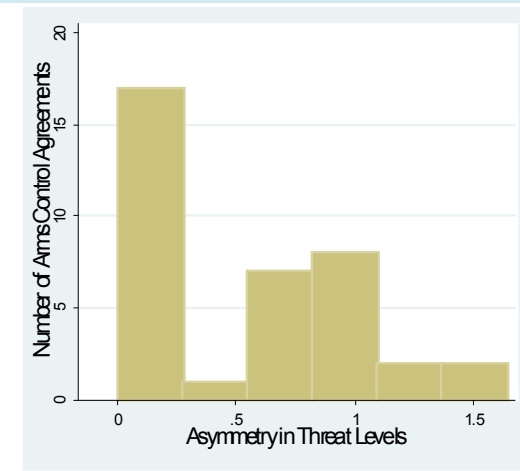
**Regional Trade
(Import Penetration Ratio)**



**Regional Fisheries
(Size of Fishing Industry)**



**Arms Control
(Threat Level)**

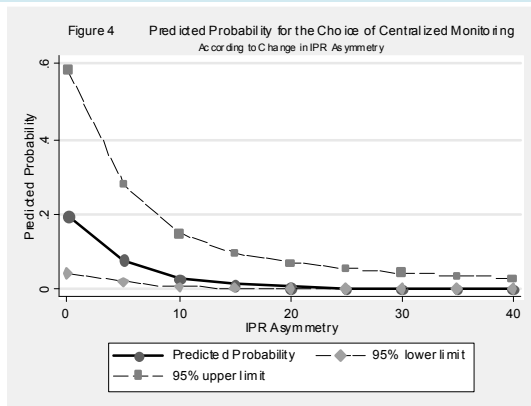


Given the empirical distribution of the dependent variable (Figure 6.1) and the key explanatory variable (Figure 6.2), similar statistical analyses were conducted in all three issue areas. The results generally support the theoretical conclusion that heterogeneous compliance environments are likely to discourage the choice of international delegation. The general pattern is summarized in Figure 6.3. Controlling for other types of symmetry and potential confounding factors (polity asymmetry, regional clustering, etc.), as the key asymmetry increases, the probability of having an international monitoring mechanism decreases. When asymmetry increases, it appears that a fully delegated inspection system or international body vested in expertise is rarely agreed upon.

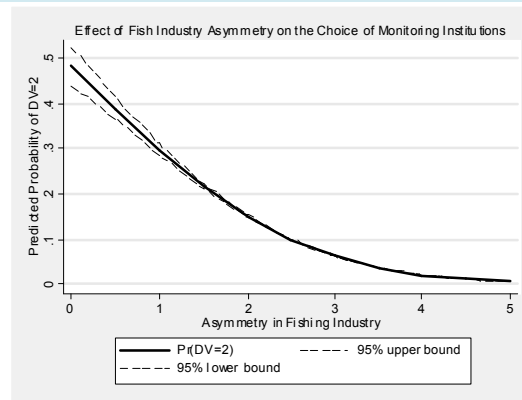
Figure 6.3 The Linear Effect of Asymmetry on the Choice of International Monitoring Systems

ASYMMETRY AND MONITORING CHOICE:
MONOTONE PREDICTION

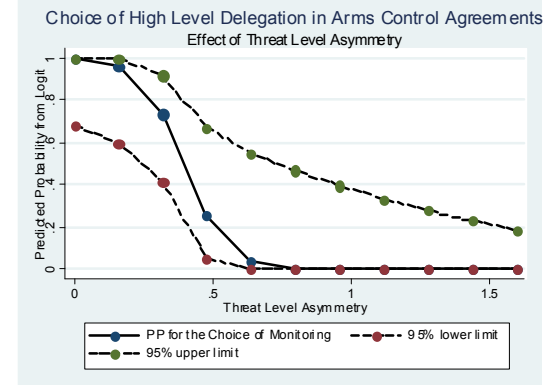
Regional Trade



Regional Fisheries



Arms Control

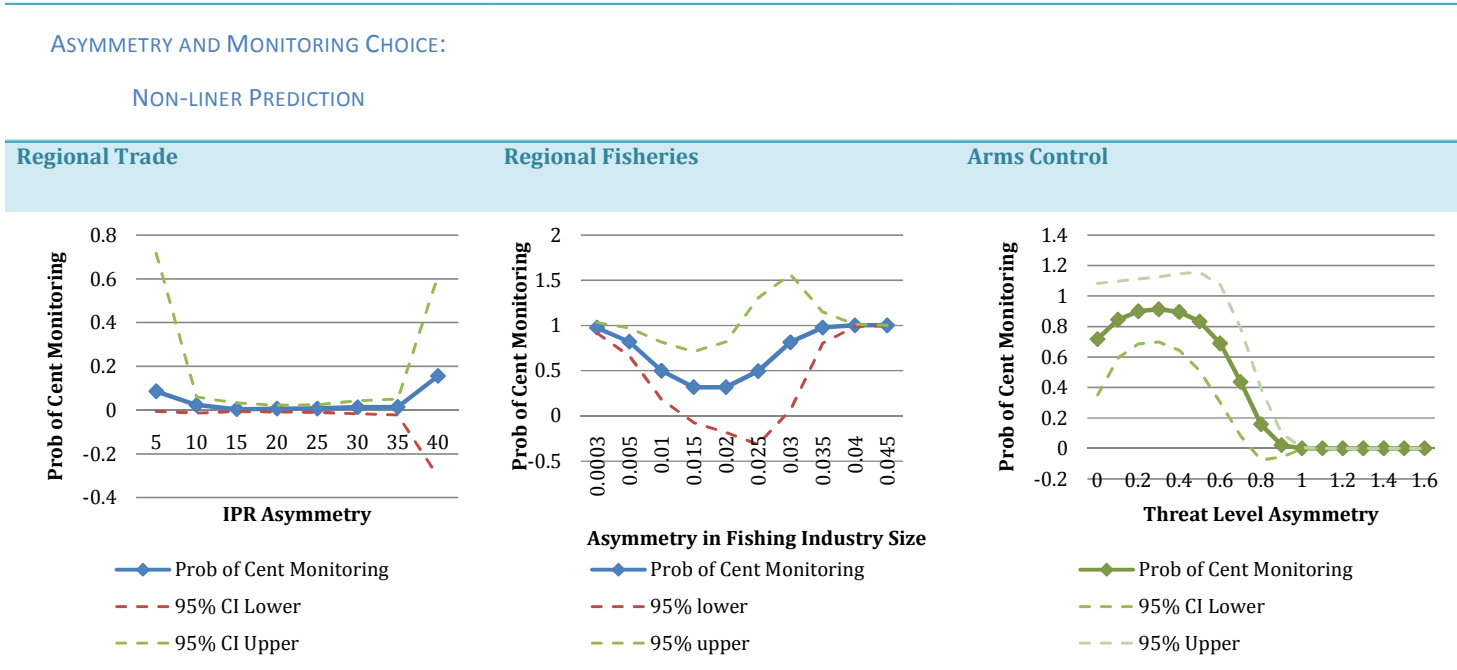


Although the overall effect of asymmetry on the adoption of centralized monitoring is negative, its effect is not necessarily monotonic. We have also seen that countries in the sample expect to benefit from having an international monitoring body. Amid the kinds of asymmetries we have mentioned, some states reap substantial benefits from delegating informational capacity to international organizations.

If we further investigate the non-linear statistical effect of asymmetry, we find that the asymmetry has a positive effect on the development of international monitoring systems in certain regions of asymmetry, as Figure 6.4 shows. The positive effect of asymmetry only occurs when the asymmetry is extreme. This means that countries with large asymmetries between them are more likely to institute a monitoring mechanism. At the same time, the reader should be cautioned that, given the small sample size of centralized monitoring institutions, the reliability of this effect should be further tested. This is particularly true in the case of arms control agreements, where the sample size numbered 38. However, this empirical pattern generates a puzzle that the theory did not address: the issue of what types of countries initially enter negotiations to sign an agreement.

Since the data only covers countries that have entered into agreements, the sample is not completely adequate to test thoroughly the effects of the heterogeneity of potential member states. Some countries may not appear in the dataset, despite the high level of asymmetry they exhibit. Those countries may have screened themselves out of the sample. It is likely that structurally similar countries tend to initiate international negotiations to produce agreements, and we may be overlooking many potential member states that could have entered the agreements. This issue of voluntary exclusion from membership prompts us to re-think our methods for treating non-member countries and their substantive effects on the development of institutions. This also lets us think about the bargaining process that contributes to the making and un-making of international institutions.

Figure 6.4 The Non-linear Effect of Asymmetry on the Choice of International Monitoring Systems



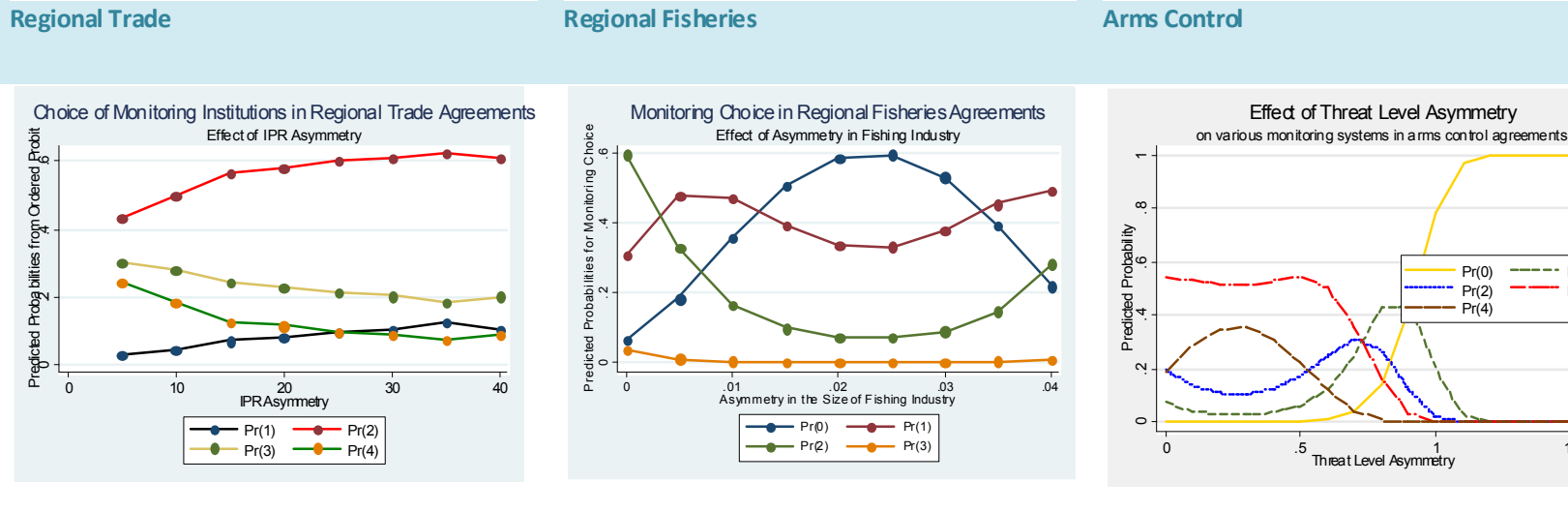
In relation to the issue of selection into agreements, the non-linear analysis shows that the arms control issue area has a different pattern with regard to the effect of asymmetry. The non-linear term in arms control is significantly negative but the same square term is positive in fisheries and regional trade agreements, which produces the differing effect of asymmetry on the design of monitoring institutions. I made a conjecture that the peak at the extreme asymmetry may be due to the cohesion among member states in regional trade and fisheries case. In contrast, arms control case has a little hump at the lower level of asymmetry because states realize the benefits when the asymmetry is not so great. It has monotonically decreasing pattern in asymmetry maybe because countries in asymmetric environments are more careful entering an agreement. Again, the selection process may be different in arms control case from other two cases, which requires further analysis on the negotiating process of each issue area.

Thus far, I have presented the results of statistical analyses that used dummy variables to yield a choice of “delegation” or “no delegation” in both linear and non-linear statistical models. In reality, however, monitoring systems come in different shades. The results of ordered analysis are presented in Figure 6.5. The benefits of ordered analyses are two-fold. The first is that we can see how sensitive the probabilities are to changes in asymmetry. Compared to the areas of fisheries and arms control, the trade issue area exhibits rather stable patterns in terms of bringing in institutions. We can conclude that predictions regarding the adoption of monitoring institutions in regional trade agreements are relatively stable, while similar predictions in the areas of fisheries and arms control are volatile.

The second benefit of ordered analyses is to predict, more specifically, the particular category of monitoring system that will be adopted depending on the asymmetry levels and other control variables. We are able to generate predictions about the likelihood of getting one monitoring system over the others. For instance, we can see that when two countries exhibit an asymmetry level in the size of their fishing industries of about 0.2, the probability of their opting for no monitoring system is as high as 0.6; the probability of their having either a political commission, a scientific committee or an observer system is about 0.3; and the probability of their having two systems is about 0.1.

Figure 6.5 The Ordered Analysis of the Effect of Asymmetry on Monitoring Choice

ASYMMETRY AND MONITORING CHOICE:
ORDERED ANALYSIS



Identifying compliance-environment asymmetry as the source of distributional conflicts is, by itself, not enough to explain fully the making of monitoring institutions. One complicating factor in the analysis of the choice and design of monitoring systems is that the asymmetries we have identified may not be the only proximate cause of compliance behaviors that, in turn, determine the amount of flexibility allowed under a particular agreement. Other theories have suggested other potential causal mechanisms, indicating that political differences or economic power differences may affect the outcome of institutional bargaining. With these existing theories in mind, I have examined the effects of polity differences as well as of bargaining power differentials by including such variables as control variables.

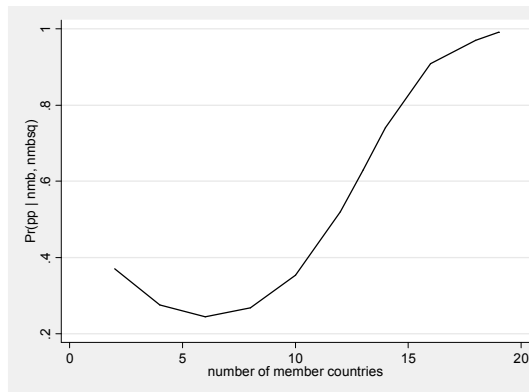
The findings about the effects of polity differences are mixed in our three issue areas. It turns out that polity asymmetry – the standard deviation of polity scores of member countries – has a statistically significant negative effect on the design of monitoring institutions in the case of regional trade and arms control cases. This is an expected effect. But polity asymmetry had a slightly significant and positive effect in the case of regional fisheries agreements. We can discount this positive effect in the case of fisheries due to its low level of statistical significance; still, this result presents us with a puzzle as to why fisheries agreements exhibit a different effect than either arms control or trade agreements with respect to the differences in polity scores.

Among the other control variables, the effect of the number of member countries is worth considering, given the traditional concern about collective action problems. The theory of collective action suggests that the number of participants may increase collective action problems. The composition of the group matters too, of course, whether or not collective action problems are present, but if we bracket the characteristics of member countries, then the rising number of participants can be expected to have a negative effect on institutional development.

Surprisingly, the effect of a rising number of participants is ambiguous in the case of international agreements, and even sometimes defies the conventional wisdom that a large number of participants is not conducive to institutional development. In fact, the regional trade case shows that a large number of participants is more conducive to institutional creation, all other factors being equal (even controlling for different kinds of

asymmetry). This effect is graphed in Figure 6.6. The number of participants was not significant in the analysis of regional fisheries agreements and arms control agreements, but still appears to have a positive effect on the probability of getting a more delegated monitoring institution.

Figure 6.6 Number Effect in Regional Trade Agreements



The U-shaped pattern of the relationship between asymmetric environment and the likelihood of the adoption of monitoring institutions suggests that there is something different about the international agreements that distinguishes them from other types of contractual relationship. Countries enter into agreements with the expectation that there is a positive probability that the agreement would be concluded and the members are usually like-minded countries. This self-selection at the outset of international negotiations may distinguish this process and its outcomes from other kinds of negotiation.²⁷⁸

Upon closer examination, the second part of the U-shape (the increasing trend at the right-end tail) reveals the unique feature of international agreements. It shows that countries that enter the negotiation stage usually do so as a cohesive group, and existing asymmetries are overcome or resolved even before the agreement-making stage. As Downs and Rocke (1998) argued, we analysts tend to observe only a truncated sample of

²⁷⁸ International relations scholars began to pay attention to the fact that countries self-select into international agreements. Some works in this area attempt to take into account this selection issue and various statistical methods have been employed and their relative benefits are currently debated (See for instance Ringquist and Kostadinova 2005; Baier and Bergstrand 2005). I plan to address this selection issue in my future research.

countries that have entered agreements. Agreements between countries facing a high level asymmetry may have been screened out of the international agreement sample pool, and what we observe is a rather cohesive group of countries in which the sheer number of participants does not complicate the development of monitoring systems. This raises an interesting research question about non-cases (i.e. cases that did not enter the agreement phase)²⁷⁹ and pre-agreement bargaining.

The U-shape and the potentially positive effect of the increasing number of participants is in stark contrast to the finding of a mound-shape reported in Agrawal and Goyal (2001) with respect to the establishment of monitoring systems in Indian villages. The authors found that as the number of villagers increased, the probability of having meetings and allocating a larger budget for monitoring at first increases but then decreases.²⁸⁰

Taken together, the empirical results presented in this dissertation's three empirical chapters convey the same message: that the more heterogeneous compliance environments are among member states in an international agreement, the less likely it is that an international monitoring institution will emerge. At the same time, the evidence collected here suggests subtle differences across our three issue areas. For instance, fisheries agreements are formed exclusively between countries with similarly structured fishing industries (i.e. similar size of fishing industry). Arms control and regional trade agreements, for their part, are not usually based on such similarities.

In addition to adding a new research question, the evidence also produces a challenge to the application of existing theories to the design of international agreements. International agreements do not conform to what traditional collective action theory would predict. Larger groups of countries are more likely than smaller groups to institute some kind of international monitoring mechanism. This point prompts us to deepen our study of what leads countries to initiate agreements. In sum, the empirical investigation of the theoretical model put forward in this dissertation provides us with some confirming evidence, while also leaving us with some puzzles to solve in the future.

²⁷⁹ See Dimitrov et al. (forthcoming) for conceptualization of non-cases in international cooperation.

²⁸⁰ Agrawal and Goyal 2001, p.84

Although the proposed deductive theory is proven to be useful in understanding the design of monitoring institutions, the inductive process of looking at the cases suggests that other dynamics are also in action. Specifically, I find that the determinants of institutional patterns states utilize to manage information in international cooperation are not restricted to the strategic concerns I highlighted in my theory. As recent studies on policy diffusion²⁸¹ suggest, emulation has occurred among similar sets of regional trade agreements. The emulation was not just a copy of previous agreements but reflected the consideration of reputation costs or the expectation of future relations with other countries outside of the specific agreement. In the case of the fisheries agreements, the question of nested and overlapping monitoring systems arises. In the arms control case, the effect of systemic factors²⁸² as well as strategic interactions was strongly felt on the design of monitoring institutions.

This research therefore answers the questions about how states design monitoring institutions, but simultaneously leaves other questions for further research. I show theoretically and empirically that strategic interactions and uncertainty about each others' compliance environments influence the design of monitoring institutions. Although I uncovered the common structure, empirical details also revealed the need to study emulation dynamics, nested institutions, and systemic changes, in conjunction with the proposed strategic factors in designing international institutions.

Policy Memo

Negotiating Strategies while Building Compliance Environments

Monitoring institutions are systems designed to collect compliance-related information, including information about compliance behaviors and compliance environments – political and economic conditions that could contribute to compliance with international obligations. In recent years, international monitoring institutions have played an increasingly important role in peacekeeping operations, environmental management, and enforcement of human rights. The goal of this memo is to provide

²⁸¹ Simmons et al. 2006.

²⁸² Characteristics of international system

recommendations to the various parties involved in negotiations to create politically viable and potentially effective monitoring institutions.

The policy suggestions are based on the theoretical argument and empirical evidence presented in previous chapters. The theory suggested the potential obstacles to building a centralized monitoring system when member countries' compliance environments differ. The difficulty however does not mean impossibility. The theoretical mechanism has provided a positive analysis as to how distributive conflicts arise from disparate compliance environments. By thinking about the ways to alter some theoretical elements that are subject to manipulation,²⁸³ we can reach some meaningful policy suggestions.

This memo is addressed first and foremost to the policymakers involved in international negotiations to establish monitoring bodies, and secondly to the representatives of international organizations, both existing and future. The recommendations are conveniently divided into negotiation phases (before negotiation, during negotiation and after negotiation) to facilitate timely implementation.

Memo to Negotiating Parties

You are negotiating to create a monitoring system for a specific international agreement. Table 6.2 lays out for you the available monitoring options, including (1) the diplomatic track, providing for consultation among the involved; (2) agreement-specific political institutions, such as intergovernmental bodies; and (3) international third parties, with or without binding clauses. These options fall on a spectrum, with the latter systems showing greater centralization and having a higher level of autonomous authority and informational capacity with resources to collect and analyze information about compliance. Hybrid systems and gradations of functions are also possible. The weaknesses and strengths of each mechanism will be discussed within the context of the following recommendations.

²⁸³ This process involves relaxing the model assumption about variables being exogenous but thinking about what determines those variables.

International third parties are known to operate effectively as information providers, thereby promoting cooperation.²⁸⁴ Nevertheless, attempts to build such mechanisms are often met with resistance for various political reasons. This policy memo identifies such obstacles and offers suggestions for defusing and resolving potential conflicts. Although decentralized monitoring is desirable under certain circumstances—where compliance is purely local and where incentives to hide compliance information are not strong²⁸⁵—most current compliance problems inevitably involve state control and an international third-party mechanism is essential in promoting compliance.

Table 6.2 Available Monitoring Options

Options	Corresponding institutional arrangements	Examples	Weaknesses and Strengths
Diplomatic track	Inquiry points (contacts among existing government units) Voluntary reporting requirements	Many bilateral agreements (e.g. government hotline); WTO/TBT (Technical Barriers to Trade) Human rights reporting under six major human rights agreements ²⁸⁶ ; WTO policy review mechanism; IAEA Safeguards system	Effective when information is cross-checked; usual voluntary reporting may omit relevant new information (or may contain grossly distorted information)
Agreement-specific political institutions	Intergovernmental bodies	Intergovernmental bodies in regional trade agreements Councils in fisheries agreements Bilateral Commissions in arms control agreements	Facilitate diplomatic solutions, but contains no built-in assurance mechanism
International third parties	Standing courts or inspection bodies	European Court of Human Rights East African Court of Justice	Improve cooperative benefits if adequate monitoring capacity is given. However, the establishment could face oppositions:

²⁸⁴ Keohane and Axelrod 1985

²⁸⁵ See Ostrom 1990 for the study of decentralized monitoring systems in the context of common pool resources.

²⁸⁶ International Covenant on Economic, Social and Cultural Rights (ICESCR), International Covenant on Civil and Political Rights (ICCPR), International Convention on the Elimination of All Forms of Racial Discrimination (ICERD), Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT), and Convention on the Rights of the Child

		International Atomic Energy Agency	Binding rulings may create opposition from countries with unfavorable compliance environments; combination of binding-ness and flexible mechanisms can create opposition from countries with favorable compliance environments
--	--	------------------------------------	--

Recommendation 1: Before negotiation, identify compliance environments.

Assess your own political and economic conditions and those of others that may potentially affect compliance with the goals of the international agreement. These conditions establish your “compliance environments.” A checklist for assessing compliance environments includes, but is not limited to, 1) the lobbying strength of sensitive sectors in your own country and potential partner(s) that are potentially vulnerable to the terms of the agreement (e.g. the agricultural sector, the steel industry in the case of trade agreements, and so forth), and 2) national capacity to monitor compliance (e.g. surveillance technology, military control in case of security agreements). After identifying compliance environments, try to aggregate and summarize the differences between your own compliance environment and your partners.’

Recommendation 2: Before starting negotiations, understand that negotiating positions regarding monitoring systems can stem from the assessment of compliance environments.

Large differences in compliance environments between you and your partners are likely to hinder the development of efficient third-party monitoring on the international level. For example, note the possibility that your negotiating partner with a sensitive sector may be reluctant to establish a dispute settlement mechanism because of the binding conditions a third party may impose and the corresponding political costs. If safeguards are established to allow political escapes, this reluctance may be lessened. By sacrificing depth of cooperation in this way, you may achieve the desirable goal of a more centralized monitoring system.

If negotiations involve partners with unfavorable compliance environments, you may expect negotiations to be delayed, and it may be beneficial to start with a diplomatic monitoring system, such as an intergovernmental body composed of government bureaucrats. Seize every opportunity to push for the establishment of specialized working groups or committees (e.g. expert bodies in human rights agreements, scientific advisory bodies in environmental agreements, and technical review committees in trade agreements) to enhance the informational capacity of the international body.

Recommendation 3: After identifying compliance environments and before negotiation, make efforts to improve them.

If you are a party with an unfavorable compliance environment, make strenuous efforts to monitor *yourself*. These efforts will signal to the other party that you are determined to increase the level of your commitment and to avoid violations of treaty goals. For instance, by setting up national bodies empowered to resolve conflicts between your government and your country's sensitive sectors,²⁸⁷ you can reassure your negotiating partner that your government will exert some level of control over the compliance behavior of those private entities, thus making your compliance environment more transparent.

Some cases may inevitably involve political decisions to violate treaty obligations due to particular interest group pressure or economic hardships. To prevent those situations, it is prudent to encourage the development of counter-groups in domestic politics, respecting different balancing forces.

Recommendation 4: At the proposal-making stage, weigh the available options for monitoring systems in consideration of other legal provisions and offer a system that demonstrates your commitment.

Recall that in general your options include global-level institutions, the diplomatic track, or agreement-specific institutions, and that you may add specific features to each institution. Your proposal depends on compliance environments, your own and your

²⁸⁷ These solutions have been actually suggested in several bilateral regional trade agreements, including the case of Chile-ROK FTA.

partners.’ If your domestic compliance environment is not favorable to the proposed commitments in the agreement, rather than proposing nothing, make a proposal to have a third party without binding conditions. Such a proposal will demonstrate the commitment of your country, without compromising too much in terms of possible future reputational loss from future violations. Alternatively, you can offer to establish intergovernmental bodies with specific informational functions, which may be more acceptable to the other party. This latter option to choose established diplomatic venues such as intergovernmental bodies can become a stepping-stone toward more advanced monitoring systems in the future.

Likewise, if you are a party with a favorable compliance environment (e.g. with little domestic political pressure against international commitments), a third party system with binding conditions is a reasonable choice for you in order to pressure the other party to commit to the proposed goals of the treaty. As long as the mechanism sufficiently guarantees continuing cooperation during normal times, it will be acceptable to the other party. However, if you expect that the other party will frequently invoke flexible mechanisms to satisfy its domestic constituents, a third party system may not be an appealing option to you.

Table 6.3 Summary of Suggestions depending upon Compliance Environments

	Relatively favorable domestic compliance environments	Relatively unfavorable domestic compliance environments
Pre-negotiation Efforts	Thoroughly assess your and your partners’ compliance environments	Monitor yourself , for example, by establishing conflict resolution bodies
Proposal-making during Negotiation	Propose a third party with adequate capability of dealing risks of monitoring	Propose intergovernmental bodies or third parties without binding conditions
Acceptance Range of Monitoring Options	Accept binding conditions if the disparity in compliance environments is not large. Reject binding conditions if the disparity is large and when you have to guarantee many escape clauses	Accept binding conditions if flexible mechanisms are guaranteed.

Remember that monitoring systems operate in conjunction with other provisions in the treaty. Enforcement systems (namely, the possibly binding power of third party recommendations) and decision-making processes are particularly relevant to monitoring

decisions. The negotiation over monitoring systems is often made difficult exactly for the reason that monitoring decisions are made in relation to these other provisions. When monitoring systems are established, a decision should be reached without delay regarding the binding or non-binding character of third party recommendations, a decision that, again, will largely hinge upon the level of asymmetry and imbalance in compliance environments among potential members.

Flexible mechanisms also affect the positions of negotiating parties regarding monitoring systems. Flexible mechanisms such as escape clauses in trade agreements or reservation clauses in human rights agreements allow states to retain a degree of policy discretion and therefore create distributional conflicts over the choice of monitoring systems. If a country with an unfavorable environment pushes for too many flexible mechanisms under binding conditions, other countries with favorable compliance environments are likely to oppose the idea of having third parties because they might have to allow many cases of flexible mechanisms.

Recommendation 5: During negotiation, recognize your preconceptions and work against them to leave room for persuasion. In other words, be open to evidence that your prior beliefs might need updating.

Do not assume that the other party does not want rule-based mechanisms. Conventional wisdom holds that powerful countries do not want to relinquish their policy discretion to international organizations. Although this is true to some extent, there is no *a priori* reason to think that powerful parties do not want rule-based mechanisms. The United States eventually accepted the dispute settlement mechanism under the global trade system, illustrating that powerful countries also favor creating international organizations that can dependably promote compliance.

During negotiation, try to play up the potential benefits of third party monitoring bodies. In doing so, try to address the concerns expressed by domestic opposition groups in the powerful country. If there are concerns about the technology or informational capability of third parties, form a coalition with other like-minded countries or form a working group to air and then resolve the difference in views. Since more powerful countries have bargaining leverage, their concerns should be addressed in such a way as

to avoid unanticipated conflicts during negotiation. Do not be discouraged by the powerful party's initial rejection of third party monitoring mechanisms, but continue to play up the potential benefits.

Recommendation 6: Improve the proposed system and re-shape the expectations.

Propose ways to improve the third party mechanisms, since expectations about how the monitoring institution will perform can influence the decision of the other party. For example, if critics emphasize the inadequacy of third party monitoring because of its potential inability to detect violations sufficiently, provide scientific evidence to the contrary and suggest improvements to that body. Outright rejection of potential monitoring or surveillance systems often stems from political arguments and carries political overtones, as illustrated by the debates within the International Whaling Commission (IWC). The adoption of the Revised Management Scheme (RMS) has been stalled for ten years due to the divergent negotiating positions of pro-whaling and anti-whaling countries. In such cases of heated disputes, the involvement of a neutral scientific body becomes essential to settle the debates over scientific uncertainty and to defuse and refocus ossified political conflicts.

Another way to improve the proposed system is to reduce the likelihood of errors. Two risks exist in performing monitoring functions: failing to spot violations and falsely accusing innocent countries. A well-functioning monitoring body requires sufficient resources to ensure a high level of success in spotting violations, with remaining resources devoted to reducing the risk of false accusations, thereby avoiding diplomatic wars. Unfortunately, however, broad support for both these goals is difficult to achieve among involved nation states, especially when state parties have different compliance environments. Your partners, if they have unfavorable compliance environments, will likely want to focus on reducing the risk of falsely accusing suspected countries, rather than on the risk of detection failure.

The key to bridging this gap is for you to devote sufficient resources to reducing the kind of error that all parties can immediately agree needs to be addressed, thereby building support for reducing the other kind of error. This has been the experience of the

International Atomic Energy Agency (IAEA), which started by introducing a comprehensive safeguards system that allowed basic and regular inspections, and then gradually focused on the reduction of detection errors by strengthening its safeguards system and adopting Additional Protocols.²⁸⁸ This gradual approach will help build confidence and improve the overall system.

Another way to re-shape the expectations is to encourage different voices in domestic political arena. International relations scholars, such as Raustiala (2004) and Dai (2005), give specific examples where domestic environmental groups pushed forward the agenda of establishing international monitoring institutions, in their respective case studies on the NAAEC²⁸⁹ and LRTAP.²⁹⁰ This solution may be less feasible in international security issues but highly applicable to other issues. The existence of such domestic groups works in favor of national delegations when they want international monitoring as those groups could counter-act the opposition in domestic politics.

All the proposed recommendations are geared toward improving the international monitoring systems when they are needed. The goal is to satisfy national interests while seeking better global governance. Negotiators should not lose sight of the big picture in formulating national positions and implementing the recommendations.

²⁸⁸ For the IAEA safeguards system, see

http://www.iaea.org/worldatom/Programmes/Safeguards/safeg_system.pdf

²⁸⁹ North American Agreement on Environmental Cooperation (NAAEC) was born during the NAFTA negotiation.

²⁹⁰ According to Dai, the terms of the Long-range Transboundary Air Pollution (LRTAP) were highly influenced by the domestic environmental groups.

Memo to International Organizations

This memo is mainly addressed to officials and representatives in existing international organizations who are increasingly involved in the negotiation of new monitoring bodies. For example, international organizations, especially the United Nations, often participate in constructing other international institutions, as in the case of the Montreal and Kyoto Protocols, which were concluded under the aegis of the United Nations Environment Programme (UNEP). As officials and representatives in existing international organizations, you may therefore in the future find yourself in a position to play a more active and shaping role during the negotiation of new monitoring bodies. This memo may also be relevant to bureaucrats in newly established monitoring bodies who see a need to improve existing monitoring mechanisms and arrangements.

Recommendation 1: Prior to negotiation, expect moderate opposition from the state parties.

Differences among member countries' political and economic conditions (which can be conveniently termed "compliance environments") can lead to divergent proposals with respect to monitoring systems. When disparities in compliance environments are not large, parties will not have much difficulty accepting third parties into the agreement. However, when the disparities are large, divergent negotiating positions regarding monitoring systems are to be expected. Parties with favorable compliance environments may not accept third parties because they feel they will have to allow too many escape clauses to the party with unfavorable compliance environments. The parties with unfavorable compliance environments, on the other hand, have incentives to accept such centralized monitoring systems only if they are guaranteed flexible mechanisms such as escape clauses. They are, however, generally averse to such systems when they foresee losing reputation because they expect frequent violations during the implementation stage. Given such differences in negotiating positions among parties when the disparities are large, international organizations can still play a crucial role by highlighting the potential benefits of working with international institutions and joining international agreements, as well as by moderating negotiating proposals. The following

recommendations can help existing international organizations to highlight the potential benefits of strong monitoring mechanisms within the framework of international agreements.

Recommendation 2: During negotiation, seek to broaden networks with other international organizations.

Expanding the knowledge base through networks that include other international organizations is an effective method currently practiced by many existing international organizations. For example, the TRAFFIC network (the wildlife trade monitoring network) is heralded as a successful example of pooling environmental data to strengthen implementation of the Convention on International Trade in Endangered Species (CITES). By establishing networks with other international institutions and promoting inter-agency cooperation, organizations benefit in three ways. First and foremost, the network can facilitate information flow while avoiding excessive information overlap. Second, creating a system where information can be cross-checked means more reliable information. Third, new organizations can create positive mission creep within the parameters of the authority delegated by the state parties.

Recommendation 3: Find ways to engage non-governmental organizations, but also be wary of their potentially negative effects.

Engaging non-governmental organizations (NGOs) is the principal method of gaining more leverage over information about compliance and expanding informational capacity. NGO involvement is rarely sufficient, by itself, to monitor compliance but will be particularly necessary when your organization does not have broad global reach. The relevant NGOs will function as fire alarms and thus provide ways for cheap and effective monitoring. However, be aware that NGOs often advocate partisan views, since most of them have advocacy roles. It is important to engage with a number of NGOs with a variety of views in order to avoid opposition from state parties. Member states, particularly democratic countries, are mindful of public opinion, and therefore, they may oppose the idea of expanding knowledge bases perceived to be biased. Recall the recent

Abu Ghraib scandal where intergovernmental organizations (IGOs) such as the International Committee of the Red Cross (ICRC) had to be cautious about making their information public for financial and political reasons, in addition to reasons pertaining to the ICRC's own internal policy of neutrality and discretion. In contrast, NGOs such as Amnesty International published their explicit opinions, some of which were not readily accepted by the United States government.

In sum, expect moderate opposition regarding NGO involvement and strive to establish systems that engage organizations with sufficiently diverse views to avoid such accusations of bias and opposition. How the information is eventually used affects future decisions to establish monitoring systems, and in this regard, NGO involvement should be carefully considered. Currently, NGOs participate as observers in many treaties, and expanding knowledge bases by including more NGO participation should be conditioned upon the potentially divergent views of monitoring institutions held by negotiating parties, views stemming from political and economic systems that in turn affect compliance. If you expect negotiating parties to hold dramatically divergent views, try harder to bring in a broader spectrum of views from NGOs.

Recommendation 4: Learn about potential risks in monitoring.

As representatives of international organizations, it is important for you to be aware of the potential failures and misfires of monitoring systems. Two risks exist in performing monitoring functions: failing to spot violations and falsely accusing innocent countries. The kinds of risks the organization is willing to take influence the form monitoring institutions will take. In general, a sufficient level of success in spotting violations is necessary to have legitimacy as a monitoring body, and remaining resources can be spent on reducing the risk of false accusations to avoid diplomatic wars. Nominally, every organization has to focus primarily on deterring violations; however, it is not easy in practice to draw on a consensus on this point among involved nation states, especially when state parties have different compliance environments. Depending on the compliance environments they are in, some countries may want to focus on reducing the

risk of falsely accusing suspected countries, while others may want to focus on reducing the risk of detection failure.

Also note the tradeoff between two types of errors. Reducing one type of monitoring error may actually increase another type of error. Focusing on deterring violations can make the system hypersensitive and thereby increase the risk of false accusations. Similarly, avoiding false accusations can increase the risk of detection failures. A delicate balance may have to be struck depending on the demands of the states, although the general rule should be followed of focusing primarily on deterrence.

Recommendation 5: Find ways to bolster accountability and legitimacy.

Gaining legitimacy should be one of the primary goals for any international organizations: by forming appropriate expectations regarding their role and by creating positive mission creep, international organizations can develop into efficient and reliable information collectors and providers. Eventually, they will be able to gain further support from member states for expanding their informational roles. This sought-after legitimacy is likely to come from implementing the above recommendations. For example, building networks with other international organizations can enhance the use of information by providing opportunities for double-checking. Recently, many international organizations have streamlined their reporting procedures and adopted a uniform format to facilitate reporting by state parties. Although this effort is laudable, data voluntarily reported by countries may contain inconsistent or incomplete information, and therefore, establishing networks with other international organizations can provide more reliable information.

Accountability can also come from establishing an oversight body that can operate as an internal audit system, similar to the World Bank Inspection Panel. The Panel takes requests from various parties be affected by Bank projects, including NGOs, governments and private citizens, and investigates problems and addresses concerns about the Bank's projects when necessary. The suggested measures to enhance legitimacy and accountability are essential in the management stage, but such considerations will aid

the negotiation process when state parties have divergent expectations about monitoring bodies.

Concluding Remark

International third parties are difficult to establish, despite their potential benefits in terms of promoting transparency with respect to compliance environments. Both international negotiators and potential third parties should recognize that member countries' political and economic differences regarding compliance can negatively affect their choice of monitoring mechanisms. It is therefore essential for negotiators as much as possible to de-politicize their negotiations over monitoring systems. It is essential to recognize potential differences *before* negotiation and improve understanding of each others' compliance environments by eliminating domestic obstacles to compliance. Existing international organizations, likewise, should focus their efforts on improving their informational capacity to the extent possible by building informational networks with NGOs and setting up internal audit systems. Managing information based on these measures will constitute an important step toward effective global governance.

From Design to Practice: How Monitoring Institutions Actually Work

This dissertation thus far has focused on statutory aspects of monitoring institutions. Adding to the analysis of *de jure* aspects of monitoring arrangements, this section studies their *de facto* aspects through evidence of actual practices. By looking at how monitoring institutions operate, we can get a better sense of the purpose of their design, while also learning about how monitoring institutions further cooperation. We can also examine how and when political conflicts obstruct the workings of existing arrangements. Since a systematic study of the effectiveness of monitoring institutions lies beyond the scope of this dissertation,²⁹¹ my approach here will be illustrative rather than exhaustive. Accordingly, this section provides cases from three issue areas illustrating how monitoring institutions judge different kinds of violations (e.g. as involuntary or as undeterrable defections²⁹²) and how states respond after such judgments are made.

I first identify the scope of involuntary or undeterrable defections in each issue area and excavate some cases that involve those kinds of defection. Cases echo the same theme explored throughout this dissertation—that countries try to utilize international organizations to further cooperation but face distributional conflicts due to the various kinds of defections that hamper commitments to international obligations. Through these particular cases, then, I intend to show that distributional conflicts continue play a decisive role in the adoption of monitoring agreements as well as in the operation of the international bodies that do the monitoring. I also discuss other theoretical elements such as the nature of commitment problems and the respective positions of involved actors regarding monitoring arrangements.

²⁹¹ International relations scholars recently embarked on the efforts to assess the effect of international agreements or institutions (see Ringquist and Kostadinova 2005 for the case of the 1985 Helsinki Protocol, and Tomz, Goldstein and Rivers 2007 for the effect of WTO) and it may be too early to tell the effect of specific institutional arrangements like monitoring systems.

²⁹² As discussed in Chapter 2, these violations abstractly refer to cases where the cost of compliance is large and reciprocity does not work. These cases can arise either 1) when private parties within a country willfully violate international agreements, thereby causing involuntary defections on the part of a state; or 2) when the cost of compliance is prohibitively high due to domestic political demands for protectionism. The first category consists of “involuntary” violations and the second consists of “undeterrable” violations.

In this section, I primarily look at the workings of global institutions. Note that monitoring institutions come in different forms and operate at different levels, from global to regional to bilateral to domestic. The co-existence of these levels may result in countries having more leeway to select an appropriate and/or advantageous forum when disputes occur. Added levels may operate as complementary systems. For instance, if two countries fail to achieve resolution through bilateral consultation, then regional or global monitoring bodies embodied in regional or global trade agreements can take up the issue for review. Future research will look at how different levels of institutional arrangements interact, which could provide us with a more comprehensive view of how monitoring institutions work in international politics.²⁹³

How International Monitoring Institutions Operate regarding International Trade

Systematic evidence has yet to be produced regarding the workings of the global trade regime, not to mention the workings of separate regional trade regimes. The World Trade Organization (WTO) has several sub-bodies that monitor the implementation of global trade regulations, including the Trade Policy Review Mechanism (TPRM) and the Dispute Settlement Mechanism (DSM). The TPRM is for regular reviews of domestic implementations (e.g. changes in legislation) and the DSM for disputes brought by complainant countries. Technically, the TPRM and DSB are separate processes but they work as complementary institutions for monitoring purposes. TPRM examines the trading practices of each WTO member whereas DSM focuses on the legal compatibility or compliance with WTO rules when suspected violations occur.

The primary goal of TPRM is to enhance transparency. All WTO members are subject to review on a regular, periodic basis²⁹⁴ and the review is based on reports submitted by each party regarding the details of domestic trade policy

²⁹³ This investigation also addresses some aspects of forum shopping literature that is currently developing in the field of international organizations. See Davis 2007 and Busch 2007.

²⁹⁴ The review is held every two years for the four members with the greatest share of world trade (currently the European Community, the United States, Japan and Canada), every four years for the next 16 members (ranked in terms of their share of world trade), and every six years for other members, with the possibility of a longer term period for the least-developed countries.

implementations.²⁹⁵ The TPRM is essentially a preventive mechanism to avoid unnecessary retaliations before they occur by reviewing member nations' trade policies. This is particularly important in the case of policies that may cause undeterrable violations when protectionist actions will yield large temporary political benefits to a particular party. The Review Mechanism was only established in 1989 and it is too early to judge the workings of TPRM, but the basic operating logic is to enhance transparency and thereby increase the power of preventive measures.

The institutional effectiveness of the Dispute Settlement Body (DSB) has also not yet been determined. Looking at all fifty cases that reached the Appellate Body (AB), Garrett and Smith (2001) assess compliance records of disputants and conclude that the overall record of compliance is not impressive. They report that it takes one year on average for countries to comply with decisions of the AB. If we add to this the 15-month period it takes on average to reach a decision, we see that countries get to reap the benefits of protectionist measures for almost 2.5 years. The cases that reach the AB stage are likely to be highly controversial and attract public attention, in many cases generating a public diplomatic contest. Therefore, some countries resort to a post-adjudicative bargaining process to get a "reasonable period of time" to adjust their policies. The adverse consequences of procedural tactics of this kind can be damaging to the principle of free trade embodied in WTO rules.

Potential cases of undeterrable violations occur frequently in international trade. Politicians often find it difficult to cooperate due to protectionist demands from domestic groups; these politicians then face temporary incentives to impose protectionist measures to pander to groups with political clout. In this situation, politicians may resort to economic policies that fall in the so-called "grey areas," such as anti-dumping policies, or countervailing duties or safeguards, thereby walking the fine line between compliance and non-compliance. International law generally relies on the good will of countries to comply with international obligations, and the spirit of the law hinges on the principle of *pacta sunt servanda*. However, the letter of the law can allow some deviations to accommodate the politics of member states.

²⁹⁵ The notifications include the details of any new anti-dumping or countervailing legislation, new technical standards affecting trade, changes to regulations affecting trade in services, and laws or regulations concerning the Trade Related Intellectual Property (TRIPs) agreement.

The WTO steps in and issues its rulings in such controversial cases that activate the dispute settlement mechanism. The DSB judges a particular case based on relevant legal criteria and often looks into administrative procedures. For instance, in dispute cases that involve safeguards, the DSB weighs the fact that one of the requirements of safeguards measures is “unforeseen developments.” In the case of the 2003 steel case,²⁹⁶ for example, the appellate body concluded that the US failed to prove the need for safeguard measures, and one of the evidentiary documents submitted consisted of administrative opinions. While the law requires that there be a sudden and significant increase in imports,²⁹⁷ the United States government failed to prove that this was the case. In its ruling, the WTO panel found that the inconsistent and irreconcilable conclusions of three U.S. International Trade Commission Commissioners formed the basis for President Bush’s determination.²⁹⁸

Less well known, the WTO also has a follow-up procedure called compliance panel besides the panel and appellate procedures. The goal of the compliance panel is to monitor whether nations found in violation have worked toward lifting protectionist measures. The process however is not automatic. Any party that has issues about implementation progress can request for the establishment of the Compliance Panel. Thus far, among 331 total cases requested for consultation, only 10 cases reached up to the Compliance Panel stage.²⁹⁹

Various cases of trade relations provide mixed evidence about the overall effect of international monitoring arrangements. All the tactical delays within the dispute settlement process hurt the spirit of the WTO rules. High-profile cases not only nullify the effect of the DSB but also undermine the very basis of monitoring institutions. The systematic and scholarly evidence needed to investigate this field is still being gathered. The existing literature focuses heavily on policy outcomes—whether trade volume

²⁹⁶ *United States – Definitive Safeguard Measures on Imports of Certain Steel Products*, WT/DS248, 249, 250, 251, 252, 253, 254, 258, 259/AB/R, adopted 10 December, 2003.

²⁹⁷ See the case of *Argentina—Safeguard Measures on Imports of Footwear*.

²⁹⁸ Trachtman 2003.

²⁹⁹ The cases include high profile ones such as US-FSC (Foreign Sales Corporation), Canada-Dairy and EC-Banana. Horn and Mavroidis 2005. WTO Dispute Settlement Database The dataset is accessible at <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20804376~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html> Horn, Hendrik and Petros Mavroidis 2006. “The WTO Dispute Settlement System 1995-2004: Some Descriptive Statistics”

increases or not³⁰⁰—instead of on the various behavioral implications of what institutions did to change countries' behaviors. Further research on behavioral changes influenced by monitoring institutions will include issues such as 1) when and why countries resort to dispute settlement rather than negotiation and 2) when and why countries restrain themselves from imposing retaliatory and protectionist measures.

How International Monitoring Institutions Operate regarding International Fisheries

Global environmental cooperation depends on the collection and sharing of reliable scientific evidence, given the inherent uncertainty that exists about the true state of the world. Resource management issues such as fisheries management are no exception to this rule. Judgments about the current status of the world's fish populations and about future risks also, in turn, condition judgments about what measures need to be taken. Global institutions that monitor fisheries include the UN Fisheries and Aquaculture Department (FAO), the Coordinating Working Party of Fisheries Statistics (CWP) and the Fishery Resources Monitoring System (FIRMS/FIGIS). In collaboration with those global institutions, regional fisheries management organizations (RFMO) provide monitoring tools for fisheries management.³⁰¹

Monitoring institutions that oversee fisheries include scientific bodies that provide advice for management and conservation, as well as regulatory bodies such as commissions that set management policies for matters such as total allowable catches (TAC) or catch allocation schemes. Adding to the scholarship that discusses fisheries management bodies,³⁰² this section attempts to assess the role of fisheries monitoring bodies in the 1995 Turbot War. Conflicts are the instances where people expect not much significant role for international institutions, but I intend to show how countries involved in the Turbot War recognized the benefits of having monitoring institutions. I also discuss

³⁰⁰ The most recent debate on the effect of GATT was between Rose 2004 and Tomz, Rivers and Goldstein 2006.

³⁰¹ A list of RFMOs can be found at <http://www.fao.org/fi/website/FISearch.do?dom=rfb>

³⁰² Exemplary works include Kaye 1979 and Peterson 2001.

how the involved parties re-designed the existing institutions to take into account their distributional concerns.

The theory of asymmetric compliance environments presented in Chapter 2 accounts for the preferences of concerned parties in utilizing international monitoring bodies. When a party is guaranteed flexibility mechanisms, it may be willing to submit itself to international monitoring or adjudication. Flexibility mechanisms have this effect because they grant the accused party the opportunity to demonstrate its compliance and thereby avoid unnecessary punishments. On the other hand, when a party expects commitment problems from other countries, then this party may not want to rely on international bodies because the informational benefit of having such bodies distinguish compliance from non-compliance disappears at the margin. The cost of allowing occasional violations, following the decision of a particular monitoring body, looms large when one of the parties has obvious commitment problems.

The Turbot War is a nice case to illustrate the relationship between commitment problems and the propensity of countries to accept international monitoring bodies when three conditions exist. The long duration of the Turbot War (1960-1996) allows us to compare different levels of commitment problems during both pre-dispute and actual dispute stages. When commitment problems were not an issue and fish stocks were abundant, during the 1970s, the Northwest Atlantic Fisheries Organization (NAFO) provided sharing arrangements to the relevant parties. When the commitment problem became prominent and when one party (Canada) started to expect violations by its counterpart (the EU), it preemptively took measures to opt out of the international body by filing a reservation. Canada also took measures not to be subject to the compulsory jurisdiction of the International Court of Justice with regard to conservation measures. Finally, it was able to arrange new monitoring mechanisms under the framework of NAFO as a result of negotiation with the EU.

The dispute started when Canada fired upon and seized a Spanish ship, the *Estai*, just outside of the Canadian EEZ, in March 1995. This was at a time when both Canada and the EU were noticing the depletion of fish stocks in the Northwest Atlantic. The dispute was as a result of an action by a small Spanish trawler – frequent cause of private violations that may be difficult to deter and often not attributable to state. Earlier, in May

1994, Canada enacted its own conservation measure, authorizing the Coastguard to seize any vessel suspected of illegal fishing. The *Estai* was using illegal nets that would not allow young fish to escape. At this time, Europeans were also dissatisfied with the catch allocation arrangements assigned by NAFO. In the aftermath of the seizure of the *Estai*, Canadian politicians benefited from a surge in public support. Opinion polls showed that the tough action was backed by 9 out of 10 Canadians interviewed.³⁰³

Recognizing the need for further action, Canada and the EU decided to strengthen NAFO's inspection system with measures such as verification of gear and catch records, and satellite surveillance; they also introduced regulatory measures such as fines and restrictions on fishing nets.³⁰⁴ The parties therefore established assurance mechanisms that would give each party some degree of confidence regarding the compliance of the other party. We should note that this bargaining outcome was part of the larger bargain to find a solution to long-standing distributional conflicts between Canada and the European Union. Before the dispute, the EU was not happy about the allocation scheme by NAFO that assigned to the EU only 12.5% of the 27,000-ton allotment, compared with almost 60% assigned to Canada. The EU therefore had decided to act unilaterally. As a result of the bargain after the dispute, the EU was able to triple the size of its allocation³⁰⁵ by agreeing to the new monitoring scheme. As discussed in the theory chapter, a trade-off exists between monitoring arrangements and enforcement schemes: some concession in the area of enforcement may be necessary to ensure commitment to a monitoring scheme. In this case, Canada made concessions regarding its allocation amount in order to establish a new inspection scheme within the framework of NAFO.

Another international body that played a role in this dispute was the International Court of Justice (ICJ). The Court decided to review the case because of the optional clause Canada filed before the dispute. Canada had filed a reservation to the compulsory jurisdiction of the ICJ that excluded cases involving conservation measures. The reservation conveniently came two days before the parliament passed the 1994 Coastal Fisheries Protection Act that authorized the seizure of any illegal foreign vessel.

³⁰³ Farnsworth 2007.

³⁰⁴ Ibid.

³⁰⁵ Ibid.

The Turbot War case shows that design factors continuously influence the implementation of monitoring institutions. NAFO operated as a management body for two decades, laying out sharing arrangements among member parties. However, this management power stopped working when the tragedy of the declining fish stocks got worse. When distributional conflicts became serious, countries resorted to unilateral measures rather than take a multilateral approach.

When Canada, the EU, and the United States concluded the NAFO agreement in 1969, there was no looming problem of overfishing. The relationship among these parties was rather friendly. This is consistent with the theoretical expectation that rather homogeneous fishing industry structures that did not generate much competition were amenable to the establishment of international monitoring bodies. For a while, the sharing arrangement crafted by NAFO was accepted by all members.

Circumstances changed in the mid-1980s. Canada, politically hurt by its declining fishing industry in Nova Scotia in particular, took domestic measures to prevent other countries from fishing in its EEZ waters. Once commitment problems loomed large, the countries' propensity to accept the NAFO arrangement declined. At this point, the Canadian government even went so far as to submit a declaration to limit its exposure to compulsory jurisdiction in issues of conservation. As mentioned, the timing was such that the reservation came two days before the parliament passed the Coastal Fisheries Protection Act that authorized the seizure of any illegal foreign vessel. According to the theoretical expectation, the expectation that serious EU violations were forthcoming put Canada in a position to reject any use of an international body.

At this point, NAFO was weak due to its lack of any dispute settlement mechanism, and the ICJ could not take up the case because of the jurisdictional exemption filed by Canada. This case illustrates how commitment problems can reduce the propensity of countries to turn to international bodies for adjudication or information-sharing purposes. The Turbot War case nicely shows that NAFO was a useful tool for members during the 1970s, but when the dispute over violations erupted, member countries shied away from engaging with international bodies, whether NAFO or the ICJ. The monitoring institution was strengthened after the Turbot War when both parties adjusted allocation schemes to alleviate commitment problems. Canada could agree to

having a stronger monitoring scheme under NAFO primarily to deter future violations of EU fishermen; from the perspective of EU, the primary benefit was to increase its catch allocation while agreeing to such arrangement. It could also prevent future instances of such conflicts.

The general conclusion from this case is that the design of monitoring institutions may change over time depending on the political atmosphere (in this case, the political incentives of Canadian politicians), environmental factors (i.e. depletion of fish stocks), and bargaining deals the parties could strike (i.e. adjustment to catch allocation scheme) to reach the conclusion of having a stronger monitoring scheme. The exercise and effectiveness of monitoring institutions therefore ultimately hinge upon the acceptance of involved actors and their surrounding political circumstances.

How International Monitoring Institutions Operate regarding Arms Control

Undeterrable violations in the area of security issues are not as prevalent as in other areas due to the terrifying consequences involved. At the same time, the collection of information in this area, and the corresponding judgments about possible violations, are made more difficult by virtue of the highly secretive nature of most security matters. In the realm of security, compared to other areas, the threshold for tolerating violations is also much lower because of the huge dangers that violations entail. In security matters, the overlap between cooperation and compliance is greater than it is in trade matters, where compliance with legal rules may not necessarily mean cooperation. As a result, not many flexible mechanisms are allowed relative to the other issue areas of environment or trade.

Just as fisheries management started with the collection of scientific evidence geared toward conserving resources, arms control agreements emerge in the context of a continuous activity of monitoring. The interpretation of collected information is ultimately political and the process of collecting information is also subject to political decisions made by inspectors and inspectees. The case of IAEA inspections between 2002 and 2007 of suspected Iranian nuclear program sites is a case in point. In the

following paragraphs, using the case of Iran, I will describe the working of IAEA³⁰⁶ and how the Agency verifies compliance and involves the UN Security Council to formulate policy responses to potentially undeterrable violations. In the process of collecting evidence on Iranian compliance, the IAEA deferred its judgment to the UNSC as to whether Iranian violations happened in the context of overriding domestic political incentives—with the rationale that, if this were the case, punishments for Iran in the form of sanctions might be prohibitively costly. This consideration was reflected on the fact that Russia and China were reluctant to the idea of imposing tough sanctions on Iran. Although the IAEA provided the basic facts about the Iranian compliance with the NPT and safeguards agreements, the ultimate political judgment was within the Security Council.

The Iranian case illustrates why reaching a judgment on compliance requires basic information collection activities as well as final political decision. The first step is to collect objective evidence to determine whether compliance has occurred or not. The IAEA's job was to verify the existence of an Iranian nuclear program by visiting particular sites and cross-validating reports from the Iranian government. As international security issues usually pose high risks to other countries, the final judgment on compliance critically depends on the facts gathered on the ground. The second step of determining a violation is to identify and categorize the kinds of violations before the appropriate policy response can be devised. Iranian violation of NPT may be undeterrable but no violations are essentially or absolutely undeterrable. The determination depends on how involved countries, in this case permanent members within the Security Council, view the violation and issue political decision. If a punishment response entails prohibitive costs, violations may go unpunished. After the IAEA gathers the basic facts, the Security Council steps in to determine what policy responses are necessary.

Detailed account of the Iranian case shows this two-step process of monitoring and policy decisions. Suspicions regarding a secret Iranian nuclear program first appeared in 2002. In 2006, Iran was clearly in violation of the terms of various safeguards agreements by virtue of removing IAEA seals at enrichment-related locations.³⁰⁷

³⁰⁶ The politics of designing the IAEA inspection system has been discussed in Chapter 5.

³⁰⁷ IAEA Press release 2006/02 “Iran begins removal of IAEA seals at enrichment-related locations”

However, whether Tehran was in violation of NPT has been difficult to ascertain. As discussed in Chapter 5, many actions involved in the development of nuclear weapons fall into a grey area where violations are hard to prove. Uranium enrichment can occur even during the use of peaceful nuclear energy; the use of heavy-water reactors contributes to the enrichment of uranium. Since the IAEA did not have access to non-declared materials, it could not confirm compliance.

Iran was subject to a comprehensive safeguards agreement but had not signed the additional protocol that covers undeclared materials.³⁰⁸ The fact that the IAEA has established systems for monitoring nuclear weapons does not necessarily mean that these systems are going to be accepted by the inspectors in every instance. NPT members have designed the verification program such that the inspectors need permission to enter nuclear sites. Countries first have to grant the IAEA rights of access and authority for verification. Iran refused to grant rights to all potential nuclear sites.

Despite the limitation that the inspectors could not review undeclared materials or visit undesignated sites, the IAEA's mandate was to investigate the nature of the Iranian nuclear program.³⁰⁹ While Iran refused to suspend its program, the IAEA had been working as an information clearinghouse to deal with the Iranian case. The IAEA has asked for relevant documents but Iran had provided the agency with false information regarding its centrifuge procurement efforts.³¹⁰ The IAEA, even after three years of inspection, could not confirm whether Iran was developing nuclear weapons or not. Since Iran broke the seals, the IAEA could not verify the nature of the Iranian nuclear program and, beyond its defiant attitude toward the IAEA, Tehran's exact intentions remained unclear.

The Agency does not have direct enforcement power but can refer matters to the Security Council. Not all the judgments circulated within the IAEA go to the Security Council, but only those that are approved by the General Council of the Agency. The IAEA makes its final decisions about adopting resolutions at its General Conference by a two-thirds majority vote, based on the recommendations and draft resolutions submitted by the Board of Directors. With a two-thirds majority approval from the Board, IAEA

³⁰⁸ IAEA 2002.

³⁰⁹ Iran had several nuclear sites including Arak, Natanz, Pars Trash and Farayand Technique.

³¹⁰ Kerr 2006.

resolutions go to the Security Council. In October 2005, the Board passed its resolution on Iran containing the accusation that Iran had breached international nuclear safeguards and engaged in suspicious nuclear activities, “giving rise to questions that are within the competence of the Security Council.”³¹¹ The resolution, however, failed to reach the UNSC because the vote was twenty-two in favor, with one against and twelve abstentions.³¹² The EU pushed for the agenda but faced opposition from Russia, China, and some Nonaligned Movement countries on the Board. At that time, Iran had threatened to restart uranium enrichment and stop admitting snap IAEA inspections if the resolution were adopted. The Agency had given several verdicts on the nature of the Iranian nuclear program, but none of these cleared Iran of suspicion. In 2003 and February 2007, after inspecting declared nuclear materials, the Agency announced finding no proof of any weapons program. The IAEA consistently announced that “the Agency is not yet in a position to conclude that there are no undeclared nuclear materials or activities in Iran.”³¹³ The Agency meant that it could not confirm Iranian compliance, but it did not directly say that Iran was non-compliant. The connection between the IAEA and UNSC also illustrates the related problem of determining non-compliance when the formulation of policy seems to be difficult.

How did the UNSC react to this situation where Iran was not fully cooperating with IAEA inspections? The UNSC thus far has imposed two sanctions. The first sanction in December 2006 mandated that UN members not supply Iran with any equipment or technology that could help its uranium enrichment.³¹⁴ The second sanction in March 2007 sought to target the elite Revolutionary Guard by banning dealings with the state Bank Sepah and 28 other Iranian organizations.³¹⁵ The sanctions, however, remain weak, mainly because China and Russia oppose the imposition of strong sanctions. Iranian efforts to develop nuclear weapons have not been deterred so far and

³¹¹ Lagenbach et al. 2005.

³¹² The twenty-two countries who voted “in favor” were Argentina, Australia, Belgium, Canada, France, Ecuador, Germany, Ghana, Hungary, India, Italy, Japan, the Netherlands, Peru, Poland, Portugal, Singapore, Slovakia, South Korea, Sweden, the United Kingdom, and the United States; the 12 states who abstained were Algeria, Brazil, China, Mexico, Nigeria, Pakistan, Russia, South Africa, Sri Lanka, Tunisia, Vietnam, and Yemen; the one state that voted against was Venezuela. The voting record is from Legenbach et al. 2005.

³¹³ This appeared in August and September resolutions of 2005.

³¹⁴ Resolution 1737.

³¹⁵ Resolution 1747.

are proving to be undeterrable in the absence of tougher levels or a wider scope of economic sanctions.

The case of IAEA inspections of the Iranian nuclear program conveys a complex picture of monitoring compliance. International organizations use their expertise to verify compliance but their activities are essentially political. The information collection activity of the IAEA vis-à-vis Iran was contingent upon the safeguard agreements with Iran that limited the Agency's authority to oversee undeclared materials. Even after three years, the IAEA did not arrive at a definitive final judgment, and the resolution it passed was overshadowed by the distributional conflicts among the members of its Board and the members of the Security Council. NPT members saw the benefit of the IAEA and created the institution, but its operation has been limited by bilateral safeguard agreements and the policy decisions of the UNSC.

The preceding examination of three issue areas—WTO rulings, the Turbot War, and the inspection of the Iranian nuclear program—turns up the same theme that was highlighted earlier in this dissertation: states create international organizations and delegate authority to a greater or lesser degree, but the constraints that affected the design of these institutions continue to limit their effectiveness. On the one hand, we observe evidence of institutional effectiveness of monitoring mechanisms. For instance, the development and history of NAFO monitoring illustrate that international organizations have helped avert unnecessary and counterproductive retaliation and spiraling disputes. In the case of Turbot War, Canada and Spain were able to agree to monitoring mechanisms by adjusting catch allocations. On the other hand, the institutional effect of monitoring bodies continues to be an object of study, as examined by the mixed record of effectiveness of global trade institutions. Scholars are not settled with the question of whether the WTO has contributed to the increase in trade flows, let alone the institutional effectiveness of an institution as a whole. International monitoring institutions, such as the dispute settlement body of the WTO and the IAEA, have faced a number of instances of non-compliance; whether their efforts to bring about behavioral changes can be called successful is a subject deserving further scholarly scrutiny.

Appendix A

Technical Supplement to Chapter II

I characterize the equilibrium in each scenario (incomplete information, reporting mechanism and verification equilibrium) and present equilibrium-supporting conditions while calculating the equilibrium payoffs. These characterizations form the basis for the proofs for lemmas, propositions and corollaries.

Incomplete information (no-information system case)

Equilibrium Payoffs

Let V_i be the continuation value of this incomplete information game for player i .³¹⁶ Then STATE 1 gets a cooperation payoff of 1 in addition to the continuation value in later rounds under Normal Times with probability of $1-\varepsilon$. In Difficult Times, which occurs with probability ε , STATE 1 would gain 2α by cheating but only get zero in the subsequent round because of STATE 2's retaliatory action and the continuation value (V_1) for later rounds. All rounds are discounted by δ . The calculation is shown below;

$$(1 - \varepsilon)(1 + \delta \cdot V_1) + \varepsilon(2\alpha + 0 + \delta^2 V_1) = V_1$$

This solves to

$$V_1 = \frac{1 + \varepsilon(2\alpha - 1)}{(1 - \delta)(1 + \varepsilon\delta)} \quad \text{----- (1.1)}$$

In a similar manner, we get the continuation value for S2 (V_2).

$$V_2 = (1 - \varepsilon)(1 + \delta \cdot V_2) + \varepsilon(-\beta + 0 + \delta^2 \cdot V_2)$$

which solves to

$$V_2 = \frac{1 - \varepsilon(\beta + 1)}{(1 - \delta)(1 + \varepsilon\delta)} \quad \text{----- (1.2)}$$

Patience Level to Support Equilibrium

To obtain the patience level (delta)³¹⁷ of both players under the incomplete information case, I check the condition where STATE 1 is better off cooperating than defecting under Normal Times.

$$EU_1(C) \geq EU_1(D)$$

$$1 + \delta \cdot V_1 \geq \alpha + 0 + \delta^2 V_1 \quad \text{----- (1.3)}$$

To substitute $V_1 = \frac{1 + \varepsilon(2\alpha - 1)}{(1 - \delta)(1 + \varepsilon\delta)}$ to (1.3) and solve for δ , I get

$$\delta_1 \geq \frac{\alpha - 1}{1 + \alpha\varepsilon}$$

For STATE 2 to play C in Normal Times, using STATE 2's *ex ante* expected utility, $V_2 = \frac{1 - \varepsilon(\beta + 1)}{(1 - \delta)(1 + \varepsilon\delta)}$, the

equilibrium supporting δ is calculated as,

³¹⁶ The continuation value is the total utility expected in later rounds, calculated from an equilibrium. For its use in iterated games, see Morrow (1989; 262)

³¹⁷ Delta is the discount factor that measures how much a player values future. In international relations literature, it is also termed as "shadow of future" (Axelrod and Keohane 1985).

$$EU_2(C) \geq EU_2(D)$$

$$1 + \delta \cdot V_2 \geq \alpha + 0 + \delta^2 V_2$$

$$\delta_2 \geq \frac{\alpha - 1}{1 - \varepsilon(\alpha + \beta)}$$

Note that the required patience level of S1 is lower in the incomplete information case than in the complete information case, $\delta \geq \frac{\alpha - 1}{1 - \varepsilon}$. In contrast, the required patience level for STATE 2 became higher given the asymmetric information. The uncertainty about the sources of non-compliance requires more patience from STATE 2 if STATE 2 is to continue cooperation.

Reporting Equilibrium

I verbally sketch the reporting equilibrium and then outline the logic more formally. To obtain equilibrium of this reporting mechanism, the key question to ask is whether an honest communicative equilibrium exists where STATE 1 sends an honest signal to STATE 2. The answer is negative because this game approximates a cheap talk game. By all accounts, STATE 1 *should* send the signal ‘d’ if a defection occurs in Difficult Times. It is never in his interest to send the signal ‘n’ when Normal Times actually happens. STATE 1 might have an incentive to play D and opportunistically reap the benefit of α and then send his dishonest signal ‘b’ to mislead STATE 2. STATE 1 does not gain by sending signal ‘n’ when a violation occurs in Normal Times: he is better off sending ‘d’ regardless of the situation.

This characteristic of cheap talk becomes clearer when I examine the response of STATE 2. An appropriate question here is whether STATE 2 would be able to deter such opportunistic defection with a punishment mechanism. Recall that in the incomplete information case, STATE 2 enters the punishment phase every time defection occurs. Now suppose that under reporting mechanism, in contrast, STATE 2 may decide to punish probabilistically. Assume that STATE 2 wants to play D (and punish STATE 1 one period) with the probability of p and play C (go back to cooperation regardless) with the probability $1-p$. Could STATE 2 be able to assign such probabilities enough to deter STATE 1 from lying and sending the signal ‘d’ when the actual situation was Normal Times? It turns out that the probabilistic use of punishment cannot make an equilibrium strategy because STATE 1 will always send the signal ‘d’ to avoid punishment. To summarize, the honest reporting mechanism cannot be supported as equilibrium, and therefore, STATE 2 will not condition his strategy upon STATE 1’s signal.

Consequently, STATE 1 sends the same signal ‘d’ all along and STATE 2 does not have any reason to believe the signal and condition his strategy on that signal. Regardless of honesty entailed in the signal, STATE 2 has to retaliate if a defection occurs. Therefore, learning from the signal does not occur as the signal is not informative about STATE 1’s defection environment.

Now I write the logic more formally. Assume that STATE 2 punishes probabilistically. If STATE 2 receives the signal ‘n,’ he will punish with probability ‘ p .’ In addition, STATE 2 will punish with probability ‘ q ’ for signal ‘d,’ such that $p > q$. $p > q$ means that the probability of punishment given signal ‘a’ is larger than the probability of punishment given the signal ‘b.’ This should be the case because STATE 2 should punish opportunistic violation but may forgive undeterrable violations to restore cooperation after defection and to sustain future cooperation. Let’s first check which signal STATE 1 wants to send given the Normal Times, by comparing expected utility for sending ‘n’ and ‘d,’ that is, $u_1(n|N)$ & $u_1(d|N)$ and

$$u_1(n|D) \text{ \& } u_1(d|D).$$

$$u_1(n|N) = \alpha + \{p(0 \cdot \delta + \delta^2 V_1) + (1-p)(\delta V_1)\}$$

$$u_1(d|N) = \alpha + \{q(0 \cdot \delta + \delta^2 V_1) + (1-q)(\delta V_1)\}$$

$$\therefore u_1(d|N) - u_1(n|N) = (q - p)(\delta V_1)(\delta - 1) > 0$$

Under Normal Times, STATE 1 is better off sending ‘d.’

$$u_1(n|D) = 2\alpha + \{p(0 \cdot \delta + \delta^2 V_1) + (1-p)(\delta V_1)\}$$

$$u_1(d|D) = 2\alpha + \{q(0 \cdot \delta + \delta^2 V_1) + (1-q)(\delta V_1)\}$$

$$\therefore u_1(d|N) - u_1(n|N) = (q-p)(\delta V_1)(\delta-1) > 0$$

Likewise, under Difficult Times, STATE 1 is better off sending 'd.'

The *ex ante* expected utilities for STATE 1 and STATE 2 then are the same as in the incomplete information game, because the signals do not communicate any information; neither player changes its strategy as a result of the signal.

$$V_1 = \frac{1 + \varepsilon(2\alpha - 1)}{(1 - \delta)(1 + \varepsilon\delta)}, V_2 = \frac{1 - \varepsilon(\beta + 1)}{(1 - \delta)(1 + \varepsilon\delta)}$$

If the punishment period is to be only round only, additional conditions specified under incomplete information equilibrium should also be satisfied.

The Role of Costly Signals

Cheap talk is not the only means of communication, as Austen-Smith and Banks (2000) demonstrated. If an informed party is willing to impose costs, informative equilibrium could be created. Critical questions are whether such costly signal equilibrium is plausible and how much cost would be enough to convince the other party of its situation. This section demonstrates how costly signals, unlike under reporting mechanism, generate a cooperative equilibrium by informing S2 (uninformed party) of S1's (informed party that knows the source of non-compliance) honesty/dishonesty. I assume that the cost is attached to the signal and perfectly observable. It is paid when S1 sends a signal, which comes right after a defection occurs and right before both players make next move.³¹⁸ Costly signals can be thought of as diplomatic efforts or costly policy changes on the part of a violator.

In what follows, I show how costly signals create an honest communicative equilibrium in the context of undistinguishable sources of non-compliance. The key problem in cheap talk (i.e. reporting mechanism) was that S2 could not figure out which situation, *A* or *B*, occurred. It was because S1 always sent 'b' regardless of the true situation. S2 therefore has no choice but to punish indiscriminately.

Now, suppose there are two types of S1, honest and dishonest types. S2 has prior beliefs about those types. I assume the following and check for the existence of equilibrium. Prior beliefs about honest types are $p(b|B) = 1, p(a|A) = 1, p(a|B) = 0, p(b|A) = 0$ while S2's prior beliefs about dishonest types are $p(b|B) = 1, p(a|A) = 0, p(a|B) = 0, p(b|A) = 1$.³¹⁹ In other words, S2 believes that honest types send the signal true to the situation while dishonest types send signal 'b' regardless of the situation.³²⁰ The key question for S2 then is how to distinguish between the two types {honest, dishonest}. The task is especially difficult when S2 receives the signal *b*. It is because the signal could be true coming from the honest types but at the same time, it could be from dishonest S1 who tries to avoid punishment by lying. Meanwhile, the question for honest type S1 is how to distinguish himself from dishonest types and avoid unnecessary punishments.

³¹⁸ Thus, the sequence still retains the sequence of simultaneous move, not alternating move, since the actors get to move at every opportunity (Axelrod, 2000).

³¹⁹ This restrictive assumption about prior belief eliminates the possibility of semi-separating equilibrium. The more reasonable assumption would be to assign different probability for a type that faces Situation A (probability of *p*) and the other type that faces Situation B (probability of *1-p*) randomly drawn by Nature. That way, conventional signaling of costly signal would work with three different types of equilibria: pooling, separating and semi-separating. I am currently working on this possibility.

³²⁰ The prior beliefs are common to S1 as well as to S2.

Honest types of S1 would be able to distinguish themselves by paying some costs when signaling. They will send ‘a’ in A and ‘b’ in B. When sending ‘b,’ honest types could distinguish themselves by paying direct costs to avoid punishment from S2.³²¹ Dishonest types would send ‘b’ regardless of the condition and does not pay the cost. In response, S2 could now condition his action upon his observation of the costs attached to the signals. If S2 observes costs from S1, he could conclude that it is facing honest type of S1. Otherwise, he will think that he is facing a dishonest type and punish indiscriminately regardless of the source of violation.

In thinking about costly signals, the concept of subgame perfection does not work since beliefs are involved. Since S2 has to update his belief at every subgame coupled with his strategy, I use the concept of Perfect Bayesian equilibrium (PBE). To construct PBE and find the conditions that support the costly signal communication, first, S2’s belief should be sequentially rational, and the beliefs are updated following Bayes’ rule³²²:

$$p(B|b) = \frac{p(B)p(b|B)}{p(B)p(b|B) + p(A)p(b|A)} = \frac{(\varepsilon)(1)}{(\varepsilon)(1) + (1 - \varepsilon)(0)} = 1$$

for honest type who sends the costly signal, and

$$p(B|b) = \frac{p(B)p(b|B)}{p(B)p(b|B) + p(A)p(b|A)} = \frac{(\varepsilon)(1)}{(\varepsilon)(1) + (1 - \varepsilon)(1)} = \varepsilon$$

for dishonest type who does not pay the cost.

Under cheap talk, signal ‘b’ was meaningless informing S2 of the source of non-compliance. Now with costly signals, S2 can update its belief upon observing the costly signal, depending on the cost paid by S1.

How large should the cost be to support the separating equilibrium? ‘c*’ should be large enough to make dishonest types not to resort to the cost. In other words, it should be the case that dishonest types cannot afford the cost to imitate honest types. If a defection occurs in Situation B, dishonest types should not be willing to pay the cost. In equilibrium, upon observing the cost ‘c’ less than the threshold c* and signal ‘b,’ S2 updates its belief and thinks that S1 is a dishonest type with the probability ε . The expected utility of not paying the cost and taking the punishment should exceed that of paying the cost and being exonerated for dishonest type S1.

$$EU_1^{dishonest}(Pay) < EU_1^{dishonest}(NotPay)$$

$$(2\alpha - c) + \varepsilon\delta V_1 + (1 - \varepsilon)(0 \cdot \delta + \delta^2 V_1) < 2\alpha + 0 \cdot \delta + \delta^2 V_1$$

$$\therefore c > \varepsilon\delta(1 - \delta)V_1$$

Also, it should be worthwhile for honest type S1 to pay the cost to convince S2 to return to cooperation. That is, the expected utility of paying the cost should be greater than that of not paying after a defection in Situation B.

$$EU_1^{honest}(pay) > EU_1^{honest}(NotPay)$$

$$(2\alpha - c) + \delta V_1 > 2\alpha + 0 \cdot \delta + \delta^2 V_1$$

³²¹ Possible alternatives for modeling costly signals are 1) audience cost paid over time as opposed to one-time payment, and 2) penalty for lying (e.g. cost for b given Situation A is larger than that of b given Situation B). I design the costly signal as sincere efforts/gestures on the sender’s part to make the receiver believe its non-compliance situation.

³²² Morrow, 1994, p.164

$$\therefore c < \delta(1 - \delta)V_1$$

$$\varepsilon\delta(1 - \delta)V_1 < c < \delta(1 - \delta)V_1 \quad \text{-----}$$

---- (3.1)

The cost should be then, $\varepsilon\delta(1 - \delta)V_1 < c < \delta(1 - \delta)V_1$. It is the range of the cost within which S2 would be able to determine S1's type as an honest one. If the cost is smaller than $\varepsilon\delta(1 - \delta)V_1$, S2 thinks that S1 is a dishonest type and updates its belief to ε .

To summarize, there could be a communicative equilibrium with costly signals, where S2 could separate honest and dishonest types. Strategy and belief pairs for separating communicative equilibrium are written as follows:

Example of Costly Signal Equilibrium Strategies

Actor	Strategy & Signal
S1	<ul style="list-style-type: none"> Honest type S1 plays C in A, D in B, and sends honest signals (that is, 'a' given A and 'b' given B). Sending 'b' honest type S1 attaches the cost 'c' of $\varepsilon\delta(1 - \delta)V_1$, the lowest pay possible to distinguish himself from dishonest types. Dishonest type S1 plays C in A, plays D in B, and sends 'b' and does not incur any cost. It sends $c=0$.
S2	Play C. If a defection occurs, punishes S1 one period if 'c' is not observed. Forgo the single punishment period if 'c' is observed where $\varepsilon\delta(1 - \delta)V_1 < c < \delta(1 - \delta)V_1$, maintaining the belief for honest types (which is unity). If 'c' is not observed, update the belief from 1 to ε for dishonest types.

Pooling equilibrium could also occur but trivial to discuss. If 'c' is greater than the threshold, $\delta(1 - \delta)V_1$, even honest types tell a lie and send signal 'b' all the time. Accordingly, S2 does not update its belief and equilibrium remains the same as in the incomplete information case. Similarly, if 'c' is too small (i.e., $c < \varepsilon\delta(1 - \delta)V_1$), no updating occurs on S2's part and it has to resort to indiscriminate punishment.

Verification Agency Equilibrium

Equilibrium Payoffs

I first obtain equilibrium payoffs and then other additional conditions to support equilibrium with the involvement of a verification agency. Following the equilibrium strategy, the *ex ante* expected payoff for STATE 1 is

$$V_1 = (1 - \varepsilon)(1 + \delta \cdot V_1) + \varepsilon[2\alpha + r \cdot \delta \cdot V_1 + (1 - r) \cdot (0 \cdot \delta + \delta^2 \cdot V_1)]$$

This solves to

$$V_1 = \frac{1 + \varepsilon(2\alpha - 1)}{(1 - \delta)(1 + \varepsilon\delta(1 - r))} \quad \text{----- (2.1)}$$

Compared to the incomplete information case where STATE 1 gets $V_1 = \frac{1 + \varepsilon(2\alpha - 1)}{(1 - \delta)(1 + \varepsilon\delta)}$, he gets benefits from the agency since the presence of independent information prevents STATE 2 from imposing unnecessary punishment on STATE 1.

To calculate the expected utility for STATE 2 in a similar manner,

$$V_2 = (1 - \varepsilon)(1 + \delta \cdot V_2) + \varepsilon\{-\beta + r \cdot \delta \cdot V_2 + (1 - r) \cdot (0 + \delta^2 V_2)\}$$

$$= \frac{1 - \varepsilon(1 + \beta)}{(1 - \delta)\{1 + \varepsilon\delta(1 - r)\}}$$

The expected payoff of STATE 2 is also compared to that of the incomplete information case, $V_2 = \frac{\varepsilon(\beta + 1) - 1}{(1 - \delta)(1 + \varepsilon\delta)}$. The expected utility with the participation of the verification agency is again found to be greater.³²³

As in other scenarios, it should be the case that S1 should be willing to play C instead of D when the Normal Times is given. That is, $EU_1(C|N) > EU_1(D|N)$

$$1 + \delta \cdot V_1 > \alpha + \{q \cdot (0 \cdot \delta + \delta^2 V_1) + (1 - q) \cdot \delta V_1\}$$

To solve this for q , I obtain the following. This represents the deterrent effect of a verification agency.

$$q \geq \frac{\alpha - 1}{\delta V_1(1 - \delta)} \quad \text{----- (2.2)}$$

Substituting (2.1) into (2.2) yields,

$$q \geq \frac{(\alpha - 1)\{1 + \varepsilon\delta(1 - r)\}}{\delta\{1 + \varepsilon(2\alpha - 1)\}} \quad \text{----- (2.3)}$$

Patience Level to Support Verification Equilibrium

The patience level for S1 that supports the verification agency could be calculated from (2.3).

$$\delta_1 \geq \frac{\alpha - 1}{q\{1 + \varepsilon(2\alpha - 1)\} - \varepsilon(1 - r)(\alpha - 1)} \quad \text{----- (2.4)}$$

Similar methods yield the patience level for S2.

$$\delta_2 \geq \frac{\alpha - 1}{1 - \varepsilon\{\alpha + \beta + r(1 - \alpha)\}}$$

Proof of Lemma 1 (relative importance of two types of verification accuracy, q and r)

To see the relative effects of q and r on players' equilibrium discount factors, we take the first derivatives with respect to q and r . Substantively, the derivatives indicate the rate at which patience level is affected by either of verification accuracy. From (2.3), we have the equilibrium level of patience level,

$$\delta \leq \frac{\alpha - 1}{[1 + \varepsilon(2\alpha - 1)] \cdot q - [(\alpha - 1)(1 - r)\varepsilon]}$$

³²³ If $r=1$, the additional benefit of having the agency is $\frac{(2 + \varepsilon\delta)\{1 - \varepsilon(1 + \beta)\}}{1 + \varepsilon\delta}$.

and the first derivatives of the upper bound of patience level, δ^* with respect to q and r are calculated as,

$$\frac{\partial \delta^*}{\partial q} = \frac{(-1)(\alpha - 1)(1 + \varepsilon(2\alpha - 1))}{[[1 + \varepsilon(2\alpha - 1)] \cdot q - [(\alpha - 1)(1 - r)\varepsilon]^2} < 0$$

$$\frac{\partial \delta^*}{\partial r} = \frac{(-1)(\alpha - 1)(\alpha - 1)\varepsilon}{[[1 + \varepsilon(2\alpha - 1)] \cdot q - [(\alpha - 1)(1 - r)\varepsilon]^2} < 0$$

The negative first derivatives indicate that the increase in either type of verification accuracy lowers the threshold patience level that is required for a verification equilibrium. To examine the relative amount of $\frac{\partial \delta^*}{\partial q}$ and $\frac{\partial \delta^*}{\partial r}$, it is enough to compare $1 + \varepsilon(2\alpha - 1)$ and $(\alpha - 1)\varepsilon$.

$$\begin{aligned} & [1 + \varepsilon(2\alpha - 1)] - [(\alpha - 1)\varepsilon] \\ & = 1 + \varepsilon\alpha > 0 \end{aligned}$$

$$\therefore \left| \frac{\partial \delta^*}{\partial q} \right| > \left| \frac{\partial \delta^*}{\partial r} \right|$$

The comparison of two negative partial derivatives shows the decreasing rate of change of the patience level with respect to r and q . Two interpretations follow given the larger decreasing rate with respect to q than to r . First, δ^* is more sensitive to the change in q than that in r . This means that the equilibrium in order to be stable requires a certain level of q . A small drop in q could dramatically increase the required level of patience for cooperation. Second, increasing q is a more effective way of lowering the threshold patience level, producing a more inclusive treaty with more diverse set of member countries. I conclude that increasing q is more effective than increasing r in inducing cooperation. This is because q can easily raise the effectiveness of the monitoring agency by letting a violator suffer through the punishment phase. In contrast, r operates merely to eliminate unnecessary punishments, and therefore elicits less patience compared to q . ■

Proof of Remark 1 (trade-off in monitoring accuracy)

To see the relationship between q and r , I substitute (2.1) into (2.2), which yields,

$$q \geq \frac{(\alpha - 1)\{1 + \varepsilon\delta(1 - r)\}}{\delta\{1 + \varepsilon(2\alpha - 1)\}}$$

As r increases, the threshold for q decreases. That is,

$$\frac{\partial q}{\partial r} = -\frac{\varepsilon \cdot (\alpha - 1)}{1 + \varepsilon(2\alpha - 1)} \leq 0 \text{ (as } \varepsilon \rightarrow 0) \quad \blacksquare$$

Proof Proposition 1 (distributional conflicts due to shocks, ε)

Recall the definition of verification gains (**Definition 1**). Following the definition, the verification gain for STATE 1 is,

$$VG_1 = \frac{1 + \varepsilon(2\alpha - 1)}{(1 - \delta)(1 + \varepsilon\delta(1 - r))} - \frac{1 + \varepsilon(2\alpha - 1)}{(1 - \delta)(1 + \varepsilon\delta)} = \frac{\varepsilon \cdot \delta \cdot r \cdot (1 + \varepsilon(2\alpha - 1))}{(1 - \delta)(1 + \varepsilon\delta)(1 + \varepsilon\delta(1 - r))}$$

Likewise, the verification gain for STATE 2 is,

$$VG_2 = \frac{1 - \varepsilon(\beta + 1)}{(1 - \delta)(1 + \varepsilon\delta(1 - r))} - \frac{1 - \varepsilon(\beta + 1)}{(1 - \delta)(1 + \varepsilon\delta)} = \frac{\varepsilon \cdot \delta \cdot r \cdot (1 - \varepsilon(\beta + 1))}{(1 - \delta)(1 + \varepsilon\delta)(1 + \varepsilon\delta(1 - r))}$$

To see the marginal effect of shocks on the size of verification gains, check the first order condition of the gains for each player.

$$\text{For STATE 1, } \frac{\partial(VG_1)}{\partial(\varepsilon)} > 0$$

$$\text{For STATE 2, } \frac{\partial(VG_2)}{\partial(\varepsilon)} < 0$$

Verification gains become negative for STATE 2 when $\varepsilon > \varepsilon^*$ wherever ε^* , the solution for $\frac{\partial(VG_2)}{\partial(\varepsilon)} = 0$, exists. The distributional conflicts that inhibit the establishment of an international monitoring system occur when the flexibility level ε exceeds the threshold ε^* . This is because STATE 2 no longer prefers having a monitoring mechanism while STATE 1 prefers to institute such a mechanism. ■

APPENDIX B

List of Regional Trade Agreements in the Sample

Signature Year	Agreement Name	Alternate Name
1957	EC	
1960	CACM	Central American Common Market
1960	EFTA1	Stockholm Convention
1964	UDEAC	Central African Customs and Economic Union
1965	CARIFTA	Caribbean Free Trade Association; Dickenon Bay Agreement
1967	EAC1	Abuja Treaty; Treaty Establishing the African Economic Community
1969	CAN	Andean Pact; Codification of the Andean Subregional Integration Agreement; Andean Community; Cartagena Agreement
1969	SACU1	Southern African Customs Union
1973	CARICOM	Treaty establishing the Caribbean Community; Treaty of Chaguaramas
1973	CEAO	West African Economic Community
1973	Manor River Union	
1975	ECOWAS1	Economic Community of West African States
1975	Bangkok Agt	
1976	CEPGL	Communaute Economique des Pays des Grands Lacs; Economic Community of the Countries of the Great Lakes
1978	PATCRA	Papua New Guinea-Australia Trade and Commercial Relations Agreement
1980	SPARTECA	South Pacific Regional Trade and Economic Cooperation Agreement
1981	OECS	Organization of East Caribbean States
1981	PTA	Preferential Trade Area for Eastern and Southern Africa
1981	GCC	Gulf Cooperation Council
1983	CER	Closer Economic Relations: ANZCERTA
1983	ECCAS	Economic Community of Central African States; Communauté Économique des États d'Afrique Centrale (CEEAC)
1984	LAIA	Latin American Integration Association; ALADI; Treaty of Montevideo
1985	Dominican Republic - Panama	
1985	United States — Israel	
1986	Panama - El Salvador	
1991	Chile - Central America	
1991	MERCOSUR	Southern Common Market
1991	India - Nepal	
1992	EEA	European Economic Area
1992	EFTA2	
1992	CEFTA	Central European FTA
1992	AFTA	ASEAN FTA
1992	Armenia - Russian Federation	
1993	Chile - Bolivia	
1993	Chile - Venezuela	
1993	Chile - Colombia	
1993	NAFTA	North American FTA
1993	Czech Republic - Slovakia	
1993	Armenia - Moldova	
1993	Baltic FTA / BAFTA	
1993	ECOWAS2	
1994	Romania - Moldova	

1994	Mexico - Bolivia	
1994	Group of Three	
1994	WAEMU/UEMOA	West African Economic and Monetary Union
1994	Kyrgyz Republic — Kazakhstan	
1994	Kyrgyz Republic — Russian Federation	
1994	Kyrgyz Republic — Armenia	
1994	Mexico — Costa Rica	
1994	COMESA	Common Market for Eastern and Southern Africa
1994	Hungary - Slovenia	
1994	CIS	Commonwealth of Independent States; Minsk Agreement
1994	Armenia - Ukraine	
1994	Georgia — Russian Federation	
1994	MSG	Melanesian Spearhead Group
1995	Kyrgyz Republic — Ukraine	
1995	Kyrgyz Republic — Moldova	
1995	Armenia - Turkmenistan	
1995	Estonia - Ukraine	
1995	Georgia — Armenia	
1996	Estonia - Czech Republic	
1996	Canada — Chile	
1996	Czech Republic - Lithuania	
1996	Czech Republic - Israel	
1996	Israel — Turkey	
1996	Estonia - Slovenia	
1996	Kyrgyz Republic — Uzbekistan	
1996	Canada — Israel	
1996	Israel - Slovakia	
1996	Czech Republic - Latvia	
1996	Estonia - Slovakia	
1996	Georgia — Azerbaijan	
1996	SADC	Southern African Development Community
1996	Georgia — Turkmenistan	
1997	Georgia — Kazakhstan	
1997	Croatia - Slovenia	
1997	Romania — Turkey	
1997	Croatia - Macedonia	
1997	Czech Republic - Turkey	
1997	Israel - Poland	
1997	SAPTA	South Asian Preferential Trade Arrangement; SAARC Preferential Trading Agreement
1997	Estonia - Turkey	
1998	Chile - Peru	
1998	Chile — Mexico	
1998	Hungary - Lithuania	
1998	Hungary - Israel	
1998	Hungary - Turkey	
1998	Estonia - Hungary	
1998	India - Sri Lanka	
1998	Bulgaria — Turkey	

1998	Turkey - Latvia	
1999	EAC2	African Economic Community
1999	Chile - El Salvador	
1999	Bulgaria — Former Yugoslav Republic of Macedonia	
1999	Hungary - Latvia	
1999	Armenia - Kazakhstan	
1999	Turkey — Former Yugoslav Republic of Macedonia	
1999	Egypt - Jordan	
2000	Mexico — Israel	
2000	EAEC	Eurasian Economic Community
2000	United States — Jordan	
2001	Croatia - Bosnia and Herzegovina	
2001	Canada — Costa Rica	
2001	CARICOM2	Treaty establishing the Caribbean Community; Treaty of Chaguaramas
2001	Bulgaria - Israel	
2002	Albania - Croatia	
2002	FYROM - Bosnia and Herzegovina	
2002	Turkey - Bosnia and Herzegovina	
2002	Croatia - Albania	
2002	Albania - FYROM	
2002	Turkey - Croatia	
2002	SACU2	
2003	India - Thailand	
2003	Albania - Serbia Montenegro	
2003	Republic of Korea - Chile	
2003	Albania - Romania	
2003	United States — Chile	
2003	Albania - Bosnia and Herzegovina	
2003	Albania - Bulgaria	
2003	China - Macao, China	
2003	ECO	Economic Cooperation Organization Trade Agreement (ECOTA)
2003	Albania - Moldova	
2004	United States - Australia	
2004	Japan - Mexico	
2004	Turkey - Tunisia	
2004	Bulgaria - Serbia and Montenegro	
2004	Thailand - Australia	

APPENDIX C

List of Regional Fisheries Agreements in the Sample

Signature Year	Treaty Name
1946	Convention For The Regulation Of The Meshes Of Fishing Nets And The Size Limits Of Fish
1946	International Convention For The Regulation Of Whaling
1948	Agreement For The Establishment Of The Indo-Pacific Fisheries Commission
1949	International Convention For The Northwest Atlantic Fisheries
1949	Convention For The Establishment Of An Inter-American Tropical Tuna Commission
1949	Agreement For The Establishment Of A General Fisheries Commission For The Mediterranean
1952	Exchange Of Notes Constituting An Agreement Between The United States Of America, Canada And Japan Relating To Scientific Investigations Of The Fur Seals In The North Pacific Ocean
1952	Agreement Concerning Measures For The Protection Of The Stocks Of Deep Sea Prawns (<i>Pandalus borealis</i>), European Lobsters (<i>Homarus vulgaris</i>), Norway Lobsters (<i>Nephrops norvegicus</i>) And Crabs (<i>Cancer pagurus</i>)
1952	International Convention For The High Seas Fisheries Of The North Pacific Ocean
1952	Convention On The Organization Of The Permanent Commission Of The Conference On The Exploitation And Conservation Of The Maritime Resources Of The South Pacific
1952	Agreement Supplementary To The Declaration Of Sovereignty Over The Maritime Zone Of Two Hundred Miles To The Permanent Commission Of The South Pacific
1954	Agreement Relating To The Issue Of Permits For The Exploitation Of The Maritime Resources Of The South Pacific
1954	Agreement Relating To Penalties Under The Permanent Commission Of The South Pacific
1954	Agreement Relating To Measures Of Supervision And Control In The Maritime Zones Of The Signatory Countries To The Permanent Commission Of The South Pacific
1954	Agreement Relating To A Special Marine Frontier Zone Under The Permanent Commission Of The South Pacific
1954	Regulations Governing Whaling In The Waters Of The South Pacific
1955	Agreement relating to the International Convention for Regulating the Police of the North Seas Fishery signed at The Hague on 6 May 1882
1956	Convention On The Canalization Of The Mosel
1957	Interim Convention On Conservation Of North Pacific Fur Seals
1958	Convention Concerning Fishing In The Waters Of The Danube
1959	Northeast Atlantic Fisheries Convention
1959	Convention Concerning Fishing In The Black Sea
1962	Agreement Concerning Cooperation In Marine Fishing
1962	Agreement On The Protection Of The Salmon In The Baltic Sea
1963	Act Regarding Navigation And Economic Cooperation Between The States Of The Niger Basin
1963	Agreement Concerning An International Observer Scheme For Factory Ships Engaged In Pelagic Whaling In The Antarctic
1964	European Fisheries Convention
1964	Agreement as to transitional rights between Ireland, Belgium, the Federal Republic of Germany, the Republic of France, the Netherlands, Spain and the United Kingdom of Great Britain and Northern Ireland
1966	Agreement Relating To The International Legal Personality Of The Permanent Commission Of The South Pacific
1966	International Convention For The Conservation Of Atlantic Tunas
1966	Agreement On Reciprocal Access To Fishing In The Skagerrak And The Kattegat
1967	Convention On The Conduct Of Fishing Operations In The North Atlantic
1967	Exchange of letters constituting an agreement between Denmark and the European Community concerning concessions from the European Economic Community on herring
1967	Agreement Establishing The Southeast Asian Fisheries Development Center
1970	Agreement On The Regulation Of North Pacific Whaling
1971	Agreement On The Regulation Of North Pacific Whaling
1972	Agreement Between The Governments Of Iceland, Norway And The Union Of Soviet Socialist Republics On The Regulation Of The Fishing Of The Atlanto-Scandian Herring
1972	Agreement Between The Government Of Canada, The Government Of The Republic Of Iceland And The Government Of The Kingdom Of Norway Concerning An International Observer Scheme For Land-Based Whaling Stations In The North Atlantic Area
1972	Convention For The Conservation Of Antarctic Seals

1973	Agreement Between The Government Of The Union Of Soviet Socialist Republics, Iceland And Norway Concerning The Regulation Of Fishing Of The Atlanto-Scandian Herring
1973	Convention On Fishing And Conservation Of The Living Resources In The Baltic Sea And Belts
1973	Arrangement Relating To Fisheries In Waters Surrounding The Faroe Island
1974	Agreement Between The United Kingdom, Norway And The Union Of Soviet Socialist Republics On The Regulation Of The Fishing Of North-East Arctic (Arcto-Norwegian) Cod
1977	Agreement For The Establishment Of An Organization To Manage And Develop The Kagera River Basin
1978	Convention On Future Multilateral Cooperation In The Northwest Atlantic Fisheries
1979	South Pacific Forum Fisheries Agency Convention
1979	Agreement Incorporating Colombia Into The System Of The Permanent Commission Of The South Pacific
1980	Convention On The Conservation Of Antarctic Marine Living Resources
1980	Convention On Future Multilateral Cooperation In Northeast Atlantic Fisheries
1980	Convention Creating The Niger Basin Authority
1982	Nauru Agreement Concerning Cooperation In The Management Of Fisheries Of Common Interest
1982	Convention For The Conservation Of Salmon In The North Atlantic Ocean
1982	Constitutional Agreement Of The Latin American Organization For Fisheries Development
1983	Eastern Pacific Ocean Tuna Fishing Agreement
1984	Convention Concerning The Regional Development Of Fisheries In The Gulf Of Guinea
1985	Convention For The Establishment Of A Sub-Regional Commission On Fisheries
1985	Agreement For The Establishment Of The Intergovernmental Organization For Marketing Information And Technical Advisory Services For Fishery Products In The Asia And Pacific Region
1987	Treaty On Fisheries Between The Governments Of Certain Pacific Island States And The Government Of The United States Of America
1987	Agreement Establishing The Economic Community Of Cattle, Meat And Fishing Resources In UDEAC
1988	Agreement On The Network Of Aquaculture Centres In Asia And The Pacific
1989	Agreement Creating The Eastern Pacific Tuna Fishing Organization
1989	Convention For The Prohibition Of Fishing With Long Driftnets In The South Pacific
1990	Arrangement Implementing The Nauru Agreement Setting Forth Minimum Terms And Conditions Of Access To The Fisheries Zones Of The Parties
1990	Second Arrangement Implementing The Nauru Agreement Setting Forth Additional Terms And Conditions Of Access To The Fisheries Zones Of The Parties
1991	Agreement On The Conservation Of Seals In The Wadden Sea
1991	Western Indian Ocean Tuna Organization Convention
1991	Convention On Fisheries Cooperation Among African States Bordering The Atlantic Ocean
1991	Agreement For The Establishment Of The Intergovernmental Organization For Marketing Information And Cooperation Services For Fishery Products In Africa
1991	Agreement Establishing Common Fisheries Surveillance Zones Of Participating Member States Of The Organisation Of Eastern Caribbean States
1992	Convention For The Conservation Of Anadromous Stocks In The North Pacific Ocean
1992	Agreement On The Conservation Of Small Cetaceans Of The Baltic And North Seas
1992	La Jolla Agreement On The Reduction Of Dolphin Mortality In The Eastern Pacific Ocean
1992	Niue Treaty On Cooperation In Fisheries Surveillance And Law Enforcement In The South Pacific Region
1992	Arrangement For The Management Of Western Pacific Purse Seining Fishery
1993	Agreement To Constitute The International Center For Living Aquatic Resources Management As An International Organization
1993	Convention For The Conservation Of Southern Bluefin Tuna
1993	Extension To The Treaty On Fisheries Between The Governments Of Certain Pacific Island States And The Government Of The United States Of America
1993	Constitution Of The Centre For Marketing Information And Advisory Services For Fishery Products In The Arab Region
1993	Convention Under The Sub-Regional Commission On Fisheries On Cooperation In The Exercise Of The Rights Of Maritime Pursuit
1993	Agreement To Promote Compliance With International Conservation And Management Measures By Fishing Vessels On The High Seas
1993	Agreement For The Establishment Of The Indian Ocean Tuna Commission
1994	Constitution Of The Centre For Marketing Information And Advisory Services For Fishery Products In Latin America And The Caribbean

1994	Convention On The Conservation And Management Of Pollock Resources In The Central Bering Sea
1994	Convention For The Establishment Of The Lake Victoria Fisheries Organization
1994	Federated States Of Micronesia Arrangement For Regional Fisheries Access
1996	Agreement On The Conservation Of Cetaceans Of The Black Sea, Mediterranean Sea And Contiguous Atlantic Area
1996	Inter-American Convention For The Protection And Conservation Of Sea Turtles
1996	Convention Regulating Fishing Activity Within The Waters Of The Member States
1998	Agreement Of Cooperation For The Conservation Of The Marine Turtles In The Caribbean Coast Of Costa Rica, Nicaragua And Panama (Tripartite Agreement)
1998	Agreement On The International Dolphin Conservation Program
1998	Agreement Between Iceland, Greenland/Denmark, And Norway About The Capelin Stock In The Area Between Greenland, Iceland, And Jan Mayen
1999	Agreement Between Iceland, Norway And Russia Concerning Certain Aspects Of Cooperation In The Area Of Fisheries
1999	Agreement For The Establishment Of The Regional Commission For Fisheries
2000	Agreement for the Establishment of the International Organisation for the Development of Fisheries in Eastern and Central Europe (eurofish)
2000	Framework Agreement For The Conservation Of The Living Marine Resources Of The High Seas Of The South Pacific
2000	Convention on the Conservation and Management of the Highly Migratory Fish Stocks of the Western and Central Pacific Ocean
2001	Convention On The Conservation And Management Of Fishery Resources In The South East Atlantic Ocean
2002	Second Extension To The Treaty On Fisheries Between The Governments Of Certain Pacific Island States And The Government Of The United States Of America
2003	Convention For The Strengthening Of The Inter-American Tropical Tuna Commission Established By The 1949 Convention Between The United States Of America And The Republic Of Costa Rica

APPENDIX D
List of Arms Control Agreements in the Sample

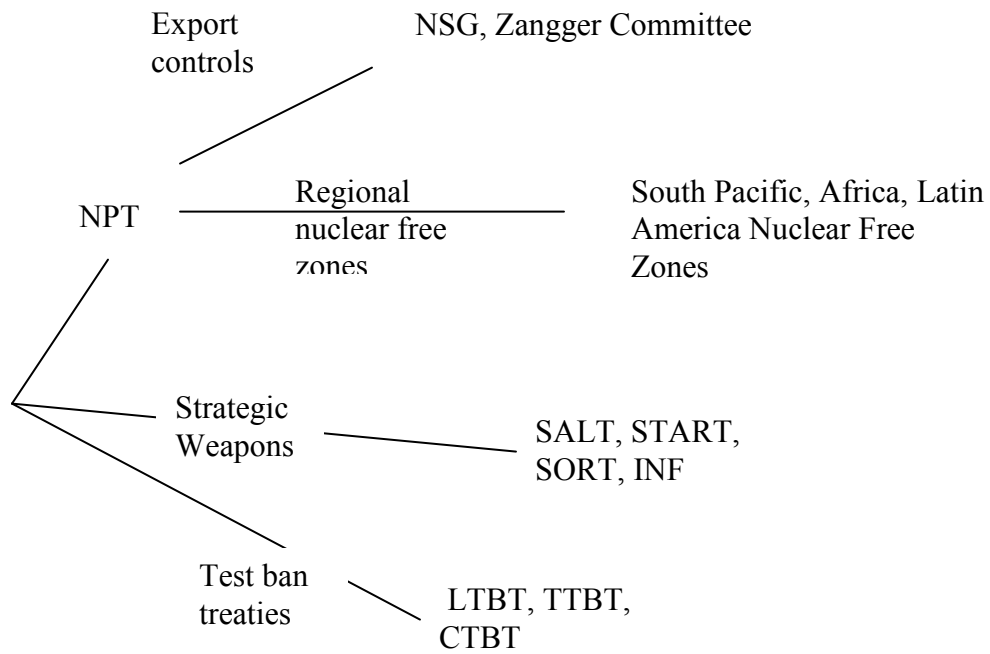
Signature Year	Agreement Name	Alternate Name/Subtitle
1959	Antarctic Treaty	
1963	Treaty Banning Nuclear Weapon Tests in the Atmosphere, Outer Space and Underwater	Limited (Partial) Test Ban Treaty
1963	Hot Line Agreement	
1967	Latin American Nuclear Free-Zone Treaty	Treaty of Tlatelolco
1967	Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and other Celestial Bodies	Outer Space Treaty
1968	Treaty on the Non-Proliferation of Nuclear Weapons	NPT
1970	Zangger Committee	
1971	Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War between the United States of America and the Union of Soviet Socialist Republics	Accidents Measures Agreement
1971	Hot Line Modernization Agreement	Agreement Between The United States of America and The Union of Soviet Socialist Republics on Measures To Improve the U.S.A.-USSR Direct Communications Link (With Annex, Supplementing and Modifying the Memorandum of Understanding With Annex, of June 20, 1963)
1971	Seabed Arms Control Treaty	Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof
1971	Accidents Measures Agreement	
1972	Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems	Anti-Ballistic Missile Treaty (ABM)
1972	Strategic Arms Limitation Talks (SALT I)	SALT I; Interim Agreement... on Certain Measures with Respect to Limitation of Strategic Offensive Arms; Vladivostock accord
1972	Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological and Toxin Weapons and on their Destruction	Biological Weapons Convention (BWC)
1972	Agreement..on the Prevention of Incidents on and over the High Seas	Incidents at Sea Agreement
1973	Agreement..on the Prevention of Nuclear War	
1974	Threshold Test Ban Treaty	TTBT
1975	CSCE Confidence-Building Measures	Helsinki Final Act
1975	Nuclear Suppliers Group (NSG)	London Club
1976	Treaty... on Underground Nuclear Explosions for Peaceful Purposes	PNE Treaty
1977	Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques	Environmental Modification Agreement
1979	Strategic Arms Limitation Talks (SALT II)	SALT II
1980	Convention on the Physical Protection of Nuclear Material	Nuclear Material Convention
1980	Convention on Conventional Weapons (CCW)	The Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects

1984	Hot Line Expansion Agreement	Agreement Between The United States of America and The Union of Soviet Socialist Republics To Expand the U.S.-USSR Direct Communications Link
1985	South Pacific Nuclear Free Zone Treaty (SPNFZ)	Treaty of Rarotonga
1985	Australia Group (AG)	
1986	Document of the Stockholm Conference on Confidence and Security Building Measures and Disarmament in Europe	Confidence and Security-Building Measures [OSCE]
1987	Treaty...on Elimination of their Intermediate-Range and Shorter-Range Missiles	Intermediate-Range Nuclear Forces (INF)
1987	Missile Technology Control Regime (MTCR) Guidelines	MTCR
1987	Nuclear Risk Reduction Centers	
1988	Agreement between the United States of America and the Union of Soviet Socialist Republics on Notifications of Launches of Intercontinental Ballistic Missiles and Submarine Launched Ballistic Missiles	Ballistic Missile Launch Notification Agreement
1989	Treaty on Conventional Armed Forces in Europe	CFE
1989	Wyoming MOU	Bilateral Verification Experiment and Data Exchange
1990	Charter of Paris for a New Europe	subtitle: a new era of democracy, peace and unity
1990	Treaty on Open Skies	
1990	Bilateral Destruction Agreement [BDA]	
1991	Strategic Arms Reduction Treaty (START I)	START I
1993	Convention on the Prohibition of the Development, Production and Stockpiling of Chemical Weapons and on their Destruction	Chemical Weapons Convention (CWC)
1993	Strategic Arms Reduction Treaty II (START II)	START II
1993	US-Russia Memorandum of Understanding on Warhead Attribution and Heavy Bomber Data	
1994	Vienna Document 1994	Vienna Document 1994 of the Negotiations on Confidence- and Security-Building Measures
1994	Mutual Detargeting	Moscow Declaration
1995	Southeast Asia Nuclear Weapon Free Zone	Treaty of Bangkok
1996	African Nuclear-Weapon-Free Zone Treaty	Treaty of Pelindaba
1996	Comprehensive Nuclear Test-Ban Treaty	CTBT
1996	Wassenaar Arrangement	The Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies
1997	Mutual Reduction of Military Forces in the Border Areas	
2000	Joint Statement concerning management and disposition of weapon-grade plutonium designated as no longer required for defense purposes and related cooperation	Fissile Material Disposition
2000	Notifications of Missile Launches	
2002	Strategic Offensive Reductions Treaty	SORT
	Joint Data Exchange Center (JDEC)	Establishment of a Joint Warning Center for the Exchange of Information on Missile Launches and Early Warning

APPENDIX E

Example of Treaty Lineage in Arms Control Agreements

Note: Within arms control agreements, some clusters of agreements share similar characteristics. The lineage of nuclear weapons treaties, many of them the offshoots of NPT, is illustrated below.



BIBLIOGRAPHY

- ADE-PwC-EPU. 2002. "Evaluation of the Relationship between Country Programmes and Fisheries Agreements." Final Report, ADE-PricewaterhouseCoopers-EPU.
- Applegarth, Claire and Rhianna Tyson. 2005. "Major Proposals to Strengthen the Nuclear Nonproliferation Treaty: A Resource Guide." *Arms Control Association*. Washington, D. C.
- Ausubel, J.H. and David Victor. 1992. "Verification of International Environmental Agreements." *Annual Review of Energy and Environment* 17:1-43.
- Avenhaus, Rudolph. 2004. "Application of Inspection Games." *Mathematical Modeling and Analysis*. 9(3): 179-192.
- Axelrod, Robert. 2003. "Risk in Networked Information Systems." Available at <http://www-personal.umich.edu/~axe/>
2000. "On Six Advances in Cooperation Theory." *Analyse and Kritik* 22: 130-151.
1979. "The Rational Timing of Surprise." *World Politics*. 31(2): 228-246.
1970. *Conflict of Interest: A Theory of Divergent Goals with Application to Politics*. Chicago: Markham.
- Bagwell and Staiger. 2005. "Enforcement, Private Political Pressure, and the GATT/WTO Escape Clause." *Journal of Legal Studies*.
- Baier, Scott and Jeffrey Bergstrand. 2005. "Do Free Trade Agreements Actually Increase Members' International Trade?" *Federal Reserve of Atlanta Working Paper* 2005-3.
- Balton, David 2004 "Dealing with the 'Bad Actors' of Ocean Fisheries." Directorate for Food, Agriculture and Fisheries. Organization for Economic Co-operation and Development (OECD). AGR/FI/IUU/RD(2004)
- Becker, Abraham. 1977. "Strategic Breakout as a Soviet Policy Option: A report prepared for U.S. Arms Control and Disarmament Agency." R-2097-ACDA. Rand Corporation.
- Bendor, Jonathan. 1993. "Uncertainty and the Evolution of Cooperation." *Journal of Conflict Resolution* 37(4): 709-734.
- Benson, Brett and David Soskice. 2004. "Non-verifiability Problems in Limited Purpose Alliances and Some Implications for Institutional Design." *Research memo prepared for the Annual Conference of the Micro-Incentive Research Center (MIRC)*, Micro-Foundations of Federal Institutional Stability, held at Duke University, April 30-May 1, 2004.
- Bergstrand, Jeffrey. 1985. "The Generalized Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory in International Trade." *Review of Economics and Statistics* 71(1):143-53.
- Bhagwati, Jagdish. 1993. "Regionalism and Multiculturalism: An Overview." in Jamie De Melo and Arvind Panagariya. *New Dimensions in Regional Integration*. Center for Economic Policy Research. Cambridge University Press.
- Bilder, Richard. 1981. *Managing the Risks of International Agreement*. University of Wisconsin Press.
- Birnie, Patricia, and Alan Boyle. 2001. *International Law and the Environment*. Cambridge University Press.

- Bodansky, Daniel, and John R. Crook. 2002. Symposium: The ILC's State Responsibility Articles. *American Journal of International Law* 96: 773.
- Bowen, Wyn. 2005 "Iran and Nuclear Safeguards: Establishing the Facts and Seeking Compliance" in *Verification Yearbook 2004*. VERTIC.
- Bown, Chad. 2007. "China's WTO Entry: Antidumping, Safeguards and Dispute Settlement." August 2007, *NBER Working Paper* No. 13349.
- Boyd, Kerry. 2002. "BWC Review Conference Meets, Avoids Verification Issues." *Arms Control Today*.
- Bradley, Curtis and Judith Kelley. 2007. "The Concept of International Delegation." *Duke Law Working Paper Series*.
- Brown, Robert. 2006. "Delegation to International Nonproliferation Institutions: The Role of Preferences." *Paper presented at International Studies Association Annual Meeting*, San Diego, CA, 22-25 March 2006.
- Bueno de Mesquita, Bruce, Alastir Smith, Randolph Siverson, and James Morrow. 2003. *The Logic of Political Survival*. Cambridge, MA: MIT Press.
- Bueno de Mesquita, Ethan and Matthew Stephenson. 2006. "Legal Institutions and Informal Networks." *Journal of Theoretical Politics* 18(1): 41-68.
- Busch, Marc. 2007. "Overlapping Institutions, Forum Shopping, and Dispute Settlement in International Trade." *International Organization*. 61(3):735-61.
- Calvert, Randall. 1998. "Explaining Social Order : Internalization, External Enforcement, or Equilibrium?" in Karol Soltan, Eric Uslaner, and Virginia Haufler (eds.) *Institutions and Social Order*. Ann Arbor: University of Michigan Press.
- Carter, Ashton. 2004. "How to Counter WMD." *Foreign Affairs*.
- Carpenter, Daniel and Michael Ting. 2005. "Regulatory Errors under Two-Sided Uncertainty: Or, the Political Economy of Vioxx" working paper.
- Chapman, Terrence. 2007. "International Security Institutions, Domestic Politics, and Institutional Legitimacy." *Journal of Conflict Resolution* 51(1): 134-166.
- Chayes, Abram and Antonia Chayes 1993 "On Compliance." *International Organization* 47: 175
- Coglianesse, Cary, Richard Zeckhauser, and Edward Parson. 2004. "Seeking Truth for Power: Informational Strategy and Regulatory Policymaking." *Minnesota Law Review* 89 (2):277-341
- Crawford, James. 2002. *The International Law Commission's Articles on State Responsibility: Introduction, Text and Commentaries*. Cambridge University Press.
- COFI/2005/2, Committee on Fisheries, Twenty-sixth session, Rome Italy 7-11 March 2005. "Progress in the Implementation of the Code of Conduct for Responsible Fisheries and Related International Plans of Action"
- Cox, Anthony and Carl-Christian Schmidt 2002. "Subsidies in the OECD Fisheries Sector: A Review of Recent Analysis and Future Directions." Paper prepared for the FAO Expert Consultation on Identifying, Assessing and Reporting on Subsidies in the Fishing Industry, Rome, 2-6 December 2002.

- CISAC (Committee on International Security and Arms Control) 2005. *Monitoring Nuclear Weapons and Nuclear-Explosive Materials: An Assessment of Methods and Capabilities*. National Academy Press. Washington, D.C.
- Cole, Leonard. 2006. "WMD & Lessons from the Anthrax Attacks." in Kamiden, David (ed.) *The McGraw-Hill Homeland Security Handbook*, McGraw-Hill.
- Crawford, A, Cleminson, F. R. Grant, D. A., Gilman, E. 1987. *Compendium of Arms Control Verification Proposals*. 3rd Edition, Operational Research and Analysis Establishment of Ottawa, Ontario.
- Dai, Xinyuan. 2005. "Why Comply? The Domestic Constituency Mechanism." *International Organization*. 59(2):363-398.
2002. "Information Systems in Treaty Regimes." *World Politics*. 54(4): 405-436.
- Davis, Christina. 2007. "Overlapping Institutions in Trade Policy." *mimeo*. Princeton University.
- De Melo, Jamie and Arvind Panagariya. 1993. *New Dimensions in Regional Integration*. Center for Economic Policy Research. Cambridge University Press.
- Devaney, Patricia L. 2005. "Regional Fisheries Management Organizations: Bringing Order to Disorder" in Lawrence Susskind and William Moomaw (eds.) *Papers on International Environmental Negotiation*, Volume 14, Program on Negotiation at Harvard Law School Clearinghouse. Available at http://www.pon.org/downloads/ien14_4Devaney.pdf
- Dimitrov, Radoslav, Detlef F. Sprinz, Gerald M. DiGusto, and Alexander Kelle. Forthcoming. "International Nonregimes: A Research Agenda." *International Studies Review*.
- Downs, George, David Rocke and Peter Barsoom. 1996. "Is the Good News about Compliance Good News for Cooperation?" *International Organization*. 50: 379-406.
- Downs, George, and David Rocke. 1990. *Tacit Bargaining, Arms Races, and Arms Control*. Ann Arbor: University of Michigan Press.
- Duffy, Gloria. 1987. *Compliance and the Future of Arms Control*. Ballinger
- ECOLEX: A Gateway to Environmental Law. www.ecolex.org
- The Economist. 2001. "Global fish stocks: Fishy figures." December 2001: 99-100
- Elster, Jon. 2006. "Authors and Actors: Executive-legislative relations in four French constitution-making moments" Conference on *Crafting and Operating Institutions*, Yale University, April 11-13 2003, www.yale.edu/coic/elster.doc (Accessed at July 12, 2006)
- Environmental Vulnerability Index (EVI): Description of Indicators. 2004. UNEP and SOPAC. South Pacific Applied Geoscience Commission (SOPAC), the United Nations Environment Programme (UNEP)
- Esty, Daniel C., Marc Levy, Tanja Srebotnjak, and Alexander de Sherbinin. 2005. *2005 Environmental Sustainability Index: Benchmarking National Environmental Stewardship*. New Haven: Yale Center for Environmental Law and Policy.
- Fang, Songying. 2006. *The Informational Role of International Institutions and Domestic Politics*. *Mimeo*. University of Minnesota.

- FAO. 1996. "Precautionary Approach to Capture Fisheries and Species Introductions." FAO Technical Guidelines for Responsible Fisheries.
- FAO Fisheries Department. 2002. "Fishery Statistics: Reliability and Policy Implications." Available at <http://www.fao.org/DOCREP/FIELD/006/Y3354M/Y3354M00.HTM>
- FAO FARISIS Database <http://www.oceanlaw.net/texts/index.htm>
- FAO Fisheries Global Information System (FIGIS)
- Farnsworth, Cyde H. 1995. "North Atlantic Fishing Pact Could Become World Model." *New York Times*, 17 April 1995.
- Farrell, Joseph, and Matthew Rabin. 1996. "Cheap Talk." *Journal of Economic Perspectives*. 10(3):103-18.
- Feakes, Daniel. 2001. "Export Controls, Chemical Trade, and the CWC." in Jonathan Tucker (ed.) *The Chemical Weapons Convention: Implementation Challenges and Solutions*. Center for Nonproliferation Studies. Monterey Institute.
- Fearon, James. 2005. "Reforming International Institutions to Promote International Peace and Security." Paper prepared for International Task Force on Global Public Goods, accessed at <http://www.stanford.edu/~jfearon/>
1998. "Bargaining, Enforcement, and International Cooperation." *International Organization* 52(2):269-306.
1997. "Signaling in Foreign Policy Interests: Tying Hands versus Sinking Costs." *Journal of Conflict Resolution* 41(1): 68-90.
- Firestone, J. and T. Polacheck. 2004. "The Effectiveness of the UN Convention on the Law of the Sea in Resolving International Fisheries Disputes: The Southern Bluefin Tuna Case." in *Science and Politics in the International Environment*, Harrison, Neil. and Gary Bryner. (eds.), Landham, MD : Rowman & Littlefield Publishers, Ch. 9, 99. 241-270.
- Foroutan, Faezeh. 1993. "Regional Integration in Sub-Saharan Africa: Past Experience and Future Prospects." in Jamie De Melo and Arvind Panagariya. *New Dimensions in Regional Integration*. Center for Economic Policy Research. Cambridge University Press.
- Fortna, Virginia Page. 2004. "Interstate Peacekeeping: Causal Mechanisms and Empirical Effects." *World Politics* 56(4): 481-519
- Frankel, Jeffrey A., (ed.) 1997. *The Regionalization of the World Economy*. National Bureau of Economic Research Project Report
- Fudenberg, Drew and Jean Tirole. 1991. *Game Theory*. MIT Press.
- Gallagher, Nancy. 1999. *Politics of Verification*. Baltimore: Johns Hopkins University Press.
- Garrett, Geoffrey and James McCall Smith. 2002. "Politics of WTO Dispute Settlement." *UCLA International Institute*. Occasional Paper Series.
- Gawande, Kishore and Usree Bandyopadhyay. 2000. "Is Protection for Sale? A Test of the Grossman-Helpman Theory of Endogenous Protection." *Review of Economics and Statistics*. 89: 139-152.
- Goldberg and Maggi 1999. "Protection for Sale: Empirical Test." *American Economic Review*

- Grossman, Gene and Elhanan Helpman 1994. "Protection for Sale." *American Economic Review* September 84(4): 833-850
- Green, Edward and Robert Porter. 1984. "Non-cooperative Collusion under Imperfect Price Information." *Econometrica*. 52(1): 87-100.
- Greif, Avner, Paul Milgrom, and Barry Weingast. 1994. "Coordination, Commitment, and Enforcement: The Case of the Merchant Guild." *Journal of Political Economy* 102(4): 745-76.
- Guzman, Andrew. 2002. "Global Governance and the WTO." *UC Berkeley Public Law Research Paper* No.89.
- Haas, Peter. 1992. "Introduction: Epistemic Communities and International Policy Coordination." *International Organization*, 46(1)
- Hardin, Garrett. 1968. "The Tragedy of the Commons." *Science*. 162: 1243-1248.
- Hendrik, James and Petros Mavroidis 2006. "The WTO Dispute Settlement System 1995-2004: Some Descriptive Statistics." *World Bank*.
- Henriksen, Tore, Geir HØnneland, and Are Sydnes. 2006. *Law and Politics in Ocean Governance: The UN Fish Stocks Agreement and Regional Fisheries Management Regimes*. Leiden, Netherlands, Martinus Nijhoff Publishers.
- Hilborn, Ray, J.M. Orensanz and Ana Parma. 2005. "Institutions, Incentives and the Future of Fisheries" *Philosophical Transactions of the Royal Society B: Biological Sciences*. 360(1453): 47-57.
- Hoyle, Rick H. 1999. *Statistical Strategies for Small Sample Research*. Sage Publications.
- IAEA, 2007. "Treaties, Conventions and Agreements under IAEA Auspices."
Available at <http://www.iaea.org/Publications/Documents/Conventions/index.html>
2007. "The Safeguards System of the International Atomic Energy Agency." Available at http://www.iaea.org/OurWork/SV/Safeguards/safeg_system.pdf
- 2005 Non-Proliferation of Nuclear Weapons and Nuclear Security: IAEA Safeguards Agreements and Additional Protocols. Available at <http://www.iaea.org/Publications/Booklets/nuke.pdf>
- Jervis, Robert. 1978. "Cooperation Under the Security Dilemma." *World Politics*, Vol. 30, No. 2 (Jan., 1978), pp. 167-214
- Jo, Dong-Joon and Eric Gartzke. 2007. "Determinants of Nuclear Weapons Proliferation: A Quantitative Model." *Journal of Conflict Resolution*. 51(1): 167-194.
- Johns, Leslie. 2007. A Servant of Two Masters: Communication and the Selection of International Bureaucrats. *International Organization*. 61 (1): 245-275.
- Kandori, Michihiro. 2002. Introduction to Repeated Games with Private Monitoring. *Journal of Economic Theory* 102: 1-15.
- Kaye, Stuart. 2000. *International Fisheries Management*. Kluwer Law International.
- Keohane, Robert. 2002. "Rational Choice Theory and International Law: Insights and Limitations." *Journal of Legal Studies*, Vol.XXXI. January.

1986. *After Hegemony: Cooperation and Discord in the World Political Economy*. Princeton: Princeton University Press.
- Keohane, Robert and Robert Axelrod 1985. "Achieving Cooperation under Anarchy: Strategies and Institutions." *World Politics* 38(1):226-254
- Kelly, David. 2002. "The Trilateral Agreement: Lessons for Biological Weapons Verification." *2002 Verification Yearbook*. VERTIC.
- Knight, Jack. 1992. *Institutions and Social Conflict*. Cambridge University Press.
- Knopf, Jeffrey. 1998. "Domestic Sources of Preferences for Arms Cooperation: The Impact of Protest." *Journal of Peace Research*. 35: 677-695
- Koremenos, Barbara, Charles Lipson and Duncan Snidal. 2001. "The Rational Design of International Institutions." *International Organization* 55(4): 761-800.
- Koremenos, Barbara. 2007. "If Only Half of International Agreements Have Dispute Resolution Provisions, Which Half Needs Explaining?" *Journal of Legal Studies*. 36(1).
2005. "Contracting around International Uncertainty." *American Political Science Review* 99: 549-65
2001. "Loosening the Ties that Bind: A Learning Model of Agreement Flexibility." *International Organization*. 55(2): 289-325
- Kramish, Arnold 1967 "The Watched and the Unwatched: Inspection in the Non-Proliferation Treaty." *Adelphi Paper* No.36, Institute for Strategic Studies, London.
- Krass, Alan. 1993. "Arms Control Treaty Verification." in Richard Dean Burns (ed.) *Encyclopedia of Arms Control and Disarmament*. Volume I. Charles Scriber's Sons. 297-316.
1986. *Verification-How Much is Enough?* London and Philadelphia: Taylor & Francis (for SIPRI)
- Lai, Brian and Dan Reiter 2000 "Democracy, Political Similarity and International Alliances, 1816-1992" *Journal of Conflict Resolution*. 44(2): 203-227.
- Lake David A. and Mathew McCubbins. 2006. "The Logic of Delegation to International Organizations." in Darren G. Hawkins, David A. Lake, Daniel L. Nielson, and Michael J. Tierney (eds.) *Delegation and Agency in International Organizations*. Cambridge University Press.
- Laffont, Jean-Jacques. 2005. *Regulation and Development*. Cambridge University Press.
- Laffont and Tirole. 1991. *Theory of Incentives in Procurement and Regulation*. Cambridge, MA: MIT Press.
- Langenbach, Anna, Lars Olberg, and Jean DuPreez. 2005. "The New IAEA Resolution: A Milestone in the Iran-IAEA Saga" Center for Nonproliferation Studies (CNS). *Monterey Institute of International Studies*.
- Li, Quan. 2000. "Institutional Rules of Regional Trade Blocs and Their Impact on Trade." in *The Political Consequences of Regional Trade Blocks*, edited by R. Switky and B. Kerremans. London: Ashgate, 85-118.
- Littlewood, Jez. 2005. *The Biological Weapons Convention: A Failed Revolution*. Aldershot, UK: Ashgate.

- Long, Scott, J. and Jeremy Freese. 2006. *Regression Models for Categorical Dependent Variables Using STATA*, 2nd Ed. College Station, TX: STATA Press Publication..
- Louise De La Fayette; Malcolm D. Evans. 1999. "The Fisheries Jurisdiction Case (Spain v. Canada), Judgment on Jurisdiction of 4 December 1998." *International and Comparative Law Quarterly*. 48(3): 664-672.
- Mailath, George and Larry Samuelson. 2006. *Repeated Games and Reputations: Long-Run Relationships*, mimeo
- Mansfield, Edward, Helen Milner, and Peter Rosendorff. 2002. "Why Democracies Cooperate More: Electoral Control and International Trade Agreements." *International Organization*. 56(3): 477-513
- Mansfield, Edward, Helen Milner, and Jon Pevehouse 2007. "Vetoing Cooperation: The Impact of Veto Players on International Trade Agreements." *British Journal of Political Science*, 36(4)
- Martin, Lisa. 2006. "Distribution, Information, and Delegation to International Organizations: the Case of IMF Conditionality." in Darren G. Hawkins, David A. Lake, Daniel L. Nielson, and Michael J. Tierney (eds.) *Delegation and Agency in International Organizations*. Cambridge University Press.
- Masiza, Zondi. 1993. "A Chronology of South Africa's Nuclear Program." *Nonproliferation Review*. Fall: 36-55
- McGillivray, Fiona, and Alastair Smith. 2000. "Trust and Cooperation through Agent-Specific Punishments." *International Organization* 54 (4):809-24.
- McNicol, Donald. 1972. *A Primer on Signal Detection Theory*. London: George Allen & Unwin.
- McCallum, John 1995. "National Borders Matter: Canada-U.S. Regional Trade Patterns." *American Economic Review* 85(3):615-23. Merrills, J.G. 1998. *International Dispute Settlement*. 3rd Ed. Cambridge University Press.
- Mearsheimer, John. 1995. "The False Promise of International Institutions." *International Security*. 19(3): 5-49.
- Meyer, Stephen. 1984. "Verification and Risk in Arms Control." *International Security*. 8(4): 111-126.
1986. *The Dynamics of Nuclear Proliferation*. University of Chicago Press.
- Milazzo, Matteo. 1998. "Subsidies in World Fisheries: A Reexamination." *World Bank Technical Paper Series*. No.406. Fisheries Series.
- Milner, Helen and Peter Rosendorff. 2001. "The Optimal Design of International Institutions: Why Escape Clauses are Essential." *International Organization*. 55(4): 829-57.
- Mitchell, Ronald. 2006. International Environmental Agreements (IEA) Database. <http://iea.uoregon.edu/>
2006. "Problem Structure, Institutional Design, and the Relative Effectiveness of International Environmental Agreements." *Global Environmental Politics* 6(3): 72-89.
2005. "The International Environmental Agreements Project: Structure, Analytic Goals, and an Example from Fisheries." *Paper presented at the Annual Meeting of the American Political Science Association*, September 1-4, 2005.

- 2003 "International Environmental Agreements: A Survey of Their Features, Formation, and Effects." *Annual Review of Environment and Resources* 28: 429-61.
1998. "Sources of Transparency: Information Systems in International Regimes." *International Studies Quarterly* 42(1): 109-130
- Mitchell, Ronald, William Clark, David Cash and Nancy Dickson (eds.), 2006. *Global Environmental Assessments: Information and Influence*. Cambridge, MA. MIT Press.
- Monterey Institute, James Martin Center for Nonproliferation Studies, 2002. "Chemical and Biological Weapons: Possession and Programs Past and Present" at <http://cns.miis.edu/research/cbw/possess.htm>
- Morrow, James. 2001. "The Institutional Features of the Prisoners of War Treaties." *International Organization*. 55(4):971-991.
1994. "Modeling Forms of International Cooperation: Distribution versus Information." *International Organization*. 48(3): 387-423.
1993. "The Political Organization of International Trade" *Paper presented at the Annual Meeting of the American Political Science Association*, September 2-5, 1993, Washington, DC.
- Morrow, James, Randolph M. Siverson and Tressa Tabares. 1998. "The Political Determinants of International Trade: the Major Powers, 1907-1990" *American Political Science Review*, 92: 649-661.
- Morrow, James. 1991. "Electoral and Congressional Incentives and Arms Control." *Journal of Conflict Resolution*. 35(2).
- Munro, G. Van Houtte, A., Willmann, R. 2004. "The Conservation and Management of Shared Fish Stocks: Legal and Economics Aspects" *FAO Fisheries Technical Paper No.465*, Rome.
- Narlikar Amrita and John S. Odell. 2006. "The strict distributive strategy for a bargaining coalition: the like minded group in the World Trade Organization, 1998-2001" in Odell (ed.) *Negotiating Trade: Developing countries in the WTO and NAFTA*. Cambridge University Press.
- Newfarmer, Richard. 2005. "Regional Trade Agreements and Development: Upside Potential and Downside Risks." *World Bank Trade Note*. September 13.
- Obertur, Sebastian. 1998. "The International Convention for the Regulation of Whaling: From Over-Exploitation to Total Prohibition" *Yearbook of International Cooperation on Environment and Development 1998/9*, 29-38
- Ostrom, Elinor, Roy Gardner, and James Walker (eds.) 1994. *Rules, Games and Common Pool Resources*. Ann Arbor. University of Michigan Press.
- Ostrom, Elinor. 1990. *Governing the Commons: the Evolution of Institutions for Collective Action*. Cambridge, New York: Cambridge University Press
- Persbo, Andreas. 2007. "Thinking inside the box: exploring legal approaches to build confidence in Iran's nuclear programme." *Verification Matters*. No. 7.
- Peterson, M.J. 1991. "International Fisheries Management" in Robert Keohane, Peter Haas, and Marc Levy (eds.). *Institutions for Earth: Sources of Effective International Environmental Protection*. Cambridge, MA: MIT Press. pp. 249-305.

- Riddle, Kevin W. 2006. "Illegal, Unreported, and Unregulated Fishing: Is International Cooperation Contagious?" *Ocean Development & International Law* 37(4): 265 - 297
- Parson, Edward 2003. *Protecting the Ozone Layer: Science and Strategy*. London: Cambridge University Press.
- Pevehouse, Jon and Renee Buhr. 2005. "Rules of Trade: Democracy and Legalism in Preferential Trade Agreements" *Paper presented at APSA*
- Pevehouse, Jon, Emilie Hafner-Burton, and Matthew Zierler. 2002. "Regional Trade and Institutional Design: Long after Hegemony?" *Presented at the 2002 MPSA Meetings, Chicago, IL.*
- Powers, Kathy. 2004. "Regional Agreements as Military Alliances" *International Interactions*. 30(4): 373-395
- Putnam, Robert. 1988. "Diplomacy and Domestic Politics: The Logic of Two-Level Games." *International Organization*. 42(3): 427-460
- Quester, George. 1973. *The Politics of Nuclear Proliferation*. Johns Hopkins University Press
- Raustiala, Kal 2005. "Form and Substance in International Agreements." *American Journal of International Law*, 99(3): 581-614
2004. "Police Patrols and Fire Alarms in the NAAEC." *Loyola of Los Angeles International and Comparative Law Review* 26(389): 391
2001. "Reporting and Review Institutions in 10 Selected Multilateral Environmental Agreements." UNEP, Nairobi
- Ringquist, Evan J., and Tatiana Kostadinova. 2005. "Evaluating the Effectiveness of International Environmental Agreements: The Case of the 1985 Helsinki Protocol." *American Journal of Political Science*. 49(1):86-102.
- Rosendorff, Peter. 2005. "Stability and Rigidity at the WTO." *American Political Science Review*. 99(3): 389-400.
- Rosendorff, Peter, and Helen Milner. 2001. "The Optimal Design of International Institutions: Uncertainty and Escape." *International Organization* 55(4):829-857.
- Rosendorff, Peter and James Raymond Vreeland. 2006. "Democracy and Data Dissemination: The Effect of Political Regime on Transparency." *Paper presented at the International Political Economy Society*. November 2006.
- Rubinstein, Ariel. 1991. "Comments on the Interpretation of Game Theory." *Econometrica*. 59(4): 909-24.
- Sampson, Gary P. and Stephen Woolcock (eds.) 2003. *Regionalism, Multilateralism and Economic Integration: The Recent Experience*. United Nations University Press.
- Sanger, David and William Broad. 2006. "How to Listen for the Sound of Plutonium." *New York Times* January 31, 2006
- Sartori, Anne. 2005. *Deterrence by Diplomacy*. Princeton: Princeton University Press.
- Schelling, Thomas, and Morton Halperin, 1985. *Strategy and Arms Control*. Potomac Books.

- Schelling, Thomas. 1960. *The Strategy of Conflict*. Harvard University Press
- Schott, Jeffrey (ed.) 2004. *Free Trade Agreements: US Strategies and Priorities*. Washington, DC: Institute for International Economics.
- Schwartz, Warren, and Alan Sykes. 2002. "The Economic Structure of Renegotiation and Dispute Resolution in the WTO/GATT System." *Journal of Legal Studies*. 31:179.
- Sebenius, James. 1983. "Negotiation Arithmetic: Adding and Subtracting Issues and Parties." *International Organization* 37(2): 281-316
- Shah, Prakash. 2001. "International Co-Operation in Chemical Trade: Has the Chemical Weapons Convention Helped?" *OPCW Synthesis*. Spring/April.
- Simmons, Beth. 2005. *International Human Rights: Law, Politics, and Accountability*. Manuscript.
- Simmons, Beth, Frank Dobbin, and Geoffrey Garrett. 2006. "Introduction: The International Diffusion of Liberalism" *International Organization*. 60(4):781-810.
- SIPRI (Stockholm International Peace Research Institute). 1971. *The Problem of Chemical and Biological Warfare*. New York, Humanities Press.
- Siverson, Randolph and Harvey Starr. 1990. "Opportunity, Willingness, and the Diffusion of War" *American Political Science Review*. 84(1): 47-67.
- Smith, James McCall. 2000. "The Politics of Dispute Settlement Design: Explaining Legalism in Regional Trade Pacts." *International Organization*. 54(1): 137-180.
- Smith, James McCall, and Geoffrey Garrett. 2002. "The Politics of WTO Dispute Settlement." *UCLA International Institute Occasional Paper Series*.
- Smithson, Amy. 1998. "Man Man Versus Microbe: The Negotiations to Strengthen the Biological Weapons Convention" in *Biological Weapons Proliferation: Reasons for Concern, Course of Action*, Stimson Center.
- Spector Leonard. 2002. "Nuclear Proliferation." In *Arms Control: Cooperative Security in a Changing Environment*. Larsen Jeffrey A. (ed.) Boulder: Lynne Rienner Publishers.
- Stokke, Oram. 2001. *Governing High Seas Fisheries*. Oxford University Press.
- Sullivan, Patrick. 2003. "Testimony on Global Overfishing and International Fisheries Management." *Hearing at the U.S. Senate Committee on Commerce, Science and Transportation*, Thursday, June 12 2003. Available at <http://commerce.senate.gov/hearings/witnesslist.cfm?id=808>
- Thorpe, Andy. 2005. "Mainstreaming Fisheries into National Development and Poverty Reduction Strategies: Current Situation and Opportunities" *FAO Fisheries Circular* No.997. FIPP/SFLP/C997, Rome, FAO. 2004. 121p.
- Thompson, Alexander. 2006. Coercion through IOs: The Security Council and the Logic of Information Transmission. *International Organization* 60(1): 1-34.
- Thompson, Alexander, and Duncan Snidal. 2005. "The Determinants of IO Autonomy: Legalization and Reform of WTO Dispute Settlement." *Paper presented at the annual meeting of the American Political Science Association*, Washington, DC.

- Tomz, Michael, Judith Goldstein and Douglas Rivers. 2007. "Membership Has Its Privileges: The Impact of the GATT on International Trade." *American Economic Review*. 97(5).
- Trachtman, Joel. 2003. "United States—Definitive Safeguard Measures on Imports of Certain Steel Products." *European Journal of International Law*. Accessible at <http://www.ejil.org/journal/curdevs/AB.html#TopOfPage>
- Trefler, Daniel, 1993. "Trade Liberalization and the Theory of Endogenous Protection: An Econometric Study of U.S. Import Policy." *Journal of Political Economy*. 101(1): 138-60, February.
- Tsipis, Kosta, David Hafemeister, and Penny Janeway (eds.) 1986. *Arms Control Verification: The Technologies that Make It Possible*. Pergamon-Brassey's. Washington, D.C.
- Tucker, Jonathan. 1998a "Verification Provisions of the Chemical Weapons Convention and Their Relevance to the Biological Weapons Convention." in *Biological Weapons Proliferation: Reasons for Concern, Course of Action*, Stimson Center. Report No.18
<http://www.stimson.org/cbw/pdf/report24-tucker.PDF>
- 1998b. "Strengthening the BWC: Moving Toward a Compliance Protocol." *Arms Control Today*, January/February
- UNDIR (United Nations Institute for Disarmament Research) & VERTIC (Verification Research, Training and Information Centre). 2003. *Coming to Terms with Security: A Handbook on Verification and Compliance*. Geneva, Switzerland.
- UNDIR. 1999. "Verification and Validation of Software Related to Nuclear Power Plant Instrumentation and Control" International Atomic Energy Agency." Technical Reports Series No.384, Vienna.
- United Nations. 1997. "Manual on Human Rights Reporting." HR/PUB/91/1 (Rev.1), Geneva.
- United States State Department. 1986. "Verifying Nuclear Testing Limitations: Possible U.S. - Soviet Cooperation." *US Department of State Bulletin*. November.
- Victor, David, Kal Raustiala, and Eugene Skolnikoff (eds.) 1998. *The Implementation and Effectiveness of International Environmental Commitments: Theory and Practice*. Cambridge: MIT Press.
- Vicuna, Francisco Orrego. 1999. *The Changing International Law of High Seas Fisheries*. Cambridge University Press.
- Victor, David, Kal Raustiala, and Eugene Skolnikoff. 1998. *The Implementation and Effectiveness of International Environmental Commitments: Theory and Practice*. MIT Press.
- Von Stein, Jana. 2005. "Do Treaties Constrain or Screen? Selection Bias and Treaty Compliance" *American Political Science Review*. 99(4): 611-622.
- Vonortas, Nicholas and Robin Auger. 2002. "Assessing Industrial Performance" *Manuscript*. Center for International Science and Technology Policy, George Washington University
- Wang, Jia, and Dean Jamison. 1998. "Regression Residuals as Performance Measures: An Assessment of Robustness in the Context of Country-Level Data" *Paper presented at the Annual Meeting of the American Educational Research Association*, San Diego, CA, April 13-17, 1998.
- Watson, Reg and Daniel Pauly. 2001. "Systematic Distortions in World Fisheries Catch Trends." *Nature*, 414(29): 534-536

- Weiss, Edith Brown, and Harold Jacobson. 1998. *Engaging Countries: Strengthening Compliance with International Environmental Accords*. Cambridge: MIT Press.
- Westlund, Lena. 2004. "Guide for Identifying, Assessing and Reporting on Subsidies in the Fisheries Sector." *FAO Fisheries Technical Paper 438*
- Willett, Susan. 2002. *Costs of Disarmament—Rethinking the Price Tag: A Methodological Inquiry into the Costs and Benefits of Arms Control*. UNDIR
- Winzowski, Karen. 2006. "A Tale of Two Industries: How the Chemical and Biotech Industries have Influenced US Arms Control Policy." *Paper presented at the annual meeting of the International Studies Association*, San Diego, California, Mar 22, 2006
- Wold, Chris, Shari Arrigotti, Lisa Johnson, Amy Van Horn and Lockey White. 2000. "A Review of Monitoring, Control, and Surveillance Programs of International Fisheries Agreements with a View to the IWC's Inspection and Observation Scheme of the RMS" *Mimeo. Northwestern School of Law of Lewis & Clark College*.
Available at http://www.lclark.edu/org/ielp/objects/comp_regimes.pdf
- World Resources Institute. 2007. *EarthTrends: Environmental Information*. Available at <http://earthtrends.wri.org>. Washington DC: World Resources Institute.
- Woollett, Gillian. 1998. "Industry's Role, Concerns, and Interests in the Negotiation of a BWC Compliance Protocol." in *Biological Weapons Proliferation: Reasons for Concern, Courses of Action*. Washington, DC: Henry L. Stimson Center.
- World Bank Inspection Panel. 2001. *Accountability at the World Bank: The Inspection Panel 10 Years On*
- Wu, Jianzhong, and Robert Axelrod. 1995. "How to Cope with Noise in the Iterated Prisoner's Dilemma." *Journal of Conflict Resolution*. 39:183-189.
- Yang, Yongzheng and Sanjeev Gupta. 2005. "Regional Trade Arrangement in Africa: Past Performance and the Way Forward." *IMF Working Paper*, WP/05/36
- Yarbrough, Beth, and Robert Yarbrough. 1997. "Dispute Settlement in International Trade: Regionalism and Procedural Coordination." in Mansfield and Milner (eds.) *The Political Economy of Regionalism*. New York: Columbia University Press.