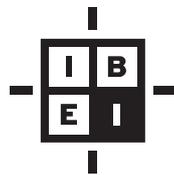


INTERNATIONAL INSTITUTIONS AS SOLUTIONS TO UNDERLYING GAMES OF COOPERATION

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This Working Paper was presented at the international workshop "Game Theory in International Relations at 50", organized and coordinated by Professor Jacint Jordana and Dr. Yannis Karagiannis at the Institut Barcelona d'Estudis Internacionals on May 22, 2009. The day-long Workshop was inspired by the desire to honour the ground-breaking work of Professor Thomas Schelling in 1959-1960, and to understand where the discipline International Relations lies today vis-à-vis game theory.

1. Introduction

Just over 50 years ago, Thomas Schelling called attention to the kind of games that intrigue scholars of international cooperation: “games in which, though the element of conflict provides the dramatic interest, mutual dependence is part of the logical structure and demands some kind of collaboration or mutual accommodation” (1958: 203). These are Schelling’s “mixed-motive games” or “non-zero sum games,” and what I refer to as “games of cooperation.”

Schelling argued that game theory is underdeveloped with respect to mixed-motive games – most likely because of its preoccupation with the zero-sum game. He states: “...non-zero-sum game theory may have missed its most promising field by being pitched at *too abstract a level of analysis*.¹ By abstracting from communication and enforcement systems and by treating perfect symmetry between players as the general case rather than a special one, game theory may have overshot the level at which the most fruitful work could be done” (1958: 221).

Interestingly, Schelling’s statement is somewhat of a contrast to that of Morton Kaplan, who, like Schelling, also published in the *Journal of Conflict Resolution* in 1958. Kaplan was not as optimistic about what game theory might be able to tell us.

In some sense, Schelling’s 1958 article was a call to action regarding what game theory might accomplish. How did we as scholars of international cooperation respond? Many important insights were gained in the decades following Schelling’s 1958 article. A few very noteworthy scholars suggested some general means by which cooperation can be facilitated. For example, Axelrod (1984) and Oye (1986) suggest devices such as lengthening the shadow of the future, practicing reciprocity, and improving recognition capabilities. Krasner (1983) looks at the role of international regimes in promoting and maintaining cooperation, and Keohane (1984) argues that regimes reduce the transactions costs associated with international cooperation. Both Stein (1982) and Snidal (1985) brought great insights through their analyses of Coordination Games versus Prisoners’ Dilemmas. They use 2x2 games to illustrate how the game states are playing affects the choice of regime. There is no question that these seminal works furthered our understanding of cooperation.

Unfortunately, by the 1990s, scholars were continuing to debate the possibility of cooperation and whether it was important. For the most part, the details of this earlier literature were being refined, but the analyses remained extremely abstract, with no details about specific institutional arrangements or questions of institutional design. In other words, this literature failed to investigate the precise mechanisms through which cooperation can emerge. Likewise, the tools of game theory continued to be directed mainly at abstract questions that emphasize cooperation per se rather than institutional design conditional on cooperation as the dependent variable. Possibility theorems were the most common type of claim. And, of course, if the possibility of cooperation was still being debated, it is no great surprise that the question of whether international institutions matter was also hotly debated.

1. Emphasis mine.

Fortunately, things are changing. We are moving away from possibility theorems to empirically testable comparative static predictions. We are moving away from viewing almost every interesting problem as being characterized as a Prisoners' Dilemma (with deliverance coming from the shadow of the future) to more conditional and nuanced theories. We are moving away from separate studies of games and solutions to institutions explicitly incorporated as options in the game – in other words, *equilibrium institutions*. We are moving away from mostly case studies to large-n testing with “scientific” data sets. And finally we are moving away from abstract debate to policy-relevant conclusions.

Just how are we getting there? First, we are refining the dependent variable. Instead of arguing about the possibility of cooperation, we take it as a given that cooperation is possible. And that leads us to focus on the form cooperation takes. One implication is that we are taking international law seriously.

Second, we are refining the independent variable. We are getting past the tendency to view every international problem as a Prisoners' Dilemma. As I will elaborate below, we are differentiating among enforcement, distribution, commitment, and uncertainty problems. With respect to uncertainty, we are distinguishing among uncertainty about behavior, uncertainty about preferences, and uncertainty about the state of the world. (This is critical because these three uncertainties have unique implications for institutional design.)

Third, we are testing our theories. This implies that we are collecting data and paying attention to issue of intercoder reliability. Testing requires precise definitions of the dependent variables regarding the form cooperation takes. Another necessary element for testing is creative and multiple operationalizations of the independent variables.

The systematic collection of data on international agreements has reached an impressive point. For example, Leeds' Alliance Treaty Obligations and Provisions data set showcases systematic and theoretically-driven data on alliance politics for close to a 200-year period. As another example, Mitchell's International Environmental Agreements Project seeks to provide systematic data on variation in international environmental treaties by establishing a system for coding treaty provisions in these agreements. And, finally, Koremenos' Continent of International Law (COIL) features a random sample of agreements across the issue areas of security, economics, environment, and human rights. It includes both bilateral and multilateral agreements, and in addition to the coding of the design features of agreements, it attempts to code the underlying cooperation problems that brought state actors to the negotiating table – in other words, the independent variables.

In what follows, I will present one vehicle for answering Schelling's call to action: The Rational Design of International Institutions research project (Rational Design).² I will first discuss the foundation of Rational Design: the underlying cooperation problems states face. I will then briefly review the set of conjectures connect-

2. Koremenos, Barbara, Charles Lipson, and Duncan Snidal, eds., 2001 “The Rational Design of International Institutions.” *International Organization*, 55 (4), Special Issue: The Rational Design of International Institutions: 761-800.

ing cooperation problems with agreement design. I will then elaborate the follow-up research program, the Continent of International Law (COIL), which includes theoretical development, data collection, and empirical testing. Finally, I will briefly discuss some of the current developments of the project.

2. Rational Design of International Institutions³

The starting point for Rational Design is a very simple observation: institutionalized international cooperation is organized in radically different ways. By institutionalized international cooperation (international institutions) I mean explicit arrangements - negotiated among international actors - that prescribe, proscribe, and/or authorize behavior. So this includes the tens of thousands of international agreements that are registered with the UN. So we have an observation and a definition. But what is really important about the rational design agenda is the following theoretical premise: We cannot understand institutional design and compare across institutions without understanding the cooperation problem(s) the institutions are trying to solve.

This may sound obvious, but it is overlooked with great frequency. I once was asked to give the opening remarks for a NAFTA (North American Free Trade Agreement) conference in Los Angeles. Before the conference began, I overheard some of the participants bemusing the fact that NAFTA did not resemble the European Union (EU). Hence I began my opening remarks with the questions, "NAFTA look like the EU?" I then argued that the cooperation problems Europeans were facing when the institutions of the EU began to form in post-World War II were far more dramatic than those ever facing North America. While trade issues involve incentives to defect and hence that cooperation problem can be said to be a common one, Europeans faced a problem with Germany that could either be characterized as significant Uncertainty about Preferences (i.e., Could Germany be trusted? Was Germany indeed a peace-loving state or would it end up going down the same path that brought about two World Wars?) or as a Commitment Problem (i.e., It is just a matter of time before some future German leader follows the destructive path of the past). Given that the Europeans had to solve either an Uncertainty about Preferences or Commitment Problem, the institutional design of the EU would likely be more elaborate than that called for by the North American environment.

If we cannot understand institutional design and compare across institutions without understanding the cooperation problem(s) the institutions are trying to solve, what this implies is that differences among international institutions are not random. Rather, states and other international actors shape institutions to solve the specific cooperation problems they face. In other words, design variations are largely the result of rational, purposive interactions. The goal is to offer a systematic account of these design features, relating them to recurrent problems faced by states.

3. This section draws almost exclusively from Koremenos, Lipson, Snidal 2001.

In game theory terms, effective international institutions are aspects of stable equilibria. Hence they must be incentive compatible and robust against small perturbations. Another way of thinking about this is to say that rational institutional design allows states to reach more efficient cooperative equilibria and helps stabilize these equilibrium outcomes.

Rational Design focuses on five key dimensions of international institutions – the dependent variables. These are listed below.

Membership rules (MEMBERSHIP)

Scope of issues covered (SCOPE)

Centralization of tasks (CENTRALIZATION)

Rules for controlling the institution (CONTROL)

Flexibility of arrangements (FLEXIBILITY)

These are not the only dimensions of institutions, but these are among the most important.

Let me elaborate each of these dependent variables further. *Membership* gets at the issue of who will be included in the institutional design? For example, is membership restrictive or all-inclusive? It is important to note that restrictive membership does not necessarily imply a small number of states like the membership of NAFTA. In fact, the EU is institutionally more restrictive in that the members must pass formal hurdles – like low budget deficits and human rights criteria. Thus restrictive membership gets at whether there are costly criteria for joining the agreement or institution.

Scope concerns the issues that will be covered in the agreement. For example, is the issue coverage limited or broad? *Centralization* addressed what tasks will be delegated to a single focal entity? Many tasks can be centralized, for example, information collection, rule-making, reviews, monitoring, and dispute settlement. Perhaps more than any other institutional design variable, Centralization is controversial in that it touches directly the idea of national sovereignty.

How collective decisions will be made in the institution is captured in the variable of *Control*. For example, do the voting rules imply equal votes for each or a veto for a minority? It is important to clarify that control is a separate variable from centralization. While centralization speaks to what will be delegated to a third party (which may be internal or external to the agreement members), control addresses how the members will make decisions.

Finally, *Flexibility* speaks to how the institutional rules and procedures will accommodate new (or perhaps even controversial) circumstances. Included in this are not only things like duration and renegotiation provisions, escape and withdrawal clauses, and amendment provisions but also the degree of precision and reservations.

Variation in institutional design is explained by the underlying cooperation problems states are facing when designing their agreements – the independent variables. Instead of using a typology of games, Rational Design calls for the disaggregation of cooperation problems. Fundamentally, states potentially face *Distribution* problems (which refer to the different preferences that actors have over alternative possible agreements) and *Enforcement* problems (which refer to the incentives actors have to break an agreement). These are then shaped by various degrees of *Uncertainty about Preferences* (that is, uncertainty regarding what one's partners' preferences are), *Uncertainty about Behavior* (not being able to decipher easily whether partners are cooperating or defecting), and *Uncertainty about the State of the World* (that is, uncertainty regarding the consequences of cooperation).⁴ Finally, the *Number of actors* and asymmetries or heterogeneity among them affect the nature of the cooperation problem. Considering these factors independently allows for a treatment of their univariate effects on important features of potential institutions and hence gets around the problem of forcing real-life issues into 2x2 games.

Rational Design offers a set of conjectures linking one cooperation problem with one institutional design solution. While I will not replicate the list of conjectures here, I will give a few examples from the Rational Design introduction. Of the sixteen univariate Rational Design conjectures relating one independent variable to one dependent variable, four conjectures involve the dependent variable, centralization. Three of the four stipulate some aspect of the cooperation problem the states are facing as the independent variable: "Centralization increases with the Enforcement Problem;" "Centralization increases with Uncertainty about Behavior;" and "Centralization increases with Uncertainty about the State of the World." The fourth conjecture is pertains to transactions costs, "Centralization increases with Number," where number can capture the literal number of states and/or their heterogeneity.

To illustrate the intuition underlying the relevant Rational Design conjectures, consider the following example: When there are incentives to defect from an agreement, as in particular environmental agreements for which free-riding off of others' cooperation is the dominant strategy, one can imagine occurrences of defection where a third party would play a useful role in arbitrating the dispute and setting a punishment. Ex ante, all parties would agree to such centralization/delegation in the face of the enforcement problem since that is one way to ensure the Pareto superior mutual cooperation rather than mutual defection. In contrast, if the issue surrounds technical standards, there is a distribution problem over which standards to choose, but once resolved, parties do not face incentives to defect. Therefore, the absence of a Rational Design conjecture linking Distribution problems and Centralization makes sense.

The Rational Design conjectures have game-theoretic underpinnings. While I will not replicate the volume here, it might be helpful to elaborate the theory informing one of the Rational Design conjectures, "Centralization increases with Uncertainty about Behavior." The law merchant model (Milgrom, North, and Weingast, 1990) provides the theoretical underpinnings. It illustrates the value of centralization in promoting coop-

4. These cooperation problems are elaborated in great detail in the Appendix.

eration when actors are uncertain about each others' past behavior. The system included a centralized actor who served as a repository of information, collated the past performance of traders, and made the information available to prospective partners. This actor also adjudicated disputes and awarded damages when appropriate.

In sum, Rational Design refines the dependent variable from the possibility of cooperation to the form cooperation takes. It refines the independent variable by differentiating among different kinds of cooperation problems and thereby broadens the past preoccupation with the Prisoners' Dilemma game. The Rational Design volume included a number of case studies that explored the conjectures. Not surprising given the newness of the research program, systematic testing was not a part of the volume. Below, I introduce the COIL research project, which allows systematic testing of the conjectures.

3. Continent of International Law (COIL)⁵

COIL is a multifaceted research program that focuses on international agreement design and features theoretical development, major data collection, and systematic empirical testing of the theory. The unit of observation in COIL is an international agreement drawn from a random sample across four issue areas: economics, environment, human rights, and security. The theoretical portion of COIL articulates a set of cooperation problems including enforcement problems, distribution problems, three (independent) kinds of uncertainty, commitment problems, and problems of externalities, deadlock, norm codification/exportation, and coordination, and provides concrete definitions and examples. Each agreement is coded for its underlying cooperation problems using background research and expertise in the sub-issue area. More than one answer can be chosen for each agreement, which gets around the problems of having to force real-life issues into 2x2 games. A completely different set of coders code 500+ questions of institutional design. This separation of coders allows for the testing of theories connecting cooperation problems to institutional design.

To bring COIL to life, it is perhaps easiest to focus on one Rational Design conjecture and briefly discuss how it was systematically tested using the COIL data. The conjecture is "Flexibility Increases with Uncertainty about the State of the World."⁶

To begin, it is worth noting one of the conventional wisdoms in international cooperation: States tie their hands in order to make their commitments credible. If one looks at Table 1 below, which uses COIL data to generate simple descriptive statistics on the duration of the random sample of agreements, one is forced to reconsider the conventional wisdom: two thirds of the agreements in this sample are designed *not* to last forever. Do these statistics imply states are not making very many credible

5. COIL is funded by the National Science Foundation (SES-0094376 and SES-0801581).

6. This example draws exclusively from Koremenos 2001 and Koremenos 2005.

commitments? I would answer an emphatic no! Rather, under certain conditions (like high uncertainty about the state of the world) incorporating flexibility helps states make commitments in the first place and makes those commitments more robust. In other words, flexibility may *enhance* credibility in environments subject to shocks. The argument is that renegeing can often be avoided if renegotiation of an agreement is an option instead. That is the essence of the conjecture, “Flexibility increases with Uncertainty about the State of the World.”

Table 1. Intended Duration of Agreements		
	Finite or Indefinite? (p=value from test of independence: 0.003)	
Issue Area	Percent Finite	Percent Indefinite
Economics	79.7%	21.3%
Environment	60.0%	40.0%
Human Rights	44.0%	56.0%
Security	48.0%	52.0%
All agreements	66.4%	33.6%
N=149		

Before one can test this conjecture with a large-n data set, the implicated variables need to be operationalized and measured. While the dependent variable of a finite duration is easily measured (finite durations are a form of flexibility), the cooperation problem of Uncertainty about the State of the World is not as straightforward to operationalize and measure. I believe the best place to start the process of operationalizing a challenging variable is through some case study research which allows one to understand the meaning of the variable in important, real-life cases. The Nuclear Non-Proliferation Treaty (NPT) is one such case.

It turns out that choosing the duration and renegotiation provisions provoked an intense debate. The treaty negotiations lasted from 1962-68. As late as 1967, the United States and the Soviet Union (the original drafters) were pressing for a treaty with an unlimited duration while the Germans and the Italians were emphasizing the impossibility of accepting such a duration. As the Italian representative to the negotiating committee, Caraciollo stated: “...it is not the lot of man, to pledge eternity. Moreover, if we look back across our thousands of years of history, we see very few noninstitutional treaties that have simply survived the vicissitudes of one generation, let alone achieved immortality. Therefore we fear that to affirm a principle so remote from reality may introduce into the treaty an element of weakness rather than of strength.”

I would argue that uncertainty about the state of the world was too high to make non-nuclear weapon states comfortable accepting an indefinitely long agreement. What did this uncertainty look like in real life? First, there were uncertainties surrounding the *security* consequences of the treaty. These included uncertainty

about the effort that the nuclear weapon states would put into nuclear disarmament, uncertainties about extended deterrence, and uncertainties about which countries would end up participating in the regime.

Second, there were uncertainties surrounding the *economic* consequences of the treaty. These included whether the treaty might restrict non-nuclear weapon states' ability to make peaceful use of nuclear energy, how economically costly the International Atomic Energy Agency monitoring would turn out to be, and whether states that were not party to the treaty might be able to obtain nuclear technology with fewer restrictions than signatory states.

Third, there were uncertainties surrounding the *political* consequences of the treaty. In particular, Italy worried that the distribution of gains from the NPT would skew the distribution of power in Europe in ways that would make European integration difficult if not impossible.

Essentially, this great uncertainty about the state of the world – that is, uncertainty about how the agreement would turn out in terms of its distribution of costs and benefits, forced the Soviet Union and the United States to compromise on their desire for an indefinite agreement. What resulted from the negotiations was a twenty-five year duration, with reviews every five years.

This case study helps shed light on how to operationalize the independent variable of Uncertainty about the State of the World in a large sample of agreements across issue areas to allow systematic testing. Beginning with economics, the sub-issue area of *monetary* agreements essentially contains exchange rate agreements. These are subject to supply and demand shocks that could dramatically alter the distribution of gains from period to period. They are all coded as having high uncertainty. All *trade* agreements are coded as high uncertainty observations for the same reason. *Finance* agreements are of two types: those that resemble monetary or trade agreements – high uncertainty – and those that are about coordinating policies (e.g., Convention for the avoidance of double taxation and the prevention of fiscal evasion with respect to taxes on income between Australia and Italy) – low uncertainty. Almost one third of finance agreements are high uncertainty. *Investment* agreements concern the promotion of and protection of investments against nationalization and expropriation and thereby are subject to political shocks that could alter the distribution of gains; hence they are high uncertainty agreements.

In the *environmental* issue area, the following rules were followed: Agreements addressing plant and bird protection or scientific cooperation on subjects like soil are coded as low uncertainty agreements (e.g., Exchange of Notes Constituting an Agreement on the Project Soil Management and Conservation in East Amazonia between Brazil and the Federal Republic of Germany). Such agreements are predominantly about coordinating policies. On the other hand, agreements about pollution abatement or about fishing or other sea resources are coded as high uncertainty (e.g., the multilateral International Convention for the Conservation of Atlantic Tunas). Pollution control as well as sea resources implicate competitive industries. Shocks affecting

availability or dependence on the resource (fish) or technology (in pollution control, expected positive developments may not be forthcoming) can alter the distribution of gains. Almost half of the environmental agreements are coded as high uncertainty.

For *human rights*, universal declarations (e.g., the multilateral Convention on the Prevention and Punishment of the Crime of Genocide) are coded as low uncertainty agreements. Such agreements serve to capture or establish ethically-based international norms. On the other hand, agreements about refugees and detailed labor standards are subject to distributional shocks. For instance, political shocks may dramatically change the flow of refugees and thereby change the distribution of gains. Just over half of human rights agreements are coded with high uncertainty.

Security agreements fall into two basic categories: universal prohibitions (e.g., the multilateral Agreement Governing the Activities of States on the Moon and Other Celestial Bodies) and those related to mutual security. Following the logic of human rights, prohibitions are low uncertainty while the mutual security agreements are high uncertainty. Almost two-thirds of security agreements are high uncertainty.

Tables 2 below presents the results of a large-n analysis on the duration of agreements, which includes as one of the three main explanatory variables, Uncertainty about the State of the World. There is significant support for the argument that Uncertainty increases states' propensity to choose a finite duration agreement. In all three model specifications the uncertainty variable was in the expected direction and highly statistically significant ($p < .001$).⁷

Table 2. Results of Probit Analyses of the Presence of a Finite Agreement			
	Model 1	Model 2	Model 3
Independent variable	Coefficient (Standard Errors)	Coefficient (Standard Errors)	Coefficient (Standard Errors)
Number of participants (logged)	-.469 (.146)***	-.658(.201)***	-.323 (.142)**
Uncertainty	1.268 (.279)***	1.223 (.294)***	1.266 (.281)***
Risk aversion (Bueno de Mesquita)	.648 (.275)**	---	---
Risk aversion (Gartzke and Jo)	---	.373 (.321)	---
Risk aversion (GDP growth)	---	---	.662 (.388)*
Human rights issue area	.848 (.517)	.996 (.548)*	.638 (.512)
Environmental issue area	.975 (.450)**	.949 (.457)**	.813 (.436)*
Economics issue area	1.110 (.381)**	.865 (.378)**	.831 (.367)**
Constant	-.698 (.421)	-.116 (.513)	-.664 (.422)
χ^2 , Wald test of joint significance of number of participants, Uncertainty, risk aversion	12.57***	6.67***	9.08**

What this large-n analysis suggests is that international agreements are nuanced and sophisticated –just like the domestic agreements and institutions studied in American and comparative politics or in law and economics. Although anarchy makes uncertainty dramatic, states contract around this uncertainty with flexibility, like the duration provisions analyzed above.

7. Table 2 appears in Koremenos 2005, which details the model and the analyses.

As another example, Koremenos 2007 asks, “Why do only half of international agreements have dispute resolution provisions?” Most likely, the typical Realist would be surprised by the half that has them while the typical international lawyer might be surprised by the half that does not. In fact, neither half needs explaining. When we examine the continent of international law through the *game-theoretic lens* of the underlying cooperation problems states are trying to resolve, we *expect* differences across international agreements and institutions. The results of that analysis also suggest that international law may actually be quite efficient with states not creating and/or delegating dispute resolution authority when it is unlikely to be needed.

The COIL theoretical framework and data can also be useful in refining and testing other work. As an example, consider the International Legalization framework put forth in 2000 by Goldstein, Kahler, Keohane, and Slaughter. The authors conceptualize legalization as characterized by three dimensions: Obligation, Precision, and Delegation. They argue that higher values on all three dimensions of legalization imply greater legalization, and they define hard law as having high values on two or three out of three of these dimensions.

When we examine two of the dimensions (precision and delegation) through a game-theoretic lens, we expect them to be inversely related. And when we subject this conjecture to the data, it turns out that precision and delegation are systematically and inversely related; which one is chosen can be explained by features of the contracting environment, including the cooperation problems the states are trying to solve, and of the parties. So it turns out that it does not quite make sense to argue that higher values on all three dimensions of legalization imply greater legalization or to argue that higher values on two of the dimensions imply harder law since two of the dimensions are often substitutes.⁸

Can COIL also shed light on the issue area of human rights? Many argue that rational design is not the correct approach to this issue area. Schelling foresaw the difficulty of human rights cooperation, when he stated: “... some seemingly desirable agreements must be left out for being undefinable operationally; agreements not to discriminate against each other will only work if defined in objective terms capable of objective supervision” (1958: 229). I agree with the Constructivists that the goal of human rights cooperation is to export norms, and as Schelling argues, these norms are hard to define. In fact, I added a potential Cooperation Problem to COIL to capture the problem of norm codification and/or exportation. But there are also other, more common cooperation problems underlying cooperation in human rights, like Uncertainty about Behavior. In particular, cooperation in Human Rights has an underlying Distribution Problem – whose norms? The typical distribution problem (territory, technical standards) also is accompanied by a Coordination Problem where complete coordination is necessary, i.e., one clear boundary, one clear technical standard). Nevertheless, most efforts to cooperate in the issue area of Human Rights pose a Distribution Problem without the Coordination Problem. Hence, if norm-exporting states have a set of preferences not identical but close to each other, imprecise language can be used so that at least some kind of norm gets codified.

8. The full analysis can be found in Koremenos 2009.

One way of thinking about the “game structure” underlying many human rights agreements is by thinking of an agreement being negotiated that has as its goal the lifting of the minimum draft age above some threshold. We can imagine a 3x3 game with the choices of No Agreement, Minimum Draft Age of 16, Minimum Draft Age of 17. Suppose State A likes 16; State B like 17; but both want to codify / export a norm to pressure states who have draft ages of 14 to raise the age. Under a reasonable set of assumptions about preferences, the Nash is 16,17. And maybe over time as norms converge, agreements will become more precise.

As a first check on whether imprecision might be used to solve the unique decoupling of the cooperation problems of distribution and coordination found underlying human rights agreements, Table 3 presents some descriptive statistics across issue area on the degree of precision of an agreement’s main prescriptions or proscriptions.⁹ Human rights agreements are significantly less precise than agreements in other issue areas. Hence a first look at the design of human rights agreements suggests that this issue area can be understood at least partly with a Rational Design framework.

Similarly, if a state has an objection to a particular human rights provision, it can add a reservation without completely undermining cooperation the way it would in other issue areas. An example of this is the adoption provision in Convention of the Rights of the Child. Finally, a smaller set of states with more similar preferences can use optional protocols which have costly criteria to screen out those who do not have those preferences.

The point is that even human rights agreements can be usefully understood within the Rational Design/COIL framework. Underlying these agreements are real international political cooperation problems that can often be solved or rectified with particular design choices.

Table 3. Precision, by issue area (percentages)				
Issue area	Very Vague/Ambiguous	Somewhat Vague/Ambiguous	Somewhat Precise	Very Precise
Economics	0%	3%	63%	35%
Environment	0%	24%	60%	16%
Human Rights	13%	39%	39%	9%
Security	4%	20%	56%	20%
Total	3%	15%	57%	25%
p-value of chi-squared test=0.000 N=145				

9. It should be noted that, because precision is somewhat of a judgment call for coders, three independent coders were used for each agreement in the sample. Two coders first code the agreements independently and disagreements are reconciled after a meeting among the coders and myself. A third coder is brought in to check the consistency of coding for only the precision of the agreement and hence is completely focused on that design variable and can make sound comparisons.

4. Conclusion

Schelling's argument just over fifty years ago that game theory was pitched at too abstract a level was accurate. Since then, however, many scholars have used the tools of game theory to study some of the institutional details of cooperative arrangements and have thereby answered Schelling's call to action. International law, it turns out, is quite easily exploited by game theory. In other words, the details of agreements can be fruitfully understood using a game-theoretic lens. Both Rational Design and COIL take cooperation as a starting point and study under what conditions this cooperation can be most successful. They thereby escape the abstract and fruitless debates about whether cooperation is possible and whether international agreements matter.

When we examine the continent of international law through the game-theoretic lens of the underlying cooperation problems states are trying to resolve, we expect differences across international agreements and institutions. States shape agreements to solve the specific problems they face; design variations are largely the result of rational, purposive interactions. In fact, instead of an anarchic international environment, or one where the time horizon is the only independent variable, we observe an environment structured by international agreements as institutions. Instead of random variations among agreements or even automatic replication of the same agreement provisions over and over, we observe that the detailed provisions of international agreements are chosen in ways that increase the incidence and robustness of cooperation. Indeed, the continent of international law is nuanced and sophisticated and one of the most exciting frontiers for those interested in the application of game theory.

References

- Axelrod, Robert. 1984. *Evolution of Cooperation*. New York: Better Books.
- Goldstein, Judith, Miles Kahler, Robert Keohane, and Anne-Marie Slaughter (eds.) 2000. Legalization and World Politics. *International Organization*, 54 (3), Special Issue.
- Kaplan, Morton A. 1958. Toward a theory of international politics: Quincy Wright's Study of international relations and some recent developments. *Journal of Conflict Resolution*, 2: 335-347
- Keohane, Robert O. 1984. *After Hegemony: Cooperation and Discord in the World Political Economy*. Princeton: Princeton University Press.
- Koremenos, Barbara 2005. Contracting around International Uncertainty. *American Political Science Review*, 99: 549-565.
- Koremenos, Barbara 2007. If Only Half of International Agreements Have Dispute Resolution Provisions, Which Half Needs Explaining? *Journal of Legal Studies*, 36: 189.
- Koremenos, Barbara 2009. An Economic Analysis of *International Rulemaking*. manuscript.

- Koremenos, Barbara, Charles Lipson, and Duncan Snidal (eds.) 2001. The Rational Design of International Institutions. *International Organization*, 55 (4), Special Issue: The Rational Design of International Institutions: 761-800.
- Krasner, Stephen D. 1982. Structural Causes and Regime Consequences: Regimes as Intervening Variables. *International Organization*, 36/2 (Spring). Reprinted in Stephen D. Krasner (ed.) *International Regimes*, Ithaca, NY: Cornell University Press, 1983.
- Krasner, Stephen D. 1991. Global Communications and National Power: Life on the Pareto Frontier. *World Politics*, 43: 336-366.
- Leeds, Brett Ashley, Jeffrey M. Ritter, Sara McLaughlin Mitchell, and Andrew G. Long. 2002. Alliance Treaty Obligations and Provisions, 1815-1944. *International Interactions*, 28 (3): 237-260.
- Mitchell, Ronald B. 2002-2008. International Environmental Agreements Database Project (Version 2007.1). Available at: <http://iea.uoregon.edu/>. Date accessed: 8 July 2008.
- Oye, Kenneth (ed.) 1986. *Cooperation under Anarchy*. Princeton: Princeton University Press.
- Schelling, Thomas. 1958. The Strategy of Conflict: Prospectus for a Reorientation of Game Theory. *Journal of Conflict Resolution*, 2: 203-264.
- Snidal Duncan. 1985. Coordination vs. prisoner's dilemma: Implications for international cooperation. *American Political Science Review*, 79: 923-942
- Stein, Arthur. 1982. Coordination and collaboration: regimes in an anarchic world. *International Organization*, 36 (2): 299-324.