The Strategic Use of International Institutions in Dispute Settlement *

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Abstract

How does the existence of international institutions alter strategic calculations of states engaged in an international dispute? The paper investigates the question by modeling an international institution as an alternative to bilateral bargaining for a dispute settlement. The equilibrium results show that only one of the two countries may find the option of appealing to an international institution attractive, and that the institution can influence the bargaining outcome even when it is not directly involved in settling the dispute. Moreover, it is found that countries condition their behavior on the types of institutions that they are dealing with; while a high capacity institution can induce cooperation, a low capacity institution does not. The results have important implications for the incentives facing democratic and non-democratic regimes in utilizing international institutions and provide an explanation for restrictive membership adopted by many significant international institutions.

In international dispute situations, we often observe that some countries are willing to resort to an international institution to settle a dispute, while others would make concessions in negotiations to avoid such a prospect. In the dispute over France's nuclear tests in a pacific test center, New Zealand and Australia filed suits to the International Court of Justice (ICJ) against France to block further nuclear tests in the region after spending a decade to no avail in bilateral negotiations. France contended that the Court did not have jurisdiction over the case, and even withdrew its acceptance of the Optional Clause; however, France continued its discussions with Australia and New Zealand and changed its testing strategy in a few months (Fischer 1982). An examination of all the contentious cases brought to the ICJ shows that unilateral applications to the Court are considerably more common than joint applications.[1] Additionally, in international trade a disproportionate number of disputes are settled bilaterally, with the defendants making concessions when the issues are brought to the attention of the General Agreement on Tariffs and Trade (GATT) or the World Trade Organization (WTO) (Busch and Reinhardt 2001; Reinhardt 2001). Such observations pose several questions: Why do countries have asymmetric incentives to utilize an international institution to settle a dispute? Does the *threat* of appealing to an international institution affect bilateral negotiations?

The study on the effect of international institutions has mostly been concerned with whether states comply with international agreements and what factors influence compliance behavior (Chayes and Chayes 1993; Downs, Rocke and Barsoom 1996; Koh 1997; Mansfield, Milner and Rosendorff 2002; Tallberg 2002). An important issue that has been overlooked is that compliance question arises only *after* countries have made the decision to accept an international involvement, thus, there is a prior question of when countries consider such an engagement desirable. Contrary to the assumption in the literature that states have a common interest in utilizing international institutions, states often make asymmetric use of internationally institutions in dispute settlement and the mere presence of an institution as an alternative method of dispute settlement can be sufficient to change the dynamics of

[1] I will return to this point after presenting the equilibrium results.

bilateral bargaining and the outcomes.

The paper develops a game-theoretic model to study the direct and indirect effect of international institutions by reexamining the relationship between bilateral and institutional solutions to interstate disputes. Bilateral negotiations and applications to international institutions have so far been conceptualized as two distinct methods of dispute settlement in the existing literature, and the recourse to the institutions is often thought to start when bilateral negotiations failed. On the other hand, case studies suggest that states see resorting to an institution as a way to communicate one's resolve to an opponent and a plea to world opinion to gain leverage at the bargaining table (Fischer 1982; Paulson 2004; Tallberg 2002). In line with the insight, the model assumes that two countries negotiate to settle a dispute, each having the option of turning the issue to an international institution. Such an option is relevant to the negotiation to the extent that the country which threatens to go to the institution expects to gain more by doing so than remaining in the negotiation. Depending on the prior beliefs of the countries about the outcome of an institutional ruling and the costs associated with noncompliance, countries can have divergent interests in engaging an international institution.

The equilibrium results show that only one of the two countries may find the option of appealing to an international institution attractive. Moreover, it is found that even when an institution is not directly involved in a dispute settlement, it can nevertheless affect the outcome by strengthening the bargaining position of one of the countries. In particular, given a prior belief, the country with a lower noncompliance cost is more likely to have a credible threat of appealing to an institution, thus more able to extract concessions at the bargaining table. Finally, the results show that countries condition their behavior on the types of institutions that they are dealing with; while high capacity institutions can bring about cooperation, low capacity institutions do not.

The results have important implications for the research on international institutions. First, the tendency for countries with lower noncompliance costs to appeal to international institutions suggests that compliance analysis has to take into account the selection effect by

controlling for the characteristics of the country that *initiates* an institutional involvement. The analysis that based only on post-ruling behavior is likely to overestimate the level of noncompliance while ignoring the deterrence effect of the institutions on countries with high noncompliance costs. The result also points to one possible reason that many significant international institutions have adopted restrictive membership: it is a response to differential noncompliance costs among countries. Second, if repeated noncompliance damages an institution's reputation and weakens its ability to generate noncompliance costs, then even a high capacity institution has to rule strategically by accommodating to countries' noncompliance costs, so that the risk of defiance is minimized. In other words, flexibility in institutional design, or low precision in legalization, may be key to the success of institutional solution to dispute settlement (Koremenos, Lipson, and Snidal 2001; Abbott et al. 2000).

Dispute Settlement and Noncompliance Costs

Settling interstate disputes is one of the most important functions of international institutions. Chapter VI of the UN charter authorizes the UN Security Council to recommend appropriate procedures to settle a dispute or directly engage in mediation and arbitration. The ICJ, which is the main judicial body of the UN, has delivered more than 90 judgments on disputes ranging from maritime boundaries to economic rights since 1946. Similarly, the European Court of Justice settles disputes between the member states of the European Union. The WTO has a more legalized dispute settlement mechanism than the GATT, and has received more than 300 appeals since its establishment in 1995. Following the lead by the WTO, both the North American Free Trade Agreement and the Association of Southeast Asian Nations have specialized procedures to settle disputes in regional economic cooperation.

A central assumption of the model is that international dispute settlement mechanisms such those mentioned above can generate noncompliance costs for countries if they ignore the decisions by such institutions. The involvement of an international institution in dispute settlement can take many forms, including providing good offices, mediation, conciliation,

arbitration and adjudication. Theoretically, all these forms of involvement could generate costs for a government if it rejects a proposal by an institution; however, the magnitude of the costs may differ depending on the nature of the institutional involvement. Good offices, mediation, and conciliation are diplomatic means and the resulted proposals are not legally binding; on the other hand, arbitration and adjudication produce binding decisions, usually on the basis of international law (Merrills 2005, p.91). Mitchell and Hensel (2007) find that binding settlement techniques employed by international institutions are more effective in bringing about compliance with international agreements, which suggests that countries may incur substantially larger costs by rejecting legally binding institutional decisions than non-binding decisions. The model allows the costs to change continuously, from small to large, to account for different forms of institutional involvement.

Where do noncompliance costs come from? Noncompliance costs could arise from institutional rules as well as domestic and international politics. The UN and the WTO can authorize sanctions or retaliations against countries that they deem to have violated the institutions' decisions. More important sources of the costs, however, are the international and domestic audiences of noncompliance behavior. Since Fearon's (1994) seminal work on audience costs, the idea that there are domestic and international audiences for a leader's foreign policy actions has become central to theories of international conflict as well as international institutions (Smith 1998; Bueno de Mesquita et al. 1999; Abbott and Snidal 1998; Mansfield, Milner, and Rosendorff 2002; Simmons 2002).[2] In particular, Lohmann (2003) argues that an institutional commitment has bite only if it is made vis-*à*-vis an audience that can and will punish institutional defections. A ruling by an international institution on a dispute does just that: it creates audiences for a state's subsequent behavior and generates audience costs, both domestically and internationally, in the event that the state does not comply.

In the domestic arena, the public and interest groups are more inclined to support a

[2]Partell and Palmer (1990) provide an empirical assessment of Fearon's model; more recently, Tomz (2007) offers an experimental study of the existence of audience costs.

government policy if it is endorsed by an international institution, and less so otherwise. This reaction in turn has consequences for leaders who wish to stay in power. There is a variety of reasons why domestic audiences would punish leaders for diverging from institutional decisions. First, the public and interest groups may identify with a policy position espoused by an international institution, such as free trade, for ideational reasons or out of self-interests. Second, domestic audiences may view the decisions by international institutions as more legitimate than unilateral policies because of perceived independence and fairness of the decision process (Abbott and Snidal 1998; Allee and Huth 2006). Third, the prospect of a continuing dispute and the material costs associated with it may remind the public of their leader's inability to resolve the dispute either by negotiation or by international arbitration.

There are also costs incurred at the international level. One of the most important differences between a negotiated outcome and an arbitrated outcome is that the latter generates more publicity than the former and creates an international audience for compliance behavior. International institutions are known to take advantage of the situation by adopting "naming and shaming" strategies (Mansfield, Milner and Rosendorff 2002). As a result of bad publicity generated by a country's noncompliance behavior, other countries may be suspicious of the country's military intention, or are less willing to enter a trading relationship with the country because they have little faith in the country's commitment to an international agreement. Moreover, international businesses may find it too risky to invest in a country which government cannot be trusted to honor international norms and rules. Finally, because countries generally have ongoing relationships in multiple spheres , other international institutions can join the efforts to punish a country's unruly behavior by linking issues through shared memberships (Lawrence 2003; Maggi 1999). These consequences taken together could do direct damage to a country's social and economic development, and strengthen domestic opposition to the leader's policy. Research has shown that internal and international pressures, especially the reactions from the allies, figured heavily in leaders' decisions to accept rulings by international institutions (Paulson 2004; Stiles 2000).

It seems at times, however, leaders could *gain* in front of a domestic audience by defy-

ing international institutions. That is, the noncompliance costs are negative in such cases. While such phenomenon exists, it is by no means a typical reaction by a domestic audience. The United States government is considered to be more intransigent with respect to international institutions than its European counterparts; however, both public opinion polls and scholarly research show that the American public is more likely to support American use of force if it is supported by the UN Security Council (Kull et al. 2002; Chapman and Reiter 2004). There are other cases in which a concession to a ruling by an international institution indeed would cause problems at home for a government, but the pressure at the international level has significant countervailing effects that leaders rarely make decisions solely based on domestic political considerations in such cases. When Iceland was engaged in a dispute over fisheries jurisdiction with Britain and West Germany, in anticipation of an unfavorable ruling by the ICJ and domestic opposition to accept the ruling, the Iceland government chose to resolve the issue through negotiations (Fischer 1982). In a territorial dispute between Nigeria and Cameroon, due to domestic pressure the Nigerian government was not in a position to accept the ruling by the ICJ, which supported more of Cameroon's claims. But with the pressure from Britain, the United States, and France, the government cooperated by not escalating the conflict (Paulson 2004). In both cases, two very different governments considered both domestic and international factors in dealing with ICJ decisions; they did not view noncompliance as an easy option even when the domestic conditions were in favor of it. Moreover, systematic empirical research has shown that leaders often use institutional decisions as cover to ease domestic opposition to a concession that they would make in bilateral negotiations (Allee and Huth 2006; Simmons 2002). The mitigating effect of international pressure on the incentive to defect is even stronger with economic disputes because of an increasingly interdependent global economy; international institutions such as the WTO can now muscle unprecedented international support for their decisions. Therefore, while it is possible that noncompliance costs are negative sometimes, such cases are sufficiently rare that the model informs us on the vast majority of interactions between states where an international institution can serve as a credible third-party dispute mediator.

The Model

Suppose two countries, labeled as country 1 and country 2, are negotiating over the resolution of a dispute.[3] The bargaining problem is modeled as a negotiation over the division of a "pie" of size 1, which represents the Pareto frontier of a bargaining set.[4] While the two countries can resolve the dispute through bilateral bargaining, either side has the option of turning the issue over to an international institution. The expected payoff from bringing an issue to the institution is determined by the anticipated outcome of the ruling and the costs associated with noncompliance if the ruling is unsatisfactory. Once a country appeals to the institution, the bilateral bargaining is effectively terminated. The game ends either by successful bilateral bargaining, or by the countries' responses to the institution's decision.

The model is an extension of Rubinstein's bargaining game, in which two players take turns to propose a partition of a unit (Rubinstein 1982). In the Rubinstein game, in each period player i ($i = 1, 2$) makes a proposal $(x_i, 1 - x_i)$, where $0 \leq x_i \leq 1$ is player 1's share and $1 - x_i$ is player 2's share. The game continues until one player accepts the other's proposal; if an agreement is never reached, then both players receive payoff 0. Rubinstein shows that there is a unique subgame perfect equilibrium (SPE) to this game, in which the players always propose $\frac{1}{1+\delta}$ for themselves and $\frac{\delta}{1+\delta}$ for the other player, where δ is a common discount factor, and an agreement is reached in the first period of the game.

The model here adds to the Rubinstein game the option of appealing to an international institution for an arbitration in any period. Economists have explored how outside options, especially the possibility of arbitration, changes the Rubinstein bargaining outcome (Binmore, Shaked, and Sutton 1989; Manzini and Mariotti 2001; Muthoo 1999; Ponsati and

[3] I use "countries" to label the players because I do not model domestic politics; substantively, however, the two countries should be understood as two *governments*.

[4] Note that many international disputes are not purely adversarial and both states may benefit from resolution of disputes. What the model highlights, however, is the possibility that when the distributional issue is not resolved, neither side can rip the benefit of cooperation. That is, even if the pie can be made bigger through cooperation, the potential may not be realized if the question of *who gets what share* is not resolved.

Sakovics 1998). Two features of this literature worth noting. First, the outside option is modeled as a specific division of the contested good and the division is assumed to be *enforceable*. Second, the outside option is often interpreted as an arbitrated outcome and the actors are assumed to have rather precise information about the outcome or the arbitration rule. I relax both assumptions. Most economic problems are situated in the domestic environment and enforcement is not a problem in general; however, enforcement *is* a problem for international institutions situated in an anarchic world. Therefore, I assume in the model that countries have a choice of defying an institutional decision with some costs. Moreover, while I conceptualize the role of international institutions as similar to that of an arbitrator, I assume that *ex ante* countries only have a prior belief about the institutional ruling rather than a perfect knowledge of what is going to happen. Interstate dispute adjudication involves more than a direct application of precise standards, and it is not unusual that a country receives a ruling that is contrary to its expectation (Paulson 2004).

Specifically, if in any period of the game a country appeals to the institution, then the institution proposes a partition of the pie. Denote the decision by the institution as $(s, 1-s)$, where s is country 1's share and $1-s$ is country 2's share. Assume that the countries have prior beliefs about the institutional decision, and the beliefs can be captured by an arbitrary cumulative distribution function, $F(s)$, which satisfies the conditions $\lim_{s\to 0} F(x) = 0$ and $F(1) = 1$. That is, there is no constraint on the shape of the distribution other than that $F(s)$ puts positive probability only on $s \in [0, 1]$, the feasible range of the division. Assume also that $f(s)$ is the corresponding probability density function. Both $F(s)$ and $f(s)$ are common knowledge for the two countries. After the institution proposes, country 1 and country 2 simultaneously decide to comply with the ruling or not. If country i defies the institution, then it incurs a noncompliance cost, c_i.[5] The simultaneous move captures the

[5]There are other costs associated with going before an international institution, such as legal fees, time and resources spent, etc. Similarly, benefits from an institutional decision include not just a good outcome to the dispute, but also a possible boost to a government's popularity in the eyes of domestic audiences. The model abstracts away from these additional considerations that influence all governments in similar ways in order to generate insights about the effects of different noncompliance costs on the decision to utilize an

idea that a unilateral application by a country could damage the bilateral relationship and the two countries may respond independently of each other to the institution's decision.

		Country 2: Comply	Country 2: Defy
Country 1	Comply	$s, 1-s$	$0, 1-c_2$
	Defy	$1-c_1, 0$	$-c_1, -c_2$

Table 1: The Simultaneous Subgame after the Institutional Ruling

The payoffs in the simultaneous subgame are as follows (Table 1). If both countries comply with the ruling, then the payoffs are s for country 1 and $1-s$ for country 2. If country 1 defies the ruling while country 2 complies, then country 1 receives $1-c_1$ and country 2 receives 0, where $c_1 \in (0,1)$ is country 1's noncompliance cost. That is, country 1 gains significant grounds on the disputed issue in this case by defying the institution, but pays a cost for such behavior; on the other hand, country 2 loses out on the issue by unilaterally abiding by the institutional ruling. Symmetrically, if country 1 complies while country 2 defies, then country 1 receives 0 and country 2 receives $1-c_2$, where $c_2 \in (0,1)$ is country 2's cost of defiance. If both countries defy the institution, then the payoffs are $-c_1$ for country 1 and $-c_2$ for country 2; that is, neither gains from the continuing dispute while paying the costs of defiance.[6]

The timing of the game is as follows. At the beginning of the first period, country 1

institution.

[6]It may seem less obvious at first what noncompliance by a plaintiff means, and how noncompliance costs could be generated for the plaintiff. A plaintiff may take an issue to a dispute settlement mechanism (DSM) with the expectation of a favorable ruling, yet a DSM may not rule as the plaintiff expected. Under such circumstances, at least in principle the plaintiff can choose to defy the institution by taking a retaliatory action against the defendant and incur noncompliance costs. Therefore, it is useful to treat the plaintiff and the defendant symmetrically in the model.

decides whether to bargain with country 2 by proposing a partition $(x_1, 1-x_1)$, or appeal to the institution to settle the dispute. If country 1 proposes a partition, then country 2 decides to accept the proposal or not. If country 2 accepts the proposal, then the game ends, with country 1 and country 2 receiving payoffs x_1 and $1-x_1$, respectively. If country 2 rejects the proposal, then the game enters the second period, and country 2 decides whether to make a counterproposal $(x_2, 1-x_2)$, or appeal to the institution. If country 2 makes a counterproposal, then it is country 1's turn to decide whether or not to accept the proposal. If country 1 accepts it, then the game ends, with country 1 and country 2 receiving payoffs x_2 and $1-x_2$, respectively. If country 1 rejects the proposal, then the game enters the next period, and country 1 again has the choice of making a new proposal or appealing to the institution. If in any period a country appeals to the institution, then each country receives a payoff based on the outcome of the simultaneous subgame following the institutional ruling. If no country ever appeals to the institution, and there is no agreement on a proposal, then the payoff is 0 for both countries. As in the Rubinstein game, the countries discount future payoffs with a common discount factor $0 < \delta < 1$. The payoffs and the time line are also illustrated in Figure 1.

[Figure 1 about here]

The model is a game of complete information, and the equilibrium solution concept applied is subgame perfect equilibrium (SPE).

Equilibrium Analysis

Two sets of results are presented in this section, corresponding to two types of institutions that emerge in the equilibrium — high and low capacity institutions.[7] There are four propositions for each type, which provide a complete characterization of all possible scenarios that the two countries may experience by having an institutional solution to the dispute. The

[7] All proofs are in the appendix.

four scenarios are: neither country prefers to take the dispute to the institution, only country 1, or only country 2, does, and both prefer taking the issue to the institution.

Define an institution as a *high capacity* institution if $c_1 + c_2 > 1$, and a *low capacity* insinuation if $c_1 + c_2 \leq 1$. Because the total benefit of resolving the dispute is assumed to be 1, the sum of the costs, $c_1 + c_2$, is in effect a ratio between the total noncompliance cost and the importance of the issue at stake. The ratio provides a new lens through which to examine the effectiveness of an international institution by placing the magnitude of noncompliance costs in the context of the issue area in which the institution operates. For example, an institution may only be able to generate low costs for noncompliance, but if the issue area is also of low salience, then the small costs may be sufficient to bring about compliance. On the other hand, an institution capable of generating significant noncompliance costs may not be able to bring about compliance if the issue involved is vital to state interests. The equilibrium results show that states indeed behave differently depending on the type of institution that they are dealing with.

A High Capacity Institution

In the case of a high capacity institution, there is a unique Nash equilibrium in the simultaneous subgame following an institutional ruling (Figure **??**), and for some parameter range the unique equilibrium is one in which both countries comply with the ruling. Specifically, if $0 \leq s < 1 - c_1$, then country 1 defies the institution while country 2 complies; if $1 - c_1 < s < c_2$, then both countries comply with the ruling; if $c_2 < s \leq 1$, then country 1 complies and country 2 defies.[8] We now calculate the countries' expected utilities from appealing to the institution. Let EU_i^{SI} denote country i's expected utility from appealing to a high capacity institution. Then,

$$EU_1^{HC} = \int_0^{1-c_1} (1 - c_1) f(s) ds + \int_{1-c_1}^{c_2} s f(s) ds, \quad (1)$$

[8]Note that if $s = 1 - c_1$ or $s = c_2$, then there are in fact two Nash equilibria. However, any particular value of s has measure zero because $F(s)$ is continuous, thus it does not affect players' expected utility calculations.

and

$$EU_2^{HC} = \int_{1-c_1}^{c_2} (1-s)f(s)ds + \int_{c_2}^{1} (1-c_2)f(s)ds. \quad (2)$$

First, note that both the noncompliance costs and the prior belief about the institutional ruling figure into the expected utilities. Second, country 1's expected utility, EU_1^{HC}, is a decreasing function of its own cost, c_1, and an increasing function of country 2's cost, c_2. Symmetrically, EU_2^{HC} is a decreasing function of c_2, and an increasing function of c_1.[9] That is, given a prior belief about the institutional ruling, the more costly for a country to defy the institution, the lower the expected utility for the country from appealing to the institution and the higher the expected utility for *the other* country from doing so. As an example, assume that $F(s)$ is uniformly distributed on [0,1]. Then, EU_1^{HC} and EU_2^{HC} are simplified to $\frac{(1-c_1)^2+c_2^2}{2}$ and $\frac{(1-c_2)^2+c_1^2}{2}$, respectively, and we can see that both functions display the monotonic properties just described. Third, it is not necessarily the case that the more optimistic a country is about a favorable ruling, the higher its expected utility from going to the institution. When a ruling is more favorable to a country, the probability that the other country defies the ruling is also higher, which leads to a higher chance of getting a zero or negative payoff for either country. Therefore, the effect of a prior belief on the expected utilities can only be understood in relation to noncompliance costs.

The equilibrium results are presented in four propositions. Figure 2 illustrates the intuitions of the results by assuming a uniform distribution of the prior belief about the institutional ruling. A uniform distribution implies that the countries are highly uncertain about the outcome of the ruling and puts a flat prior on all possible outcomes. The assumption equalizes the effect of the prior belief on the countries' incentives to appeal to the institution, and focus our attention on the relationship between the equilibrium outcome and the relative size of the two countries' noncompliance costs. [10]

[9] The proof of the claim is in the appendix.

[10] Similar figures can be drawn for asymmetric distributions where one country is believed to be favored by the institutional ruling. There, both the prior belief about the ruling and the noncompliance cost matter. For detailed discussions of the effect of asymmetric prior distributions on the equilibrium results, see the extended appendix on the author's webisite.

Since the model is an extension of the Rubinstein game, it is not surprising that the results of the two games are closely related. Proposition 1, which characterizes the baseline case, says that the existence of the institution as an outside option is inconsequential if for both countries the expected payoff from appealing to the institution is less than the expected payoff from bilateral bargaining without such an option. In this case the two countries will bargain between themselves and the equilibrium outcome is the same as that of the Rubinstein game: the bargaining will conclude in the first period, and the division of the pie is $(\frac{1}{\delta+1}, \frac{\delta}{\delta+1})$, with country 1 enjoying a larger share as the one controlling the agenda at the beginning.

Proposition 1 (Bargaining EQ). *If* $EU_1^{HC} \leq \frac{1}{1+\delta}$ *and* $EU_2^{HC} \leq \frac{1}{1+\delta}$*, then the following is the unique subgame perfect equilibrium:*
(a) Country 1 always proposes $x_1 = \frac{1}{\delta+1}$*, and always accepts* $x_2 \geq \frac{\delta}{\delta+1}$*.*
(b) Country 2 always proposes $1 - x_2 = \frac{1}{\delta+1}$*, and always accepts* $1 - x_1 \geq \frac{\delta}{\delta+1}$*.*
In equilibrium, country 2 accepts country 1' proposal in the first period and the institution is never appealed to.

[Figure 2 about here]

The condition for a high capacity institution, $c_1 + c_2 > 1$, implies that the costs are sufficiently large for at least one country. Figure 2 shows that for the conditions in Proposition 1 to hold simultaneously to produce the bargaining equilibrium, the noncompliance costs must be similar in magnitude for the two countries. That is, sharing similarly high noncompliance costs would motive them to resolve their differences through bilateral bargaining. In such a case, neither country can expect to gain from taking the issue to the institution. The result holds not only when $f(s)$ is uniformly distributed, but also when the distribution is skewed in favor of one country.

The next proposition says that the opposite is *not* true. That is, it cannot be the case that both countries prefer appealing to the institution to bilateral bargaining. If one country sees an advantage in taking the issue to the institution, perhaps due to a combination of factors,

such as a favorable prior, a low noncompliance cost of its own, and a high noncompliance cost of its opponent, then it must be the case that the opponent will be sufficiently deterred by the circumstance and will not be willing to do the same.

Proposition 2. *There is no equilibrium in which both countries prefer appealing to the institution to bilateral bargaining.*

Proposition 2 provides an explanation for the phenomenon discussed earlier that states are much more likely to file unilateral applications to international institutions than file joint applications. The intuition of the result is not difficult to grasp. Each country will only be willing to appeal to the institution if it believes that the expected payoff from doing so is greater than its payoff from the bargaining. If both countries believe this to be the case, then it implies that the sum of their expected payoffs from appealing to the institution is greater than the sum of their bargaining shares, which is the *entire* size of the pie. This cannot be true, of course, given that one country's gain in the ruling is the other country's loss, *and* there is an efficiency loss due to the possibility of noncompliance. Therefore, both countries finding it advantageous to appeal to the institution cannot be an equilibrium scenario. The result does not go away even if one of the countries, say country 1, derives a positive payoff (i.e., $c_1 < 0$) from defying the institution. In such a case, country 1 has a dominant strategy of defying the institution in the simultaneous game, which brings $1 - c_1 > 1$ to country 1 and 0 to country 2. This in turn implies that country 1 will always prefer appealing to the institution and country 2 will always (weakly) prefer bilateral bargaining, which is consistent with Proposition 2. If *both* countries receive positive payoffs from defying the institution, then the result does not hold. This scenario is highly unlikely, however.

The next two results complement the findings in the last two propositions by showing the conditions under which a particular country will benefit from the option of appealing to the institution. Proposition 3 characterizes an equilibrium in which country 1 alone prefers appealing to the institution.

Proposition 3 (Insitutional EQ1). *If* $EU_1^{HC} > \frac{1}{1+\delta}$*, then the following is the unique*

subgame perfect equilibrium:

(a) Country 1 always appeals to the institution, and always accepts a proposal $x_2 \geq \delta EU_1^{HC}$.

(b) Country 2 always proposes $1-x_2 = 1-\delta EU_1^{HC}$, *and always accepts* $1-x_1 \geq \delta(1-\delta EU_1^{HC})$.

In equilibrium, country 1 appeals to the institution in the first period.

Figure 2 provides an intuition for the result in terms of the relative magnitude of the two noncompliance costs. If the prior belief is uniformly distributed, then the condition $EU_1^{HC} > \frac{1}{1+\delta}$ in Proposition 3 and the condition for a high capacity institution, $c_1 + c_2 > 1$, jointly imply that Institutional EQ1 emerges when c_2 is significantly larger than c_1. In such a scenario, country 1 is willing to take the issue to the institution due to its low noncompliance cost, while country 2 is unwilling to do so. Given country 2's opposite preference, country 1's best strategy is to appeal to the institution sooner rather than later to avoid a delay in settlement. This leads to the equilibrium result in which country 1 appeals to the institution in the first period, and receives an expected utility of $EU_1^{HC} > \frac{1}{1+\delta}$. Consequently, the institution is directly involved in settling the dispute, and country 1 receives more than it would receive from the bilateral bargaining in the baseline case (Proposition 1).

Proposition 4 characterizes the symmetric case in which country 2 alone prefers to take the dispute to the institution. Importantly, country 2 does not actually appeal to the institution in the equilibrium, but the influence of the institution is nevertheless reflected in the bargaining outcome.

Proposition 4 (Institional EQ2). *If* $EU_2^{HC} > \frac{1}{1+\delta}$, *then the following is the unique subgame perfect equilibrium:*

(a) Country 1 always proposes $x_1 = 1 - \delta EU_2^{HC}$, *and always accepts* $x_2 \geq \delta(1 - \delta EU_2^{HC})$.

(b) Country 2 always appeals to the institution, and always accepts a proposal $1 - x_1 \geq \delta EU_2^{HC}$.

In equilibrium, country 2 accepts country 1's proposal immediately and the institution is never appealed to.

The condition in Proposition 4 and the condition for a high capacity institution jointly

imply that country 1's noncompliance cost is significantly larger than that of country 2's. Consequently, country 2 has the credible threat of appealing to the institution. The threat in turn propels country 1 to offer country 2 a significant amount in the first period to preempt country 2 from acting on the threat in the next period and country 2 accepts the offer. Specifically, country 1 proposes to country 2, δEU_2^{HC}, the discounted payoff that country 2 would receive in the second period by appealing to the institution. It can be shown that country 1's equilibrium payoff of $1 - \delta EU_2^{HC}$ is less than $\frac{1}{1+\delta}$, which is what country 1 would receive in the baseline bargaining equilibrium. On the other hand, country 2's equilibrium payoff of δEU_2^{HC} is greater than $\frac{\delta}{1+\delta}$, which means that country 2 does better than it would in the baseline case. So the equilibrium outcome is that the two countries resolve the dispute through bargaining and, consistent with the finding in Proposition 3, the country with a credible threat of appealing to the institution improves its share in a world with an institution.

A Low Capacity Institution

The results for a low capacity institution are very similar in construction to those for a high capacity institution, but the equilibrium conditions have different substantive implications. For a low capacity institution, in the simultaneous game depicted in Table 1 there is no Nash equilibrium in which both countries comply with an institutional ruling. Instead, there exist pure strategy equilibria in which only one of the countries complies. Specifically, if $0 \leq s < c_2$, then country 1 defies the ruling while country 2 complies; if $1 - c_1 < s \leq 1$, then country 1 complies and country 2 defies; if $c_2 < s < 1 - c_1$, then the two equilibria coexist.[11] This feature of the equilibrium in the subgame affects the expected utility calculations of the two countries from appealing to to the institution, and in turn, it affects the equilibrium outcomes for the entire game.

[11] As in the case of a high capacity institution (see footnote 8), I do not consider multiple equilibria that depend only on a particular value of the institutional decision, s, because such a value has measure zero given that $F(s)$ is continuous.

Let EU_i^{LC} denote country i's expected utility from appealing to a low capacity institution. In calculating the expected utilities I assume that when $c_2 < s < 1-c_1$ the equilibrium being played is one in which country 1 complies and country 2 defies. The insights can be extended to the other case straightforwardly because the two equilibria are symmetric. Then,

$$EU_1^{LC} = \int_0^{c_2} (1-c_1) f(s) ds, \tag{3}$$

and

$$EU_2^{LC} = \int_{c_2}^{1} (1-c_2) f(s) ds. \tag{4}$$

The expected utilities share similar properties as those in the case of high capacity institution. Propositions 5 to 8, provide a complete characterization of all possible scenarios of countries appealing to a low capacity institution. As in the case of a high capacity institution, Figure 3 illustrates the intuitions of different equilibrium assuming a uniform prior distribution of the institutional ruling, with some of the insights applicable to the cases of nonsymmetric prior distributions. Proposition 5 characterizes the unique equilibrium in which neither country is interested in taking the issue to the institution. As in Proposition 1, the bargaining will conclude in the first period in the equilibrium, and the division of the pie is the same as that of the Rubinstein game. The bargaining equilibrium will again serve as the baseline case when we evaluate the effect of the existence of a low capacity institution.

[Figure 3 about here]

Proposition 5 (Bargaining EQ). *If $EU_1^{LC} \leq \frac{1}{1+\delta}$ and $EU_2^{LC} \leq \frac{1}{1+\delta}$, then the following is the unique subgame perfect equilibrium:*
(a) Country 1 always proposes $x_1 = \frac{1}{\delta+1}$, and always accepts $x_2 \geq \frac{\delta}{\delta+1}$.
(b) Country 2 always proposes $1 - x_2 = \frac{1}{\delta+1}$, and always accepts $1 - x_1 \geq \frac{\delta}{\delta+1}$.
In equilibrium, country 2 accepts country 1' proposal in the first period and the institution is never appealed to.

Figure 3 shows that for the conditions in Proposition 5 to hold and produce the bargaining equilibrium, the noncompliance costs for both countries have to be similarly low or moderate.

Here, the existence of the institution does not affect what countries get out of the bargaining; countries are no better or worse off than if the institution does not exist. The result holds not only when f(s) is uniformly distributed, but also when the distribution is skewed in favor of one country. We have found a similar result in Proposition 1; however, there the costs of defiance are high for both countries. The question then becomes: why would countries ignore the option of appealing to the institution even when the costs of defiance are at most moderate with a low capacity institution?

We have noted earlier that under a low capacity institution there is no equilibrium in the simultaneous subgame in which both countries comply with an institutional ruling. In other words, when the institution is of low capacity countries are less afraid of defying the institution and one of the two will defy when it receives an unfavorable ruling. Understanding this incentive, each country will be cautious if the other country's cost of defiance is small. Proposition 5 characterizes a situation in which the costs are relatively small for both countries, so that neither country can count on the other side's willingness to abide by the institutional ruling. Consequently, neither is willing to take the dispute to the institution.

The next proposition says that there is no scenario in which both countries would prefer appealing to the institution to bilateral bargaining. The intuition is similar to that behind Proposition 2. That is, given the opposing interests in the ruling and an additional efficiency loss due to the possibility of noncompliance, it cannot be the case that both countries expect to do better by appealing to the institution than bilateral bargaining.

Proposition 6. *There is no equilibrium in which both countries would prefer appealing to the institution to bilateral bargaining.*

Propositions 7 and 8 complete the characterization of different equilibrium scenarios by specifying the conditions under which country 1 or country 2 alone would prefer appealing to the institution.

Proposition 7 (Institutional EQ1). *If* $EU_1^{LC} > \frac{1}{1+\delta}$*, then the following is the unique subgame perfect equilibrium:*

(a) Country 1 always appeals to the institution, and always accepts a proposal $x_2 \geq \delta EU_1^{LC}$.
(b) Country 2 always proposes $x_2 = \delta EU_1^{LC}$*, and always accepts* $1 - x_1 \geq \delta(1 - \delta EU_1^{LC})$.
In equilibrium, country 1 appeals to the institution in the first period.

The equilibrium outcome for this case is that the institution gets involved in resolving the dispute and country 1 benefits from appealing to the institution by receiving a higher expected utility than it would in the baseline bargaining equilibrium. Figure 3 shows that the equilibrium will emerge if country 2's noncompliance cost is large while country 1's is small. In this configuration of the costs, country 1 can afford to defy the institution if it is not pleased with the ruling, while country 2 is highly constrained from doing the same. Consequently, country 1 chooses to appeal to the institution rather than bargaining with country 2. The result holds for asymmetric distributions as well.

Proposition 8 (Institutional EQ2). *If* $EU_2^{LC} > \frac{1}{1+\delta}$*, then the following is the unique subgame perfect equilibrium:*
(a) Country 1 always proposes $x_1 = 1 - \delta EU_2^{LC}$*, and always accepts* $x_2 \geq \delta(1 - \delta EU_2^{LC})$.
(b) Country 2 always appeals to the institution, and always accepts a proposal $1 - x_1 \geq \delta EU_2^{LC}$.
In equilibrium, country 2 accepts country 1's proposal immediately and the institution is never appealed to.

Proposition 8 characterizes an equilibrium in which the institution is *never* utilized, but country 2's share of the pie is improved by its credible threat of appealing to the institution. While the dispute is resolved by bilateral bargaining, country 1 has to offer country 2 more than it would in the baseline bargaining equilibrium to preempt country 2 from appealing to the institution in the next period. The equilibrium outcome is that country 1 proposes a division that is in country 2's favor in the first period, and it will be accepted by country 2. Figure 3 demonstrates the intuition: When country 2 has a low noncompliance cost country 2 can extract more at the bargaining table with a credible threat of appealing to the institution.

Discussions

The equilibrium analysis can be summarized by two main results shared by the cases of high and low capacity institutions and one result that differentiates the two types of intuitions. First, in any given circumstance, only one country will prefer appealing to the institution to bilateral bargaining, regardless of the size of the costs or the type of institution present. This is because under the condition that noncompliance costs are known to each other, only one country will expect to do better with an institutional ruling than with bilateral bargaining. There is strong empirical support for the result. Among the 112 cases brought to the ICJ between 1946-2008, 97 cases (87%) are unilateral applications. Similarly, while the reference to the UN may be by both parties, more commonly one party will seek UN involvement and the other will resist it (Merrills 2005, 272). Moreover, all 373 WTO disputes filed between 1995-2008 are unilateral applications.[12]

Second, when the noncompliance costs are similar in magnitude for the two countries, we are more likely to observe that a dispute is resolved through bilateral bargaining. The result holds generally for any single peaked density function. Third, the country with a credible threat of appealing to the institution benefits from the option whether or not the institution

[12]Empirically, we do observe countries sometimes file join applications. We may wonder why that is the case given the model's prediction. There are at least two plausible explanations. Countries may appeal to an international institution during a dispute for reasons other than winning the case. For example, a country may go to an institution to impose costs on its opponent and deter future challengers. The model abstracts away the time and resources involved in taking an issue to an institution but such costs could be substantial and have a deterrence effect on other opponents. Countries may also use an international institution as a cover to present an unfavorable outcome to a domestic audience (Huth and Allee 2006; Simmons 2002). So, in cases where the purpose of an application is not simply to resolve a dispute, we may observe joint submissions of disputes to an international institution. A second explanation for joint applications is that countries may not know each other's noncompliance costs. In such cases miscalculations could occur and both countries may prefer appealing to an international institution to bilateral bargaining. This scenario is unlikely to occur very often, however, because through repeated interactions, media coverage, and deliberate collection of information, a country is often in a position to assess rather accurately how noncompliance will cost its opponent domestically and internationally.

is actually appealed to. Propositions 3 and 7 show that country 1 directly benefits from taking the dispute to the institution, while Propositions 4 and 8 demonstrate that when country 2 has the credible threat, it benefits at the bargaining table without actually having to go to the institution. In such cases, the *existence* of an international institution that could arbitrate a dispute is sufficient to influence the bargaining outcome. Moreover, a surprising aspect of the result is that if there is high uncertainty regarding the outcome of the institutional decision, the country with a lower noncompliance cost is more likely to have a credible threat of appealing to the institution. The result has important implications for the incentives facing democratic and non-democratic regimes in utilizing international institutions, the subject that I will return to in the next section.

Finally, countries behave differently after receiving a ruling depending on whether it comes from a high or low capacity institution. With a high capacity institution, for some range of ruling there exists an equilibrium in which both countries will comply with the ruling; with a low capacity institution, such range does not exist.[13] Even for a high capacity institution, however, its ability to promote mutual compliance depends on how it rules. An institutional ruling can easily fall outside of the range that brings mutual compliance and results in defiance by one of the two countries. If an institution's strength lies mainly in its reputation, reflected in the costs countries incur when they defy the institution, and if frequent occurrence of noncompliance behavior undermines its reputation, then a conjecture from the result is that an institution has to pay attention to countries' noncompliance costs in its ruling in order to maintain its standing. In other words, contrary to our intuition, to rule strictly according to facts and principles may not be the best strategy to preserve the prestige of an institution because the ruling could concentrate in a parameter range that precludes the possibility of mutual compliance. Empirical evidence suggests that institutions may in fact use strategic interpretation of legal doctrine to enhance compliance with its decisions. In a study of national high courts in 18 countries, it is found that court decisions are generally pleasing rather than displeasing (Gibson, Caldeira and Baird 1998). They

[13]The range for the high capacity institution is $[1 - c_1, c_2]$.

suggest that this might result from the ability of judges to frame issues in a light favorable to the maintenance of institutional legitimacy. Moving from national court to international judicial entities, Nzelibe (2005) found that the WTO's Appellate Body rules in a way to accommodate changing domestic political considerations of member states and maximize compliance with its decisions.

As with any game-theoretic analysis, one may wonder if the equilibrium results hold up under reasonable alternative specifications of the model. Here I consider two most interesting variations: one is the existence of a status quo, and the other is the possibility of war when countries disagree with an institutional ruling. The two scenarios can be incorporated into the model similarly.[14]

Suppose there is a status quo division of the disputed issue, $(q, 1-q)$, where q is country 1's share and $1-q$ country 2's share. The countries can either resolve the dispute by bilateral bargaining or appeal to an international institution for a ruling. If the institution is appealed to but at least one of the countries defies the ruling, then the status quo remains with each defying country incurs a noncompliance cost. If no country ever appeals to the institution and there is no agreement in a finite period, then the status quo remains.[15]

The above modification leads to a different simultaneous-move subgame when the institution is appealed to than the one in the original model (Table 2):

		Country 2: Comply	Country 2: Defy
Country 1	Comply	$s, 1-s$	$q, 1-q-c_2$
	Defy	$q-c_1, 1-q$	$q-c_1, 1-q-c_2$

Table 2: *The Simultaneous Subgame after the Institutional Ruling*

[14]For technical details, see the extended appendix on the author's website.

[15]Note that the discounted present value of the status quo is zero since this is an infinite game.

It can be shown that the four propositions held for both high and low capacity institutions in the original model also hold in this modified game. Different from the original model, however, I find that high and low capacity institutions do not influence compliance behavior differently in the modified model. When a status quo is added to the model, what becomes crucial for countries' compliance behavior is the size of the noncompliance costs relative to the values of the status quo. If the institution is appealed to but the noncompliance cost is larger than the value of the status quo for a country, then the country will not defy the institutional ruling. So, because of the constraint that the status quo share puts on noncompliance behavior, there always exist parameter ranges for which both countries will comply with the institutional ruling. In other words, if an issue is brought to an institution and there exists a status quo point, then countries are more likely to comply with an institutional ruling than if there weren't a status quo point to begin with.

Alternatively, suppose if at least one of the countries defies the ruling then the two countries will go into war, with country 1 wins the war with probability q and country 2 wins with probability $1-q$. If a country wins the war, then it acquires the entire pie, but also pays a cost that include both the cost of war and a noncompliance cost. Technically speaking, this is the same model as the one with a status quo division $(q, 1-q)$, with q now being interpreted as country 1's probability of winning a bilateral war against country 2 and $1-q$ country 2's probability of winning the war. Therefore, this model leads to the same simultaneous game as in Table 2and the main results hold as well.

Endogenous Application and Restrictive Membership

The model predicts that countries with lower non-compliance costs are more likely to file for dispute resolution. So counterintuitively, international institutions are more strategically "useful" for countries that care less about their authority. The logic behind the result is that if the cost of defying an institutional ruling is low for a country while the country can expect the ruling to constrain its high cost opponent, it is rational for the low cost country to appeal to the institution to resolve a dispute. The result suggests that there is a selection

effect at work when one of the countries actively seeks institutional solution to a dispute, and the effect has important implications for democratic and non-democratic governments in their relationship with international institutions.

There are reasons to believe that democratic governments incur higher noncompliance costs than their non-democratic counterparts due to their exposure to domestic sources of noncompliance costs that non-democracies are not subject to. The electoral process is one source of such costs for democratic government. While it is true that democratic leaders do not lose their lives in political competition like non-democratic leaders sometime do, they also lose their jobs more easily. Domestic interest groups and free media in a democracy play a significant role in publicizing a government's failure in working with international institutions, and the publicity can have negative electoral consequences. Additionally, democratic regimes can be sued in domestic courts — the main way for NAFTA to enforce compliance is domestic courts. In other words, domestic rule of law keep democratic leaders on the hook in a way that non-democratic leaders do not.

If indeed, on average, democratic governments incur higher non-compliance costs than non-democratic ones, then the equilibrium analysis suggests that in disputes between democracies and non-democracies, non-democracies are more likely to take advantage of international institutions. Anecdotal evidence seems to support the result. During 1990s, Libya was engaged in an effort to reverse two UN sanctions over Libya's involvement in the bombing of Pan-Am flight 103. In questioning the justifications of the sanctions, Libya defined the dispute as one with the United Kingdom (UK) and the United States and requested international arbitration. Libya eventually filled cases to the ICJ contending that neither the UK nor the United States had the right to compel it to surrender two Libyan nationals suspected of the bombing. Throughout the prolonged process, Libya "took careful advantage of the openings available to it under the procedures of the Security Council and other IOs" (Hurd 2005, 513).

A direct and broader test of the result remains illusive given that it is difficult to find out whether the condition of a flat prior was satisfied in some of the past dispute cases. To

nevertheless gauge some sense of empirical validity of the result, all the mixed dyads in the contentious cases brought to the ICJ between 1946-2008 are examined to find out if there is a pattern that non-democracies are more likely to take a dispute to the ICJ.[16] Specifically, I use democracy score in Policy IV (Jaggers and Gurr 1995) to determine if a country was a democracy, thus had higher noncompliance costs, at the time of filing a dispute with the ICJ. A country is considered a democracy if its democracy score is at least +6 (a commonly used threshold value), and a nondemocracy otherwise. Of the 112 contentious cases brought to the ICJ between 1946-2008, there are 47 cases of mixed dyads. Among them, 27 cases occurred during the Cold War (1946-1989) and 21 of them were Western democracies filing against non-democracies, which at least on the surface does not conform to the model's prediction. Of the 20 mixed dyads occurred *after* the Cold War, however, 18 cases were non-democracies filed against democracies; moreover, in one of the two remaining cases, Yugoslavia filed against Bosnia & Herzegovina in 2001, which is a weak case for democracy filing against a non-democracy because Yugoslavia was a new democracy with a democracy score +7 while Bosnia & Herzegovina is coded as *in transition* at the time of the dispute. So it seems that in the post-Cold War era there is a clear pattern that low cost non-democratic countries are more likely to apply to the ICJ. Why did the pattern run in the opposite direction during the Cold War? An explanation that is consistent with the model is that countries had different prior beliefs about the rulings by the ICJ in the two periods. During the Cold War, with the East-West conflict in the background, countries belonged to the Soviet bloc could have had pessimistic assessments of their chances of winning disputes in the Court against Western countries, thus were less willing to take an issue to the Court while Western countries had the opposite incentives. After the Cold War, with the ideological struggle fading from memory, countries may perceive more uncertainty surrounding a particular ICJ ruling and noncompliance costs have figured more importantly in their decision whether or not to involve the Court.

Given the potential for non-democracies to exploit international institutions, a question

[16]The list of the cases is available on the author's website.

arises as to why democratic states — states that care most about international institutions (high noncompliance costs) — would continue to perceive such high noncompliance costs if the institutions are taken advantage of by states with low noncompliance costs? The very question may explain the phenomenon of a particular type of restrictive membership in significant international institutions. It has been argued that founding members of an international institution may adopt restrictive membership to assure a deeper level of co-operation (Downs, Rocke and Barsoom 1998), or to safeguard against countries that do not have the capacity to implement the terms of agreements even if they wish to (Downs and Rocke 1995, pp.105-129). Both arguments are quite plausible, however, they do not directly explain exclusions that seem to target specifically at non-democracies by powerful democracies. For example, the road to WTO membership has been exceptionally long for certain countries. It took China 15 years (1986-2001) to wrap up its negotiation phase and another two years to finally gain entry to the WTO. Russia has negotiated for 13 years for its membership and is not expected to join the WTO until 2010. Iran applied to join the WTO in 1996, but the organization agreed to begin the membership talks only recently, after the United States lifted its opposition. Moreover, the EU has not allowed non-democracies to join the Union thus far. The reason behind the phenomenon may well be that powerful democracies understand the incentives facing non-democracies with lower noncompliance costs and use the restrictive membership to guard against these states that may reap the benefit without paying the costs. This leads to a further implication of the result, which is that restrictive membership allows democratic states to create credible dispute resolution mechanisms among themselves and settle their differences peacefully; lacking similar conflict management mechanisms with non-democracies, democracies are more likely to fight with non-democracies. In other words, the logic of restrictive membership provides a plausible causal mechanism for the democratic peace proposition.

Conclusion

International institutions have often been seen in the light of fulfilling the desire of states to cooperate with each other. Depending on the issues involved, however, the relationship between countries and international institutions could be more complex and nuanced. The study takes the perspectives of two states engaged in a bilateral dispute and asks how the existence of an institutional solution influences their bargaining strategies and the outcome of the dispute.

Indeed, the equilibrium results show that countries could have differential interests with respective to an institutional solution to a dispute, thus make asymmetric use of an international institution. Specifically, it is often the case that only one country finds the option of appealing to an international institution attractive. Furthermore, the model suggests that the country with a lower noncompliance cost than its opponent is more likely to utilize an institution to settle a dispute and benefit from the option. An implication of the result is that there is a selection effect that ought to be accounted for when we study compliance with international agreements. That is, we need to control for the characteristics of the country that initiates an institutional involvement.

The paper also addresses the effectiveness of international institutions more broadly. The equilibrium results show that even when an international institution is not directly involved in a dispute settlement, it nevertheless influences the outcome by promoting concessions at the bargaining table. This suggests that we may underestimate the mediating effect of international institutions if we only examine the cases in which institutions are directly involved in dispute settlement.

Finally, only a high capacity institution, which enjoys high international and domestic prestige, can induce countries to comply with its decisions by generating substantial noncompliance costs. But there is an important qualification for its ability to do so: the rulings cannot consistently fall in a range that invites defiance. When institutional rulings are concentrated in a narrow range of values and some countries repeatedly defy the rulings, the capacity of an institution can be weakened over time. Keeping an eye on countries' com-

pliance costs while considering various aspects of a dispute may increase the chance that a ruling is accepted by all sides, thus reinforce the strength of an institution. This in turn suggests that allowing for less precision in institutional rules and more flexibility in their interpretations could be desirable in some cases for the very purpose of building a high capacity institution.

The results of the study have implications for the role of an international dispute settlement mechanism regardless of the issue area that it serves. In the existing literature scholars have tended to study the influence of international institutions on different types of interstate disputes separately, making it difficult to generalize findings in one issue area to another. Yet, the underlying logic of the institutional influence may be similar. Using a modeling approach that focuses on basic features shared by different types of bilateral dispute settlement processes, the study shows that the first order importance of an international dispute settlement mechanism is that it *exists* in the first place, thus providing an outside option that affects the calculation at the bargaining table.

A Appendix

All the propositions require a uniqueness proof and an existence proof. For uniqueness, Binmore, Shaked, and Sutton (1989) show that there is a unique SPE to Rubinstein bargaining game with one player (player 2) having an outside option. Applying the logic of their proof to the case where both players have outside options, it can be shown that the uniqueness is again guaranteed. Due to space consideration, below I only provide the existence proof for each proposition.

To find SPE to the whole game, I first analyze the simultaneous subgame after the institution gives a ruling of the division of the pie (Table 1). The equilibrium to this subgame depends on the values of the institution's proposal, s, and the costs countries incur when defying the institution, c_1 and c_2.

Assume that the institution is of high capacity, i.e., $c_1 + c_2 > 1$. We have three cases to consider: (1) If $s \in [0, 1 - c_1)$, then in equilibrium country 1 defies the institutional ruling while country 2 complies; (2) if $s \in [1 - c_1, c_2)$, then in equilibrium both countries comply with the ruling; (3) if $s \in [c_2, 1]$, then in equilibrium country 1 complies and country 2 defies the ruling.

Based on the Nash equilibrium for different parameter values, we can calculate countries' expected utilities and we find $EU_1^{HC} = \int_0^{1-c_1}(1 - c_1)f(s)ds + \int_{1-c_1}^{c_2} sf(s)ds$ and $EU_2^{HC} = \int_{1-c_1}^{c_2}(1 - s)f(s)ds + \int_{c_2}^{1}(1 - c_2)f(s)ds$.

Now we turn to SPE to the whole game. Since this is a stationary game, we solve for SPE by finding players' equilibrium continuation payoffs. Given the structure of the game, there are two possible continuation values for each country $i(i = 1, 2)$. Let v_i^B denote country i's continuation value from bilateral bargaining, and let v_i^I denote country i's continuation value for appealing to the institution. Note that v_i^I is just EU_i^{HC}. The continuation value for each country is then $v_i = max\{v_i^B, v_i^I\}$, i.e., each country will choose the equilibrium path that will give it the highest expected utility. Depending on the relative magnitude of v_i^B and v_i^I, we have four cases to consider:

(i) Both countries prefer bilateral bargaining to appealing to the institution: $v_1^B \geq v_1^I$ and $v_2^B \geq v_2^I$;

(ii) Both countries prefer appealing to the institution to bilateral bargaining: $v_1^B < v_1^I$ and $v_2^B < v_2^I$.

(iii) Country 1 prefers appealing to the institution while country 2 prefers bilateral bargaining: $v_1^B < v_1^I$ and $v_2^B \geq v_2^I$.

(iv) Country 1 prefers bilateral bargaining while country 2 prefers appealing to the institution: $v_1^B \geq v_1^I$ and $v_2^B < v_2^I$;

Now I prove propositions 1-4.

Proof of Proposition 1

Proof. Suppose both countries prefer bilateral bargaining to appealing to the institution. That is, $v_1^I \leq v_1^B$ and $v_2^I \leq v_2^B$. This gives us the following system of equations:

$$\begin{cases} v_1 = v_1^B = 1 - \delta v_2^B \\ v_2 = v_2^B = 1 - \delta v_1^B \end{cases}$$

Solving the system of equations, we have

$$\begin{cases} v_1^B = \frac{1}{1+\delta} \\ v_2^B = \frac{1}{1+\delta} \end{cases}$$

For these values to be equilibrium continuation values, they must satisfy the assumptions we made above: $v_1^I \leq v_1^B$ and $v_2^I \leq v_2^B$. We know $v_1^I = EU_1^{HC}$ and $v_2^I = EU_2^{HC}$, therefore, the assumptions require that $EU_1^{HC} \leq \frac{1}{1+\delta}$ and $EU_2^{HC} \leq \frac{1}{1+\delta}$.

Now I prove the proposition by showing that the strategies characterized in (a) and (b) form a SPE. We know from the above derivation that if $EU_1^{HC} \leq \frac{1}{1+\delta}$ and $EU_2^{HC} \leq \frac{1}{1+\delta}$, then both countries prefer bilateral bargaining to appealing to the institution. This turns the game into a Rubinstein bargaining game. Suppose it is country 1's turn to make a proposal. If it offers $1 - x_1 = \frac{\delta}{1+\delta}$ to country 2, country 2 will accept and country 1's payoff is $\frac{1}{1+\delta}$. Clearly, country 1 cannot do better by offering 2 anything higher than $\frac{\delta}{1+\delta}$ since it too will be accepted by country 2 and country 1 will end up with less than $\frac{1}{1+\delta}$. On the other hand, if

country 1 offers anything less than $\frac{\delta}{1+\delta}$, country 2 will reject and in the next period country 2 will offer $x_2 = \frac{\delta}{1+\delta}$ to country 1. Country 1 will accept it and 1's payoff discounted to the current period is $\frac{\delta^2}{1+\delta} < \frac{1}{1+\delta}$. Therefore, proposing $x_1 = \frac{1}{1+\delta}$ is country 1's best response when it is 1's turn to make a proposal. Similarly, it is optimal for country 1 to accept any offer of at least $\frac{\delta}{1+\delta}$ and to reject anything less, since in the next period it can guarantee receiving $\frac{1}{1+\delta}$. By the same logic, we can show that country 2's strategy specified in Proposition 1 is its best response. The equilibrium outcome is that country 1 proposes the division $(\frac{1}{1+\delta}, \frac{\delta}{1+\delta})$ and country 2 accepts the proposal immediately. This proves the existence. □

Proof of Proposition 2

Proof. Suppose both countries prefer appealing to the institution to bilateral bargaining. That is, $v_1^B < v_1^I$ and $v_2^B < v_2^I$. This gives us the following system of equations:

$$\begin{cases} v_1^B = 1 - \delta v_2^I \\ v_2^B = 1 - \delta v_1^I \end{cases}$$

Substitute $v_1^I = EU_1^{HC}$ and $v_2^I = EU_2^{HC}$ into the above equations, we have

$$\begin{cases} v_1^B = 1 - \delta \cdot EU_2^{HC} \\ v_2^B = 1 - \delta \cdot EU_1^{HC} \end{cases}$$

For these values to be equilibrium continuation values, they must satisfy the assumptions we made above. The assumption $v_1^B < v_1^I$ implies that $EU_1^{HC} + \delta EU_2^{HC} > 1$. That is, the sum of the two countries' expected payoffs from appealing to the institution is strictly greater than the entire size of the pie. This cannot be true, however, since one country's gain is the other country's loss in the game. Moreover, there is efficiency loss if the countries appeal to the institution and then defy its ruling. Therefore, the assumption $v_1^B < v_1^I$ does not hold, and neither does $v_2^B < v_2^I$. As a result, the equilibrium does not exist. □

Proof of Proposition 3

Proof. Suppose country 1 prefers appealing to the institution while country 2 prefers bilateral bargaining. That is, $v_1^B < v_1^I$ and $v_2^B \geq v_2^I$. This gives us the following system of equations:

$$\begin{cases} v_1^B = 1 - \delta v_2^B \\ v_2^B = 1 - \delta v_1^I \end{cases}$$

Substitute $v_1^I = EU_1^{HC}$ into the above equations, we have

$$\begin{cases} v_1^B = 1 - \delta(1 - \delta EU_1^{HC}) \\ v_2^B = 1 - \delta EU_1^{HC} \end{cases}$$

For these values to be equilibrium continuation values, they must satisfy the two assumptions made: $v_1^B < v_1^I$ and $v_2^B \geq v_2^I$. For $v_1^B < v_1^I$ to be true, the following must hold:

$$\begin{aligned} 1 - \delta(1 - \delta EU_1^{HC}) &< EU_1^{HC} \\ EU_1^{HC} &> \frac{1}{1+\delta} \end{aligned}$$

For $v_2^B \geq v_2^I$ to be true, the following must hold:

$$\begin{aligned} 1 - \delta EU_1^{HC} &\geq EU_2^{HC} \\ \delta EU_1^{HC} + EU_2^{HC} &\leq 1 \end{aligned}$$

The inequality always holds, therefore, $v_2^B \geq v_2^I$ is always true.

In sum, if $EU_1^{HC} > \frac{1}{1+\delta}$, then $v_1^B = 1-\delta(1-\delta EU_1^{HC})$ and $v_2^B = 1-\delta EU_1^{HC}$ are equilibrium continuation payoffs. With a proof similar to that for Proposition 1, we can show that the strategies characterized in Proposition 3 form a SPE. This proves the existence. □

Proof of Proposition 4

Proof. Suppose country 1 prefers bilateral bargaining while country 2 prefers appealing to the institution. That is, $v_1^B \geq v_1^I$ and $v_2^B < v_2^I$. This gives us the following system of equations:

$$\begin{cases} v_1^B = 1 - \delta v_2^I \\ v_2^B = 1 - \delta v_1^B \end{cases}$$

Substitute $v_2^I = EU_2^{HC}$ into the above equations, we have

$$\begin{cases} v_1^B = 1 - \delta EU_2^{HC} \\ v_2^B = 1 - \delta(1 - \delta EU_2^{HC}) \end{cases}$$

For these values to be equilibrium continuation values, they must satisfy the assumptions we made: $v_1^B \geq v_1^I$ and $v_2^B < v_2^I$. For $v_1^B \geq v_1^I$ to be true, the following must hold:

$$\begin{aligned} 1 - \delta EU_2^{HC} &\geq EU_1^{HC} \\ EU_1^{HC} + \delta EU_2^{HC} &\leq 1 \end{aligned}$$

The inequality always holds, therefore, $v_1^B \geq v_1^I$ is always true.
For $v_2^B < v_2^I$ to be true, the following must hold:

$$\begin{aligned} 1 - \delta(1 - \delta EU_2^{HC}) &< EU_2^{HC} \\ EU_2^{HC} &> \frac{1}{1+\delta} \end{aligned}$$

In sum, if $EU_2^{HC} > \frac{1}{1+\delta}$, then $v_1^B = 1 - \delta EU_2^{HC}$ and $v_2^B = 1 - \delta(1 - \delta EU_2^{HC})$ are equilibrium continuation payoffs. With a proof similar to that for Proposition 1, we can show that the strategies characterized in Proposition 4 form a SPE. This proves the existence. □

The proofs for Propositions 5-8 are omitted since they are very similar to the proofs for Propositions 1-4.

Claim: EU_1^{HC} is a decreasing function c_1 and an increasing function of c_2; EU_2^{HC} is a decreasing function of c_2, and an increasing function of c_1.

Proof. First, rearrange EU_1^{HC} as follows:

$$\begin{aligned} EU_1^{HC} &= \int_0^{1-c_1} (1 - c_1) f(s) ds + \int_{1-c_1}^{c_2} s f(s) ds \\ &= \int_0^{1-c_1} (1 - c_1 - s) f(s) ds + \int_0^{c_2} s f(s) s ds \end{aligned} \tag{5}$$

Note that the first term in Equation (5) is a function of c_1 only, and the second term is a function of c_2 only. Now consider the first term. The function inside the integral, $1 - c_1 - s$,

is non-negative given that $0 \leq s \leq 1 - c_1$; additionally, both $1 - c_1 - s$ and the upper bound of the integral, $1 - c_1$, decrease as c_1 increases. As a result, the first term as a whole is a decreasing function of c_1. By a similar analysis, we can see that the second term is an increasing function of c_2. These two results combined show that EU_1 is a decreasing function of c_1 and an increasing function of c_2. A similar analysis proves EU_2^{HC} is a decreasing function of c_2, and an increasing function of c_1. □

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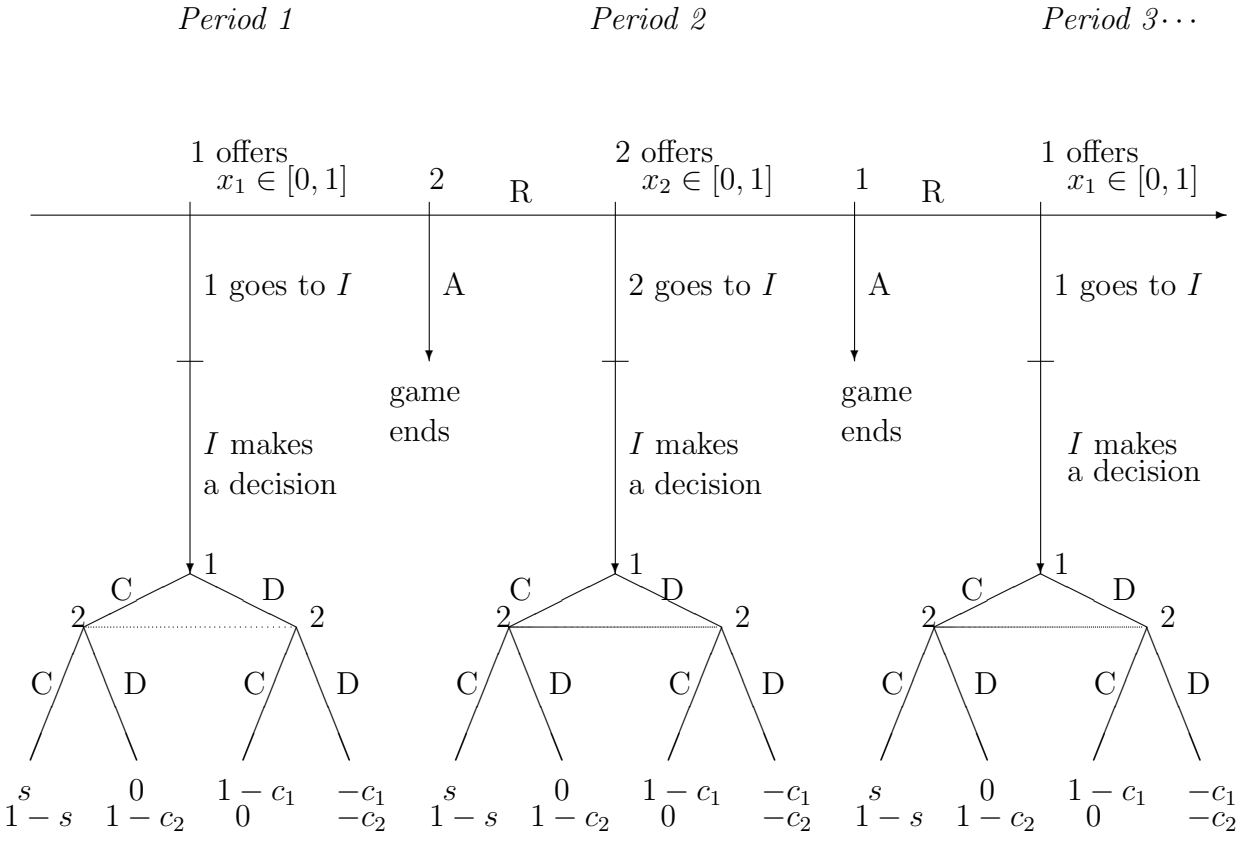

Figure 1: Time Line of the Bargaining Game

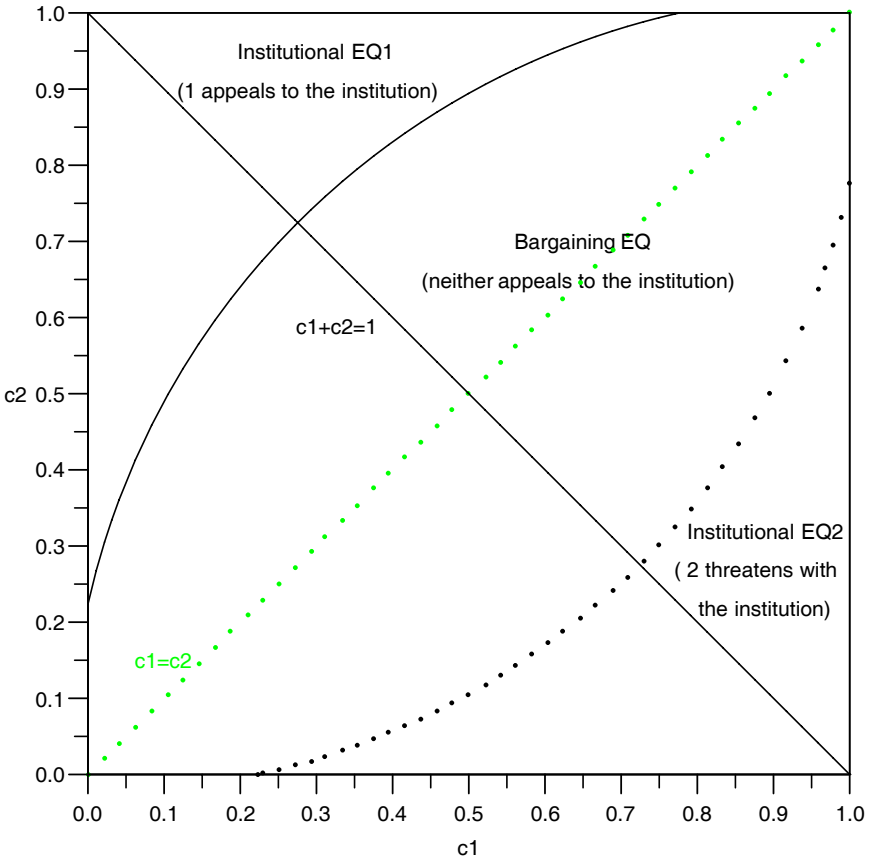

Figure 2: Equilibrium When the Institution Is of High Capacity *The figure is drawn assuming a uniform distribution of the institutional decision. The solid curve is* $EU_1^{HC} = \frac{1}{1+\delta}$, *and the dotted curve is* $EU_2^{HC} = \frac{1}{1+\delta}$; *they set the boundaries for the equilibrium characterized by Propositions 1, 3, and 4. Since a high capacity institution implies* $c_1 + c_2 > 1$, *the unique equilibrium locates in the upper triangle. In the triangle, the area bounded by the solid and dotted curves produces the bargaining equilibrium, the area at the upper left corner bounded by the solid curve produces the institutional equilibrium 1, and the area at the lower right corner bounded by the dotted curve produces institutional equilibrium 2.*

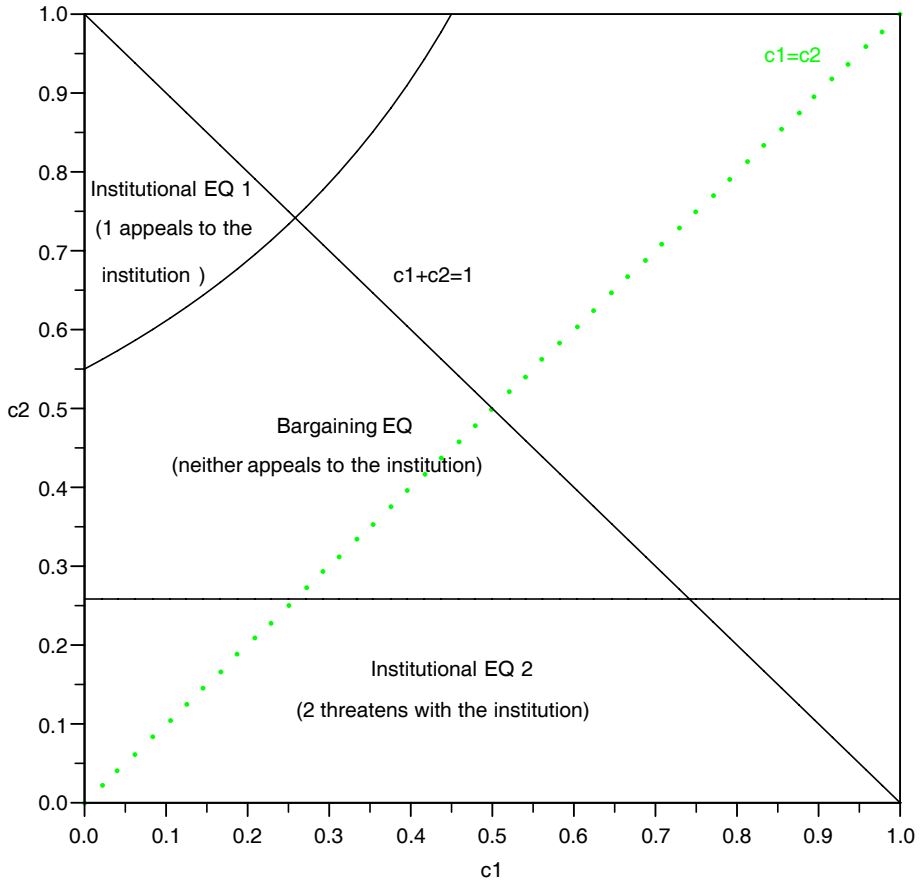

Figure 3: Equilibrium When the Institution Is of Low Capacity *The figure is drawn assuming a uniform distribution of the institutional decision. The solid curve is* $EU_1^{LC} = \frac{1}{1+\delta}$, *and the horizontal line is* $EU_2^{LC} = \frac{1}{1+\delta}$; *they set the boundaries for the equilibrium characterized by Propositions 5, 7, and 8. Since a low capacity institution implies* $c_1 + c_2 \leq 1$, *the unique equilibrium locates in the lower triangle. In the triangle, the area bounded by the solid curve and the horizontal line is the bargaining equilibrium, the area in the upper left corner bounded by the curve produces the institutional equilibrium 1, and the area at the bottom bounded by the horizontal line produces institutional equilibrium 2.*