Strengthening International Courts and the Early Settlement of Disputes[1]

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Abstract

We construct a formal model of interstate disputes that take place in the shadow of an international court. We find that strengthening the enforcement of court rulings increases both the inefficient use of the court in equilibrium and the likelihood of violent conflict over high-valued assets. Strengthening the court's jurisdiction—by increasing the probability that a court will review cases on their merits—also reduces incentives for states to reach early settlements and increases the likelihood that costly litigation will take place. For courts with relatively weak jurisdictional powers, increasing jurisdiction can lead to more war in equilibrium. In contrast, strengthening the jurisdiction of courts that already have a strong basis for jurisdiction can reduce the likelihood of conflict over the asset. We also show that increasing the court's jurisdiction has a deleterious effect on the incentive for states to reveal their private information: as the court grows stronger, less information is revealed in pre-trial negotiations. We evaluate the plausibility of our results by examining the use of the International Court of Justice.

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The recent growth in international courts has produced a renewed interest in studying international law and legalization. According to the literature, legal institutions provide two important functions in international politics. First, they provide information that is necessary for solving international disputes.[5] Second, they prompt disputants to settle their disputes before the court issues a ruling on the case.[6] We employ a formal model to show that strengthening international courts can *reduce* their efficacy on both of these dimensions. We make this argument with reference to two important measures of court 'strength:' (1) limits on their ability and willingness to rule on cases, which we operationalize as the probability that the court will review the case on its merits; and (2) the strength of their enforcement regimes. Strengthening an international court might still be beneficial despite these adverse effects if the court prevents disputes from escalating into war. However, we show that strengthening the enforcement of court rulings *increases* the likelihood of war. Also there is no unambiguous relationship between strengthening jurisdiction of an international court and war prevention. For courts with relatively weak jurisdictional powers, increasing jurisdiction can lead to more war in equilibrium. In contrast, strengthening the jurisdiction of courts that already have a strong basis for jurisdiction can reduce the likelihood of conflict over the asset.

We model two states involved in a dispute over an asset that the defendant possesses. The plaintiff has private information regarding the strength of his legal claim to the asset,[7] and hence the likelihood that the court will award the asset to the plaintiff if the court is willing to rule on the merits. The plaintiff begins by demanding a settlement from the defendant. If this demand offer is rebuffed, litigation ensues. Both players are uncertain about whether the court will be willing to rule on the merits of the case. If the court does rule on the merits, then the strength of the court's enforcement regime determines the magnitude of the effect of a court ruling. A court with a "perfect" enforcement regime can ensure that the winner of a

[5]This argument has been made by many perhaps most notably by Keohane (1984).

[6]As Hudec (1993, 360) argues: "No functioning legal system can wait until [the final verdict] to exert its primary impact." Additionally, as Reinhardt (2000) and Busch and Reinhardt (2000, 2003, 2005) argue, the absence of an adjudicatory body may make players completely unwilling to negotiate a settlement to their dispute. This is empirically demonstrated in Busch, Raciborski and Reinhardt (2007).

[7]Different institutions vary in the names that they give to the legal disputants. For example, in the International Court of Justice, the disputant who files the initial claim is the "applicant," while the state against which the claim is lodged is called the "respondent." In order to avoid confusion, we use the common terms of "plaintiff" and "defendant."

ruling on the merits gains full control over the asset, while a favorable ruling will have less of an impact on final outcomes when the court has less enforcement power. If the court refuses to issue a ruling on the merits, states enter a crisis bargaining game that can sometimes result in war.

In our model strengthening international courts impacts their efficacy in three ways. First, if using the court involves relatively low fixed costs or if disputes take place over relatively high-valued assets, then the threat of costly litigation is sufficient to induce full information revelation in pre-trial bargaining—by the time that the defendant decides whether to accept a settlement demand or go to trial, she can perfectly infer the strength of her opponent's legal claim. However, as the cost of using the court increases or the value of the disputed asset declines, the plaintiff no longer has incentive to fully reveal her private information. Strengthening the court by increasing its jurisdiction leads to *less* information revelation in pre-trial bargaining.

Second, in those situation where states do completely reveal their private information, strengthening international courts reduces the likelihood of early settlements because strong courts magnify the bargaining problems arising from incomplete information about the quality of the disputants' legal claims. When the court is weak (i.e. has a low probability of deciding the case on the merits, or has little impact on the post-adjudication outcomes because of a lack of enforcement), the plaintiff's probability of winning on the merits is largely irrelevant. As such, asymmetric information about this probability has little effect on bargaining between the disputants and they can more easily reach an early pre-trial settlement.

Finally, strengthening the court induces states to engage in more brinksmanship over high-value assets which can lead to crisis bargaining if the court refuses to intervene. Increasing the enforcement of court rulings indirectly increases the probability that states will engage in conflict over the disputed asset. When the court is relatively weak in its degree of jurisdiction, strengthening its jurisdiction can lead to increased conflict over high-value assets. However, if the court is a relatively strong institution, then strengthening its jurisdiction reduces the likelihood of war in equilibrium.

1 Strengthening International Courts

We focus on two dimensions of international courts: the ability and willingness of a court to review a case on its merits, and the enforcement of the court's rulings (Smith, 2000).

Jurisdiction

Basic principles of international law provide courts with a variety of reasons for refusing to rule on the merits of a given case, which fall under the general rubric of what legal scholars call the "justiciability" of a case. First, the court can find that it lacks jurisdiction or competence to rule in a given dispute. Second, if jurisdiction exists, the court can find that the given claims are inadmissible for reasons such as excessive delay in initiating a lawsuit or non-exhaustion of local remedies. Finally, even if jurisdiction exists and a case is admissible, a court may decline to issue a ruling if it believes that such a ruling would violate judicial propriety.[8] Whether a court will choose to review a case on its merits is a matter of great uncertainty even for legal experts.[9] As Pomerance (1997, 308) states: "[the] line dividing ... the 'non-justiciable' from the 'justiciable' remains undefined and probably undefinable except by some of the tautological and circuitous formulae which tend to be quoted and requoted unthinkingly."

Consider the following three well-known examples from the docket of the International Court of Justice. In 1984, Nicaragua filed a complaint against the United States alleging that the US had illegally mined Nicaraguan harbors and engaged in other acts of war. Although the US had accepted the jurisdiction of the Court, it did so with several reservations, one of which was applicable in the case.[10] Nonetheless, the court ruled that it did in fact have jurisdiction under customary law—a startling claim to legal scholars at the time.[11] The *South West Africa* case illustrates a similar point with an opposite result. In 1960, Ethiopia and Liberia filed cases with the ICJ alleging that South Africa had violated its UN mandate over

[8] For a more extensive introduction to these three classes of rulings, see Brownlie (1998, 479-510, 713-725).

[9] For example, see White (1999).

[10] The US recognized ICJ jurisdiction for cases involving a multilateral agreement only if all other affected members of the agreement were also impleaded. The US argued that jurisdiction did not exist for this dispute because the Court excluded El Salvador, an affected party under the agreement in dispute, from the proceedings. See *Case Concerning Military and Paramilitary Activities in and Against Nicaragua* (Nicaragua v. United States of America), Order of 4 October 1984.

[11] For example, see D'Amato (1987).

the South West Africa territory by introducing a policy of apartheid. The court dismissed the case in 1966, stating that Ethiopia and Liberia had no "legal right or interest in the subject-matter,"[12] an unexpected *volte-face* in light of the Court's earlier 1962 ruling stating that it *did* have jurisdiction in this case.(Janis, 1987, 144).[13] Finally, consider the lawsuit brought by the Republic of Cameroon against the United Kingdom in 1961. Cameroon alleged that the United Kingdom had violated its duties under a UN Trusteeship Agreement as an Administering Authority for the Northern Cameroons territory. Shortly after the lawsuit was filed, Northern Cameroons joined the independent state of Nigeria and the relevant trusteeship agreement was dissolved. The Court refused to hear the case, claiming that ruling on the merits would violate judicial propriety: since the relevant agreement was no longer in effect, any ruling "would be inconsistent with [the Court's] judicial function" because its judgment would be "devoid of purpose."[14]

Enforcement

By "enforcement" we mean the imposition of costs/punishments on states that fail to carry out the court's rulings. As documented extensively in Fang (2006) and Paulson (2004), countries sometimes face meaningful costs from refusing to comply with an international court's judgments. The costs vary both in form and substance, and may have as their source international or domestic political pressures. The reaction to France's 1973 decision not to comply with an ICJ ruling on nuclear testing provides one example.[15] French noncompliance was highly criticized within international organizations and prompted formal opposition from governments all over the world (Trumbull, 1973). The French clergy attacked military policy, and British trade unions boycotted French goods (Lewis, 1973; Robertson, 1973). France bowed to the pressure and pledged to refrain from any future atmospheric nuclear tests, illustrating that even powerful states can find compliance to be less costly than defiance (Stiles, 2000).

Just as courts can vary in the extent of their jurisdiction, they can also vary in the extent

[12] *South West Africa Case* (Ethiopia v. South Africa; Liberia v. South Africa), Judgment of 18 July 1966, p. 51.
[13] Also see Pomerance (1999) and Falk (1967).
[14] *Ibid.*, pp. 37 and 38.
[15] *Nuclear Test Case*, Order on Interim Measures of Protection of 22 June 1973.

to which their rulings are enforced (Smith, 2000). While some adjudicatory bodies, such as the WTO/GATT dispute settlement mechanism (DSM), have well-established mechanisms of punishments for noncompliance (Rosendorff, 2005), other legal institutions, such as the ICJ, have relatively weak formal enforcement mechanisms. This variation in enforcement affects whether judicial decisions constrain disputants in future interactions, including bargaining that take place after a court has ruled, as in Johns (2008).[16]

In our model, the enforcement dimension of court strength operates through *post-adjudicative bargaining*. A finding of the court, while legally binding on the parties, rarely initiates complete compliance. Disputants will continue to negotiate with each other even after a finding of the international tribunal. However, the adjudicatory process changes the bargaining strengths of the parties, and the degree to which it does is our measure of the strength of the institution's enforcement regime. Consider the WTO's archetypal case: the 1995 dispute between the US and Venezuela regarding gasoline. In 1994, the US mandated restrictions on imported gasoline that it did not apply to domestically-refined gasoline. Venezuela argued before the DSM that this action violated the "national treatment" principle and could not be justified under exceptions to normal WTO rules for health and environmental conservation measures. The dispute panel agreed with Venezuela (and Brazil, which had joined the case). After the ruling, the United States reopened negotiations with Venezuela to find regulations that were mutually acceptable.[17] More generally, even if a finding of the appellate board of the DSM authorizes compensation or the suspension of concessions, the procedure encourages the reopening of negotiations to find mutually acceptable implementation strategies.

Similarly, many cases in which the International Court of Justice allocates an asset to a particular state result in subsequent negotiations in which the winner of the court's judgment makes concessions to the loser without either party being punished for deviating from the court's ruling. Many ICJ cases consist of two states making competing claims over which legal principles should hold in allocating ownership of an asset. Once the Court has ruled on such principles, the disputants must subsequently return to the bargaining table in order

[16] As emphasized in Johns (2008), this conceptualization of enforcement regimes corresponds to the concept of "obligation" identified in Goldstein et al. (2000) and Abbott et al. (2000).

[17] http://www.wto.int/english/thewto_e/whatis_e/tif_e/disp3_e.htm

to negotiate a final settlement.[18] Indeed, ICJ judgments often contain explicit provisions urging litigants to return to negotiations and reach a new settlement in accordance with the principles established by the Court.[19]

2 The Model

Primitives and structure

The model is an extension of Reinganum and Wilde (1986). There are two unitary-actor nation-states, a plaintiff (P) and a defendant (D). The defendant has taken some action such that ownership of an asset is in dispute. The value of the asset to the plaintiff and defendant, v_P and v_D, respectively, is common knowledge. The plaintiff possesses private information about the strength of his case regarding a legal right over the asset, denoted as his expected probability of success at trial $\pi \in [0, 1]$. The defendant does not know the strength of the plaintiff's case, but has prior beliefs that π is distributed with full support along the unit interval according to a density function f. Her expectation about the value of π based on her prior beliefs is denoted by: $E[\pi] \equiv \int_0^1 \pi f(\pi) d\pi$.

One way to interpret this information structure is that the action of the defendant has caused some damage or loss to the plaintiff and the actual value of the loss is known perfectly to the plaintiff who has filed the case, while the magnitude of this loss is less certain to the defendant. For institutions in which the plaintiff must prove a loss in order to prevail in litigation, the plaintiff will have an informational advantage. When the information is revealed, either in settlement negotiations or in court, this information affects the likelihood of the court finding in favor of the plaintiff. For example, consider a typical antidumping case at the WTO's DSM, where a country has raised a barrier to the imports from a trading partner - say the US on steel imports from Brazil and others. In order for a finding of a violation to be obtained, Brazil must show that its domestic steel industry has suffered injury as a result of the US's action.[20] Brazil is likely to be more aware of (or have better information

[18] E.g., *North Sea Continental Shelf*, Judgment on the Merits of 20 February 1969.

[19] E.g., *Case Concerning the Gabcikovo-Nagymaros Project*, Judgment on the Merits of 25 September 1997, para. 155 (2) (B).

[20] This is described as "nullification and impairment" of the concessions made in the GATT/WTO texts.

about) the political and economic costs of this reduction in its ability to export steel than is the US. Hence Brazil will have better information about the strength of its case than will the US.[21]

An alternative interpretation of the information structure is that while political elites of the defendant state may be aware of their own past transgressions, they may be uncertain about the plaintiff's ability to produce evidence in court of the illegality of past behavior. For example, the U.S. foreign policy and military elite surely possessed complete information about the extent of U.S. involvement in the Nicaraguan conflict in the 1980s. However, they were likely uncertain about the extent to which Nicaragua could produce compelling evidence to the ICJ in order to prove its allegations of the illegal use of force. As the recent controversial ICJ ruling on Bosnian allegations of genocide by Serbia illustrates, even cases with well-documented violations of international law can fall apart if the plaintiff is unable to meet the evidentiary demands of the Court.[22] As such, the model struture is compatible with many different interpretations of the uncertainty inherent in the legal process.

Figure 1 displays a game tree of the model. After the plaintiff privately learns the true value of π, he has the opportunity to demand a settlement from the defendant. This settlement consists of a division of the asset, where $s \in [0, 1]$ is the share of the asset that the plaintiff demands. The defendant must then decide whether or not to accept the plaintiff's demand. If she accepts, then the asset is divided according to the settlement demand and the dispute is resolved. In contrast, if the defendant rejects the plaintiff's settlement demand, the dispute is referred to the court.

[Insert Figure 1 here.]

Both players are uncertain about whether the court will be willing to rule on the mer-

[21] Article 3, para 8. of the Dispute Settlement Understanding actually explicity declares that when a case is filed, and an infringement is established, this is "considered prima facie to constitute a case of nullification or impairment. This means that there is normally a presumption that a breach of the rules has an adverse impact on other Members parties to that covered agreement, and in such cases, it shall be up to the Member against whom the complaint has been brought to rebut the charge." This suggests that the defendant is at a disadvantage, in that it may not have the necessary information at its disposal to make its case. The demands on the plaintiff to make its case are weaker.

[22] See *Application of the Convention on the Prevention and Punishment of the Crime of Genocide* (Bosnia and Herzegovina v. Serbia and Montenegro), Judgment on the Merits, 26 February 2007, and Simons (2007).

its, but have common beliefs about the probability that the court will issue such a ruling, denoted $q \in (0,1)$. If the case is dismissed on procedural grounds, then the court makes no determination regarding which player has a legal "right" to the asset. States then enter into a crisis bargaining game that can sometimes result in war. Our primary substantive interest is in pre-trial bargaining and litigation behavior, not crisis bargaining. As such, we model this crisis bargaining game in reduced form with the following parameter definitions (Banks, 1990). Let p denote the probability that war occurs in equilibrium of the subgame such that $p \in (0,1)$. If war occurs, let w denote the expected share of the asset secured by P in conflict such that $w \in [0,1]$, and ϵ denote the share of the asset that survives war (i.e. efficiency of fighting) such that $\epsilon \in (0,1)$. If war does not occur, let b denote the expected share of the asset secured by P in crisis negotiations such that $b \in [0,1]$. So while strengthening the Court has an impact on the likelihood of litigation, it can also affect the likelihood of war. Indeed, intuition might suggest that a stronger judicial institution means that conflict is less likely to take place over the disputed asset. Below we examine whether this intuition is consistent with equilibrium behavior in the game.

If the court asserts jurisdiction and is willing to issue a ruling on the merits, then the legal process is costly for both players, where the cost of litigation is denoted by $k > 0$. The plaintiff's legal right to the asset is upheld with probability π. Following the court's judgment on the merits, players have the opportunity to engage in post-adjudicative bargaining. Rather than explicitly modeling the post-adjudicative bargaining process, we present a general framework that is consistent with many different bargaining protocols. A bargaining outcome consists of a share of the asset $x \in [0,1]$ that the plaintiff receives, while the defendant receives the share $1-x$. Let $x = a$ if the plaintiff wins a ruling on the merits and $x = c$ if the defendant wins a ruling on the merits. Recall that $x = b$ if the case is dismissed by the court and a peaceful outcome is reached in the crisis bargaining subgame. We assume throughout that $a > b > c$, which ensures that successful litigation results in the winner of a court ruling on the merits having a privileged bargaining position.[23] While the plaintiff

[23]For example, Johns (2008) shows that if the Nash bargaining solution is adopted and losers of litigation are punished for engaging in conflict over the asset, it follows that $a > b > c$. Alternatively, we might assume that post-adjudicative bargaining has a protocol of take-it-or-leave-it offers or alternating offers where the winner of a

and defendant can differ in the value that they derive from possessing the asset (as reflected in the parameters v_P and v_D), both disputants prefer to secure as large a share of the asset as possible. So the plaintiff's value from its share of the asset is xv_P, while the defendant derives the value $(1-x)v_D$ from its complementary share of the asset.

The game structure ensures that the plaintiff's strategy is a mapping, $s : [0,1] \rightarrow [0,1]$, where $s(\pi)$ denotes a settlement demand conditional on π. The defendant's strategy is a mapping, $r : [0,1] \rightarrow [0,1]$, where $r(s)$ denotes the probability that an offer s will be rejected, which is equivalent to the probability that the case is referred to the court.[24] This means that the *ex ante* probability that a trial (on the merits) takes place in equilibrium is: $T^* \equiv q \int_0^1 r^*(s^*(\pi))f(\pi)d\pi$. Similarly, the *ex ante* probability that war takes place in equilibrium is: $W^* \equiv (1-q)p \int_0^1 r^*(s^*(\pi))f(\pi)d\pi$.

Before turning to the results, a few simplifying assumptions warrant further discussion. First, we assume that the probability that the court will rule on the merits of a given case is an exogenous parameter. In practice this parameter is certainly partly endogenous since states have the ability to craft the international agreements that are used as a basis for jurisdiction.[25] Nonetheless, there is always some residual uncertainty about the likelihood that a court will rule on a case, regardless of the strength of jurisdiction of the court, because challenges to admissibility and judicial propriety often rely on subjective interpretations of the facts of a given dispute.[26] Also, even if states possess the ability to manipulate the likelihood that a court will dismiss cases due to a lack of jurisdiction, we must first understand the implications of changing this parameter before we can examine the issue of manipulating jurisdiction. That is, in order to understand why states will agree to a particular level of jurisdiction (i.e. a

court ruling on the merits is given the role of first proposer, and either player is equally likely to be chosen as the first proposer when the case is dismissed by the court. This framework is also consistent with the assumption that $a > b > c$.

[24]Note that this element of the game form means that we are implicitly assuming that the plaintiff is always willing to initiate litigation when her settlement is rejected. This means that the cost of trial is sufficiently low that the threat of litigation is always credible. As such, we set aside issues stemming from the legal capacity of states (Busch, Reinhardt and Shaffer, 2007).

[25]Johns (2008) includes an extensive analysis of such endogenous jurisdiction.

[26]For example, an international court can rule a claim inadmissible if there is an excessive delay between the time of an alleged violation and the time at which a lawsuit is initiated. However, international law lacks firm guidelines regarding what constitutes an excessive delay (Brownlie, 1998, 506-507).

particular level of q), we must first understand the implications of changing the strength of the court's jurisdiction on the strategic behavior of states. Second, we also treat the strength of an institution's enforcement regime as exogenous. We do not endogenize the provision of enforcement of court judgments because the creation of endogenous enforcement regimes for international courts is addressed at length in Johns (2008) and because this is secondary to our key issue of interest, namely the effect of a given level of enforcement and jurisdiction on final outcomes and disputant behavior.

Equilibrium selection and characterization

The standard solution concept for games of this structure is the weak Perfect Bayesian Equilibrium (wPBE), which requires that: (1) each player's action at a particular decision-node is sequentially rational, given her beliefs at that decision-node and the strategies of the other players; and (2) beliefs are updated according to Bayes' rule and the strategy profile where possible. We begin by stating some general properties that must hold in any wPBE of the game.

Proposition 1. *In all wPBE equilibria of the game,*

- $r(s)$ *is weakly increasing in equilibrium demands, and* $r(s)$ *is strictly increasing in equilibrium demands when* $r(s) < 1$
- $s(\pi)$ *is weakly increasing in* π *anytime* $r(s) < 1$
- $r(s(\pi))$ *is weakly increasing in* π

The interpretation of the second part of this result is straightforward: as the strength of the plaintiff's case increases, his own expected utility from litigation increases while his opponent's expected utility from a trial decreases. This means that it is optimal for the plaintiff to demand a larger share of the asset in pre-trial negotiations as long as there is a positive probability that his demand will be accepted.[27] The first component of this result is less intuitive. Since higher settlement offers, s, indicate that the plaintiff has a stronger case, one might expect that the defendant is more likely to accept higher offers in order to

[27]Monotonicity of $s(\pi)$ need not follow if $r(s) = 1$ because the defendant is indifferent over all offers for which $r(s) = 1$.

avoid litigation. However, the probability that a trial takes place must be increasing in the size of the settlement offer in order for the plaintiff to have incentive to credibly convey the strength of his case. This serves to "discipline" the plaintiff and ensures that he does not have an incentive to raise his offer in an attempt to convince his opponent that his case is stronger than it is in reality.

To understand the intuition behind this latter result, suppose that the probability that the defendant rejects the offer (i.e. that litigation takes place) is *decreasing* in the settlement offer. Consider a plaintiff who has a relatively weak case. If he raises his settlement offer and "mimics" the behavior of a plaintiff with a stronger case, then the defendant will believe that the plaintiff's case is stronger that it is in reality. This in turn will mean both that costly litigation is less likely to occur and that the plaintiff can extract more when his settlement is accepted. Clearly, such a situation does not create incentives for the plaintiff to credibly reveal his private information: when the plaintiff has a relatively weak case, he will want to bluff and pretend that his case is stronger than it really is. So the defendant must reject higher offers with a higher probability in order to forestall this bluffing and ensure that the only plaintiffs who have an incentive to make large demands are those that really do have higher chances of winning the case. This leads to the third component of Proposition 1: stronger types are more likely to have their equilibrium offers rejected by the defendant.

These results hold for all possible weak Perfect Bayesian Equilibria. However, this solution concept places no restrictions on beliefs that are off of the equilibrium path-of-play. In what follows, we restrict attention to equilibria that satisfy the equilibrium refinement of "universal divinity" (Banks and Sobel, 1987). This criterion puts restrictions on out-of-equilibrium beliefs that are relatively unobjectionable. Suppose that the plaintiff makes an unexpected offer that is not chosen in a given strategy profile. What should the defendant believe about the strength of the plaintiff's case? Universal divinity requires that the defendant put positive weight only on those types of plaintiff who have the most to gain from the observed deviation. As such, this refinement takes explicit account of the strategic incentives of the plaintiff to deviate from a prescribed course of action.

Proposition 2. *The unique universally divine equilibrium that maximizes efficiency is as*

follows.

- *For sufficiently low litigation costs ($k \leq k'$) or high values of the asset ($v_D'' \leq v_D$),*[28] *there is fully separating behavior characterized by:*

$$s^*(\pi) = (1-q)[p(1-\epsilon+w\epsilon)+(1-p)b] + q\pi a + q(1-\pi)c + \frac{qk}{v_D} \text{ for all } \pi \in [0,1]$$

$$r^*(s) = \begin{cases} 0 & \text{if } s < s^*(\pi=0) \\ 1 - exp\left(-\frac{\Delta_\pi}{\Gamma}\right) & \text{if } s \in [s^*(\pi=0), s^*(\pi=1)] \\ 1 & \text{if } s > s^*(\pi=1) \end{cases}$$

where $\Delta_\pi = s(\pi) - s^*(\pi=0) = q\pi(a-c)$ *and* $\Gamma \equiv qk\left(\frac{1}{v_D}+\frac{1}{v_P}\right) + (1-q)p(1-\epsilon)$.

- *For sufficiently high litigation costs $k'' \leq k$ or low values of the asset $v_D \leq v_D'$,*[29] *there is pooling behavior characterized by $s^*(\pi) = 1$ for all $\pi \in [0,1]$, and $r^*(s=1) = 0$.*

- *For moderate litigation costs ($k \in (k', k'')$) or values of the asset ($v_D \in (v_D', v_D'')$), there is semi-separating behavior characterized by:*

$$s^*(\pi) = \begin{cases} (1-q)[p(1-\epsilon+w\epsilon)+(1-p)b] + q\pi a + q(1-\pi)c + \frac{qk}{v_D} \text{ for all } \pi \in [0,\hat{\pi}) \\ 1 \quad \text{for all } \pi \in [\hat{\pi},1] \end{cases}$$

$$r^*(s) = \begin{cases} 0 & \text{if } s < s(0) \\ 1 - exp\left(-\frac{\Delta_\pi}{\Gamma}\right) & \text{if } s \in [s(0), \hat{s}] \\ 1 & \text{if } s \in (\hat{s}, 1) \\ 1 - exp\left(-\frac{\Delta_{\hat{\pi}}}{\Gamma}\right)\left[\frac{\hat{s}v_P - R_P(\hat{\pi})}{v_P - R_P(\hat{\pi})}\right] & \text{if } s = 1 \end{cases}$$

where $\hat{s} = (1-q)[p(1-\epsilon+w\epsilon)+(1-p)b] + q\hat{\pi}a + q(1-\hat{\pi})c + \frac{qk}{v_D}$ *and* $R_P(\pi) = \{(1-q)[pw\epsilon+(1-p)b] + q\pi a + q(1-\pi)c\}\, v_P - qk$.

When there is a low cost court ($k \leq k'$) or the dispute takes place over a high value

[28] These are the values of k and v_D such that when the defendant knows that she is matched against the strongest possible type of the plaintiff ($\pi = 1$), the defendant will reject a demand of $s = 1$: $0 \leq (1-q)[p(1-w)\epsilon + (1-p)(1-b)]v_D + q(1-a)v_D - qk$. Critical values k' and v_D'' are explicitly characterized in the Appendix.

[29] These are the values of k and v_D such that the defendant would rather give up the asset completely than take the gamble of trial and war if there is no information revelation: $0 \geq (1-q)[p(1-w)\epsilon + (1-p)(1-b)]v_D + q(1-a)E[\pi]v_D + q(1-c)(1-E[\pi])v_D - qk$. Critical values k'' and v_D' are explicitly characterized in the Appendix.

asset ($v''_D \leq v_D$), fully separating behavior occurs. In a fully separating equilibrium, each type of the plaintiff makes a unique settlement demand, $s(\pi)$. Such a demand function is shown graphically in Panel (a) of Figure 2. After observing the plaintiff's demand, the defendant can perfectly infer the type of the plaintiff.[30] The plaintiff always chooses a demand that makes the defendant indifferent between accepting and rejecting his offer, given the information that his demand reveals about his type. The structure of the game ensures that there are an infinite number of rejection functions, $r(s)$, that are consistent with equilibrium play. The defendant is indifferent over the choice of this function since in equilibrium he is indifferent between accepting and rejecting the plaintiff's demand. However, both joint and individual welfare of the players are maximized for the choice of $r(s)$ that minimizes the overall probability of rejection.[31] This is the strategy characterized above, which minimizes the probabilities of both trial and war.

[Insert Figure 2 here.]

In contrast, when the cost of litigation is sufficiently large ($k'' \leq k$) or the defendant places relatively low value on the asset ($v_D \leq v'_D$), there exists a pooling equilibrium in which the plaintiff always demands full ownership of the asset ($s = 1$) and this offer is always accepted. The defendant would rather completely give up the asset than take the gamble of incurring litigation or war costs in order to maintain her control over the asset. The defendant learns no information about the type of her opponent in this equilibrium because all types of the plaintiff behave in the same way and the dispute never proceeds to trial.

Finally, for moderate costs of litigation ($k \in (k', k'')$) or values of the asset ($v_D \in (v'_D, v''_D)$), a semi-separating equilibrium exists. In this equilibrium, strong types of the plaintiff are able to demand full control over the asset ($s = 1$), and this offer is accepted with positive probability. However, lower types of the plaintiff continue to engage in separating behavior. This settlement demand strategy is displayed in Panel (b) of Figure 2. Some (but

[30] If the defendant observes a large out-of-equilibrium demand, universal divinity requires that she believes that it was made by the strongest type $\pi = 1$; if the defendant observes a low out-of-equilibrium demand, universal divinity ensures that she believes that it was made by the lowest type, $\pi = 0$.

[31] As such, the equilibrium above is both classically and Pareto efficient, given individual strategic behavior and the equilibrium solution concept.

not all) information is revealed in this equilibrium: if the plaintiff is a low type $\pi < \hat{\pi}$ then the defendant perfectly learns his type; however, if the plaintiff is a high type $\pi \geq \hat{\pi}$ then the defendant can infer that $\pi \in [\hat{\pi}, 1]$, but never learns the precise type of her opponent.

Information revelation

Note that the efficiency-loss from litigation and war is lowest when *no* information is revealed in equilibrium. This challenges conventional accounts of the value of international organizations as information-providers (Keohane, 1984). Increasing q means that conditional on a given offer being rejected, the court is more likely to adjudicate the dispute. Since the court's ruling on the merits is a function of the legal claims of the disputants, a naive view of the court might suggest that states can learn more about the strength of legal claims by increasing the ability of the court to assert jurisdiction and issue rulings on the merits. However, this view doesn't take into account the strategic dynamics of pre-trial negotiations. For parameter regions in which full separation occurs, strengthening the court's jurisdiction has no effect on information-provision because all private information is fully revealed before the court is even used. Similarly, for parameter regions in which there is pooling behavior, no information is revealed in pre-trial bargaining. For parameters for which semi-separation occurs, increasing the court's jurisdiction means that the plaintiff has increased incentive to signal that he is a high type by demanding full control over the asset ($s = 1$). This in turn means that less information is revealed in pre-trial negotiations as jurisdiction is strengthened since fewer types adopt a separating strategy.

Proposition 3. *The amount of information revealed in pre-trial bargaining in equilibrium is decreasing in the strength of jurisdiction (q).*[32]

Trial and war incidence

We now consider the effect of changes in the exogenous parameters of the game on the likelihood that trial and war occur. International courts are likely to be venues where disputes over substantial issues are brought. Moreover, these courts are more likely to be used both when costs of litigation are low enough relative to the expected benefits of litigation and when these costs are lower than the costs of using alternative strategies for settling disputes.

[32]This result always holds weakly. The result holds strictly when $k \in [k', k'']$.

We therefore restrict attention to parameter regions in which the costs of using the court are relatively low ($k \leq k'$) or the issue at hand is substantially salient or valuable ($v_D'' \leq v_D$). This permits us to examine comparative statics on the fully separating equilibrium behavior.

We can now consider the effect of enforcement regimes on the likelihood that settlements are reached "in the shadow of the court." While enforcement of court judgments is not explicitly characterized in this model structure, note that the post-adjudicative bargaining outcomes implicitly capture the strength of the court's enforcement regime. When a increases, the plaintiff derives greater benefit from prevailing in a judgment on the merits of the case and the defendant pays more dearly. Similarly, when c decreases, the plaintiff suffers increased harm from losing a judgment on the merits and the defendant's payoff from successful litigation increases. Such changes implicitly capture the strengthening of an enforcement regime since higher punishments for noncompliance with a court ruling on the merits serve to increase the post-adjudicative bargaining power of the winner of litigation (Johns, 2008). So an increase in the strength of the court's enforcement regime corresponds to an increase in the quantity $a - c$. For example, in a perfect enforcement regime, in which court judgments are always implemented fully, litigation would be a "winner-takes-all" system in which $a - c = 1$. In contrast, when there is imperfect enforcement of the court's ruling, the winner of the court's ruling should still derive some advantage in post-adjudicative bargaining, but she may need to surrender part of the asset in order to ensure compliance; that is, $0 < a - c < 1$. Regardless of the specific strength of the enforcement regime, the following results hold.

Proposition 4. *For a low cost court or a dispute over a high value asset, as the plaintiff's share after winning a court judgment (a) increases, the probabilities that a settlement demand is rejected, a trial takes place, or war occurs in equilibrium all increase. As the plaintiff's share after losing a court judgment (c) increases, the probabilities that a settlement demand is rejected, a trial takes place, or war occurs in equilibrium all decrease.*

So the probabilities of litigation and war are increasing in a and decreasing in c. As the strength of the court's enforcement regime increases, the quantity $a - c$ grows, which in turn means that both litigation and war are more likely to occur. So the prospect of strong enforcement of court judgments does not encourage pre-litigation settlement: it makes players

more willing to bear the costs of litigation and war.

Corollary 1. *For a low cost court or a dispute over a high value asset, as enforcement $(a-c)$ increases, the probabilities that a settlement demand is rejected, a trial takes place, or war occurs in equilibrium all increase.*

The key factor driving this result is that increasing the level of enforcement magnifies the variation in settlements that are offered by the plaintiff.[33] This increases the temptation of a relatively weak plaintiff to mimic the behavior of a stronger type. In order for the plaintiff to credibly reveal his private information via his settlement demand, the defendant must impose more discipline by increasing the likelihood that a given offer will be rejected. This in turn increases the probabilities of war and trial in equilibrium. In effect, the level of enforcement $(a - c)$ affects the degree to which the players care about the strength of their legal claims. When $a - c$ is small, π is not very important to the disputants' welfare because whether the plaintiff wins or loses the case on the merits has little impact on the final post-adjudication bargaining outcome. When $a - c$ is large, π becomes more important to the disputants' welfare because winning or losing a trial on the merits can have a substantial impact on final allocations. So increasing enforcement serves to magnify the impact of incomplete information over π.

A similar mechanism is at work with regard to changes in the jurisdiction of the court. However, the impact of the court's jurisdiction on the probability of war is more nuanced.

Proposition 5. *For a low cost court or a dispute over a high value asset, an increase in jurisdiction (q):*

- *raises the probability that the defendant will reject a given settlement offer,*
- *raises the overall probability that a trial takes place, and*
- *raises the probability of war for low levels of q, and lowers the probability of war for high levels of q.*

Strengthening the jurisdiction of a court (by increasing the value of q) magnifies the variation in settlements that are offered by the plaintiff. This in turn increases the need for

[33] To see this, note that $\Delta_\pi = s^*(\pi) - s^*(\pi = 0) = q\pi(a - c)$ for all π.

the defendant to "discipline" the plaintiff by raising the probability that all offers will be rejected. So as Proposition 5 highlights, increasing the jurisdiction of an adjudicatory body over disputes involving high-value assets unambiguously decreases the probability that two disputants will settle out of court and increases the probability that a trial will take place.

However, the impact of the court's jurisdiction on the probability of war in equilibrium is more subtle. As shown in Figure 3, when the court has no jurisdiction ($q = 0$) or absolute jurisdiction ($q = 1$) war never occurs in equilibrium.[34] Increasing q means that *conditional on a given offer being rejected*, the dispute is less likely to escalate to war. However, increasing q also makes the defendant more likely to reject initial settlement demands, thereby opening the door to the possibility of subsequent conflict. When the court is relatively weak (i.e. has a low value of q), the latter effect dominates the former, meaning that strengthening the Court's jurisdiction increases the probability that war takes place. When the court is relatively strong (i.e. has a high value of q), the former effect outweighs the latter and strengthening the court's basis for jurisdiction makes war less likely. This non-monotonicity is displayed in Figure 3.

[Insert Figure 3 here.]

Our key substantive interest lies in examining the impact of Court strength on the incidence of trial and war over high-valued assets. Nevertheless, we briefly consider some ancillary analytical results that support the appropriateness of our modeling framework.

Proposition 6. *For a low cost court or a dispute over a high value asset, as litigation becomes more costly (i.e. k increases) or war becomes more destructive (i.e. ϵ decreases):*

- *settlement offers increase, and*
- *the probability that a given settlement demand is rejected, trial takes place, or war occurs in equilibrium all decreases.*

Increases in litigation costs or war destructiveness allow the plaintiff to demand more in pre-litigation settlements and these higher settlement demands are more likely to be accepted

[34] This is easily verified using the equations for W^* and $r^*(s^*(\pi))$ provided in Proposition 2.

by the defendant. This is ensured by the sequential structure of the game. When k increases or ϵ decreases, the range of settlements that the defendant would prefer as an alternative to the lottery over litigation and war expands for every possible value of π. Even though full separation continues to occur and the defendant is still able to infer the strength of the plaintiff's case based on her settlement offer, the plaintiff is able to demand more and knows that these demands will be accepted with a higher probability than if litigation costs were lower or war were less destructive.

Similarly, since conflict is costly because a share of the asset is destroyed in fighting, increasing the likelihood of war in the crisis bargaining subgame (by increasing the parameter p) reduces the defendant's expected utility from rejecting a given settlement demand. This in turn reduces the likelihood of trial. However, the impact of increases in p on deterring the defendant from rejecting demands is not sufficient to outweigh the increased likelihood of war when the states reach the crisis bargaining subgame. So the overall probability of war in equilibrium is increasing in the value of p. This is established by the next result.

Proposition 7. *For a low cost court or a dispute over a high value asset, as the likelihood of war in the crisis bargaining subgame (p) increases,*

- *the probability that a settlement demand is rejected or a trial takes place decrease, and*
- *the probability of war in equilibrium increases.*

These results on the impact of changes in the cost of litigation (k), the destructiveness of war (ϵ), and the likelihood of war in the crisis bargaining subgame (p) are all fairly intuitive. This suggests that the model framework we have chosen is appropriate for examining our key interest: the effect of the strength of jurisdiction and enforcement on the likelihood that states will engage in conflict and litigation over high-valued assets.[35]

In sum, the model leads to the conclusion that strengthening international courts that are either low in cost or adjudicate disputes over high value assets exacerbates the effect of the disputants' asymmetric information regarding the quality of the plaintiff's legal claim. If the court has weak jurisdiction or if its rulings do not appreciably change the bargain-

[35]Comparative statics results for w and b are available in the Technical Appendix for interested readers.

ing outcomes between the disputants, then the plaintiff's private information is irrelevant. Asymmetric information about the validity of legal claims is important only when the court has an impact on the final outcome. Strong courts magnify the importance of a source of asymmetric information (namely over the validity of the disputants' legal claims) that would otherwise be irrelevant. It is this added source of asymmetric information that reduces the probability that the states will settle their dispute without resorting to costly litigation. This means that increasing the jurisdiction or enforcement powers of international courts unambiguously increases the likelihood that states will engage in litigation, rather than reaching a negotiated settlement in pre-trial negotiations. Similarly, increasing the enforcement of court rulings indirectly increases the probability that states will engage in conflict over the disputed asset. The prospect of stronger enforcement means that states are more likely to engage in "brinksmanship"-like behavior over high value assets that can lead to crisis bargaining if the court refuses to intervene. Results regarding the impact of jurisdiction on the probability of war are non-monotonic. When the court is a relatively weak institution (i.e. has a low value of q), strengthening its jurisdiction can lead to increased conflict. However, if the court is a relatively strong institution (i.e. has a high value of q), strengthening its jurisdiction further reduces the likelihood of war in equilibrium.

3 Empirical Discussion

In this section we probe the plausibility of the key comparative statics of the model. First, we examine cases filed in the International Court of Justice in order to analyze the correlation between the likelihood that the court will rule on the merits and the likelihood that cases are settled prior to court judgments. We then turn to establishing the hypothesized correlation between strength of enforcement and the probability of litigation by examining the empirical work of Allee and Huth (2006). We emphasize at the outset that given the difficulties of measuring both of these concepts, we do not claim that these empirical results are proper and systematic tests of the model. Rather, they are meant to explore the plausibility of the theoretical findings.

Strength of jurisdiction (q) and early settlement

We examine whether cases for which the Court has a stronger basis for jurisdiction (i.e. a higher value of q) are less likely to settle and more likely to proceed fully through the legal process. Note that while the model above was framed in terms of settlements offered prior to litigation, the analysis above is equivalent to a model in which a case has already been filed (resulting in sunk costs for one or both parties) and the plaintiff and defendant are deciding whether to settle their case or continue on with costly litigation. While we believe that individual ICJ disputants possess common *ex ante* beliefs that the Court will be willing to rule on the merits (q), these beliefs are not directly observable and any attempt to systematically code such beliefs would likely be biased by the analyst's *ex post* knowledge about how the Court ruled in matters of admissibility, jurisdiction, and judicial propriety. As such, we use two different proxies for the likelihood that the Court will rule on the merits: types of jurisdictional claims and challenges to jurisdiction and/or admissibility.

We begin by examining the difference in litigation behavior across two different categories of jurisdictional claims. There are three main ways for jurisdiction of the ICJ to be established in a dispute. First, two disputants can write a special agreement in which they jointly establish the authority of the Court to hear a particular dispute. Second, a country can make a unilateral declaration accepting jurisdiction of the Court under Article 36 (2) of the ICJ (also known as the "Optional Clause"). If both disputants have made such declarations, an appeal to the Court is possible. Finally, international treaties often contain provisions known as compromissory clauses, which establish the authority of the Court to resolve disputes arising from the interpretation and/or application of the treaty. When cases are filed on the basis of a special agreement, both disputants have explicitly agreed to give the Court jurisdiction over the case.[36] While the Court can still decline to rule on the merits on the basis of judicial propriety, it is difficult for the Court to dismiss the claim on grounds of lack of jurisdiction or inadmissibility. So the probability that the Court will rule on the

[36] A similar situation arises when a case is filed under Article 38 (5) of the Rules of the Court, in which an applicant invites a respondent to establish jurisdiction for a particular dispute, but no formal special agreement is drafted by the parties. There are no such cases in the data: there are no closed cases in which jurisdiction was established this way, and we exclude unreciprocated invitations since it is clear that $q = 0$ and no court proceedings take place for such disputes.

merits is high, but still less than one. In contrast, when cases are filed on the basis of a compromissory clause or the Optional Clause, there is greater ambiguity about whether the Court will rule on the merits. Countries often challenge jurisdiction of such cases by arguing that either the particular dispute does not fall under the purview of the treaty cited as a basis of jurisdiction, or their unilateral declaration was subject to reservations that destroy the Court's basis of authority, as in the *Nicaragua* case discussed above. The probability that the Court will ultimately rule on the merits is lower when cases are not filed under special agreements because there is more ambiguity about whether jurisdiction does in fact exist.

Table 1 contains descriptive statics of cases filed in the ICJ.[37] While the Court has heard 83 closed cases in its history, only 64 of them have actually completed the legal process, with 27 cases dismissed on the grounds of lack of jurisdiction, inadmissibility, or lack of judicial propriety, and 37 cases decided on the merits. The remaining 19 cases were settled by the disputants and withdrawn from the Court's docket.[38] Of these 83 total cases, 15 were filed under special agreements, while 68 were filed under either compromissory clauses or the Optional Clause. Since we argue that cases filed under special agreements have a lower *ex ante* probability of being dismissed by the Court (i.e. a higher value of q), the model predicts that such cases should be less likely to be settled and withdrawn from the Court's docket than cases filed under another basis of jurisdiction. Indeed, all 15 cases filed under special agreements were resolved via legal rulings on the merits and were not settled by the litigants. In contrast, 19 of the 68 cases filed under another basis of jurisdiction were settled and withdrawn by the disputants. Table 2 shows that this difference is statistically significant: there is a strong negative correlation between special agreement status and the probability that the cases will be settled prior to a trial. This relationship is significant at the 0.02 level.

[Insert Tables 1 and 2 here.]

We also compare cases in which the defendant has chosen to raise challenges to jurisdiction and/or admissibility with cases in which it has not raised such challenges. In the latter, disputants have tacitly consented to the jurisdiction of the Court and admissibility of the

[37] Data was compiled from Gill (2003) and ICJ records. Data and codebook are available upon request.
[38] In such cases, the Court issues a formal order of discontinuance at the request of the parties.

claims. While the case can still be dismissed on procedural grounds, the Court is much less likely to do so if the defendant does not raise such claims himself. As shown in Table 1, 56 of the 83 total closed cases resulted in challenges to jurisdictional or admissibility. The last two columns of Table 2 show that there is a strong negative correlation between the absence of a jurisdictional challenge and the probability that the disputants will settle. The p-value on the χ^2-test is zero to three decimal places.[39] Once again, this provides strong support for the plausibility of the model.

Strength of enforcement $(a - c)$ and early settlement

Rather than focusing on cases that have already been filed, Allee and Huth (2006) conduct empirical analysis of the initial decision about whether to initiate adjudication, as opposed to continuing existing bilateral negotiations. Because of the difficulty of systematically examining all latent cases—i.e. disputes that could potentially be submitted to the court, but were not—they restrict attention to the analysis of territorial disputes in which active negotiations took place. In accordance with their theoretical mechanism of enforcement of court judgments via domestic audience costs, they measure the impact of the strength of domestic political opposition, democratic accountability, ethnic ties, and enduring rivalry on the likelihood that litigation is initiated by the disputants. They argue that increases in each of these factors corresponds to an increase in the expected enforcement of court judgments by domestic constituencies. They find strong support for our analytical result that an increase in the enforcement of court judgments corresponds to an increase in the likelihood that cases will be submitted to the court, rather than resolved through bilateral negotiations. While further empirical testing of a more comprehensive set of disputes is necessary in order to fully evaluate the theoretical framework, the work of Allee and Huth (2006) suggests the initial plausibility of our arguments.

[39]Note that six cases are missing from this calculation in Table 2. These are cases that were withdrawn before the defendant had the opportunity to challenge jurisdiction and admissibility. In effect, these are censored cases because we do not observe whether disputants would have challenged the jurisdiction of the court had the case proceeded to that state.

4 Conclusion

The importance of law and legal approaches to international dispute settlement is evident by the wide variety of international legal fora available for disputing states. International institutions that formerly took a diplomatic, negotiating track to solve conflicts are now relying more on legal, adjudicatory processes. Moreover, these institutions exhibit wide variation in their structure and use, varying from "hard" to "soft," from the more legalistic to the more politically and diplomatically driven (Smith, 2000). This paper addresses the effects of jurisdiction, strength of enforcement, and asymmetric information on the likelihood of pre-adjudicatory settlement and on the incidence of litigation and war. Both increased jurisdiction and increased strength of enforcement increase the likelihood that settlement offers are rejected and costly litigation ensues. Similarly, increasing the enforcement of court rulings unambiguously increases the probability that war takes place in equilibrium. However, the effect of the court's strength of jurisdiction on the likelihood of war is more subtle. When the court is a relatively weak institution (i.e. has a low value of q), strengthening its jurisdiction can lead to increased conflict. In contrast, if the court is a relatively strong institution (i.e. has a high value of q), strengthening its jurisdiction further reduces the likelihood of war in equilibrium. Additionally, increasing the court's jurisdiction has a deleterious effect on the incentive for states to reveal their private information: as the court grows stronger, less information is revealed in pre-trial negotiations.

Goldstein et al. (2000) characterize the level of international legalization along three dimensions: delegation, obligation, and precision. Delegation refers to the degree to which impartial third party bodies have been empowered to interpret rules, find facts, and judge state policy in the context of an international agreement. To some degree, this notion of delegation corresponds to our use of the term "jurisdiction" (q)—the degree to which the court in question has standing to adjudicate the dispute in question. Obligation refers to the degree to which states are bound by the rules. This corresponds to our notion of the "strength of enforcement" ($a - c$). Finally, precision refers to the degree of uncertainty that surrounds the rules. When precision is low, the rules permit a variation of interpretations, and this is

likely to create uncertainty about the strength of a plaintiff's case, π. In such a case, we find that greater delegation (high q) and obligation (large $a-c$) decrease the likelihood of pre-trial settlement of disputes over high value assets. The implication is that greater delegation and obligation are best suited to bodies of law that are more precise. However, even when law is precise the disputants may still possess asymmetric information about the *facts* of a given case. Precise law can lessen but not eliminate asymmetric information about π and therefore greater delegation and obligation always have the potential of reducing the probability of pre-trial settlements and increasing the probability of costly litigation and war.

As international courts are endowed with increased authority, we should expect to see less settlement, more resources dissipated on litigation, and increased apparent conflict between states in these fora. Explorations of the outcomes at the International Court of Justice provide preliminary support for these claims. More detailed data collection and analysis is necessary, but in the cases where jurisdiction is well established, settlement is indeed less likely than in cases where jurisdiction is arguable. Additionally, Allee and Huth (2006) show that as the strength of enforcement increases, cases are more likely to be submitted to litigation. Preliminary analysis of available data lends plausibility to the results. States may still prefer to strengthen courts for other reasons—presumably international law is created in the first place to pursue particular normative ends, and the availability of strong legal fora for dispute resolution ensures that real-life outcomes can more closely resemble the outcomes prescribed by the law.[40] Nonetheless, the point of this paper is to show that such an institutional change comes at a cost.

[40]We thank Erik Voeten for highlighting this point in personal communications.

5 Appendix

For ease of analysis, define the constant: $V \equiv \frac{1}{v_D} + \frac{1}{v_P}$. For a demand $\hat{s}$, define the support of $\hat{s}$ as: $\sigma(\hat{s}) \equiv \{\pi \in [0,1] \mid s(\pi) = \hat{s}\}$. Then posterior beliefs are:

$$g(\pi|\hat{s}) = \frac{f(\pi)}{\int\limits_{\sigma(\hat{s})} f(\hat{\pi})d\hat{\pi}} \text{ for all } \pi \in \sigma(\hat{s}); \ = 0 \text{ for all } \pi \notin \sigma(\hat{s})$$

So the posterior expectation of π given a demand $\hat{s}$ is: $E[\pi|\hat{s}] \equiv \int\limits_0^1 \pi g(\pi|\hat{s})d\pi$. P's expected utility from rejection of her offer is: $R_P(\pi) = \{(1-q)[pw\epsilon + (1-p)b] + q\pi a + q(1-\pi)c\}\, v_P - qk$.

Proof of Proposition 1.

- Consider two settlement demands s' and s'' s.t. $s' < s''$. Suppose an equilibrium strategy profile in which $r(s') \geq r(s'')$. Consider a type $\pi' \in \sigma(s')$. He has no incentive to deviate to s'' iff: $r(s')R_P(\pi') + [1 - r(s')]s'v_P \geq r(s'')R_P(\pi') + [1 - r(s'')]s''v_P$. Individual rationality requires that $R_P(\pi') < s'$. So as long as $r(s'') < 1$, type π' has incentive to deviate from the equilibrium strategy profile. This is a contradiction.
- Consider $\pi' < \pi''$. Suppose $s(\pi') \equiv s' > s(\pi'') \equiv s''$. By definition of an equilibrium:

$$\begin{aligned} r(s')R_P(\pi') + [1 - r(s')]s'v_P &\geq r(s'')R_P(\pi') + [1 - r(s'')]s''v_P \\ r(s'')R_P(\pi'') + [1 - r(s'')]s''v_P &\geq r(s')R_P(\pi'') + [1 - r(s')]s'v_P \end{aligned}$$

  This system of IC constraints ensures that:

$$\begin{aligned} &\big\{r(s')R_P(\pi') + [1 - r(s')]s'v_P\big\} - \big\{r(s')R_P(\pi'') + [1 - r(s')]s'v_P\big\} \\ &\geq \big\{r(s'')R_P(\pi') + [1 - r(s'')]s''v_P\big\} - \big\{r(s'')R_P(\pi'') + [1 - r(s'')]s''v_P\big\} \\ &\Leftrightarrow [r(s') - r(s'')][R_P(\pi') - R_P(\pi'')] \geq 0 \end{aligned}$$

  Note that $R_P(\pi)$ is increasing in π, so the first part above means that the constraint can only hold if $r(s') = r(s'') = 1$ (in which case the choice of s' versus s'' is irrelevant

to P's utility). Otherwise, there is a contradiction.

- If $r(s(\pi)) < 1$ for all π, this follows directly from the first and second parts above. Suppose there exists at least one equilibrium demand s.t. $r(s(\pi)) = 1$. Choose arbitrary demands s' and s'' s.t. $r(s') < 1$ and $r(s'') = 1$. For any $\pi' \in \sigma(s')$ and $\pi'' \in \sigma(s'')$, by definition of an equilibrium:

$$r(s')R_P(\pi') + [1 - r(s')]s(\pi')v_P \geq R_P(\pi')$$
$$R_P(\pi'') \geq r(s')R_P(\pi'') + [1 - r(s')]s(\pi')v_P$$

This system of IC constraints ensures that:

$$\{r(s')R_P(\pi') + [1 - r(s')]s(\pi')v_P\} - \{r(s')R_P(\pi'') + [1 - r(s')]s(\pi')v_P\} \geq R_P(\pi') - R_P(\pi'')$$
$$\Leftrightarrow r(s')[R_P(\pi') - R_P(\pi'')] \geq R_P(\pi') - R_P(\pi'')$$

Since $r(s') < 1$, this can only be satisfied when $R_P(\pi') - R_P(\pi'') < 0$ which implies that $\pi' < \pi''$.

□

Proof of Proposition 2. We demonstrate existence. Full results on uniqueness and efficiency are available in a Technical Appendix, which is available from the authors. Note that:

$$\begin{aligned}
0 &\leq (1-q)[p(1-w)\epsilon + (1-p)(1-b)]v_D + q(1-a)v_D - qk \\
\Leftrightarrow k &\leq \frac{1-q}{q}[p(1-w)\epsilon + (1-p)(1-b)]v_D + (1-a)v_D \equiv k' \\
\Leftrightarrow v_D &\geq \frac{qk}{(1-q)[p(1-w)\epsilon + (1-p)(1-b)] + q(1-a)} \equiv v''_D \\
0 &\geq (1-q)[p(1-w)\epsilon + (1-p)(1-b)]v_D + q(1-a)E[\pi]v_D + q(1-c)(1-E[\pi])v_D - qk \\
\Leftrightarrow k &\geq \frac{1-q}{q}[p(1-w)\epsilon + (1-p)(1-b)]v_D + (1-a)E[\pi]v_D + (1-c)(1-E[\pi])v_D \equiv k'' \\
\Leftrightarrow v_D &\leq \frac{qk}{(1-q)[p(1-w)\epsilon + (1-p)(1-b)] + q(1-a)E[\pi] + q(1-c)(1-E[\pi])} \equiv v'_D
\end{aligned}$$

- *Case 1:* $k \leq k'$. In a fully separating equilibrium, each type π sends a unique message

$s(\pi)$, so posterior beliefs for equilibrium demands are degenerate: after observing a demand s, player D can perfectly infer the type of P. Universal divinity requires that: (1) conditional on observing an out-of-equilibrium demand $s' > s(\pi = 1)$, D believes his opponent is of type $\pi = 1$; and (2) conditional on observing an out-of-equilibrium demand $s'' < s(\pi = 0)$, D believes his opponent is of type $\pi = 0$. Then the defendant's expected utility from rejecting P's demand given his degenerate posterior beliefs about π is: $R_D(\pi)$. The defendant is indifferent between accepting and rejecting an offer if and only if:

$$s = (1-q)[p(1-\epsilon+w\epsilon)+(1-p)b] + q\pi a + q(1-\pi)c + \frac{qk}{v_D} \tag{1}$$

The defendant will strictly prefer to reject any offer larger than this value of s, and accept any offer less than this value. In order for the plaintiff to adopt a separating strategy, it must be the case that equation (1) holds for all offers made in equilibrium. The plaintiff's expected utility from an offer s is: $EU_P(s) = r(s)R_P(\pi) + [1-r(s)]sv_P$. This means that the optimal offer s must satisfy the following first-order condition:

$$s = (1-q)[pw\epsilon+(1-p)b] + q\pi a + q(1-\pi)c - \frac{qk}{v_P} + \frac{1-r(s)}{r'(s)} \tag{2}$$

Since both equations (1) and (2) must simultaneously hold in equilibrium:

$$-r'(s)\left[\frac{qk}{v_D} + \frac{qk}{v_P} + (1-q)p(1-\epsilon)\right] + 1 - r(s) = 0$$

So there exists a class of fully separating universally divine equilibrium strategies:

$$\begin{aligned} s^*(\pi) &= (1-q)[p(1-\epsilon+w\epsilon)+(1-p)b] + q\pi a + q(1-\pi)c + \frac{qk}{v_D} \text{ for all } \pi \in [0,1] \\ r^*(s) &= \begin{cases} 0 & \text{if } s < s^*(\pi=0) \\ 1 - exp\left(-\frac{s-\theta}{\Gamma}\right) & \text{if } s \in [s^*(\pi=0), s^*(\pi=1)] \\ 1 & \text{if } s > s^*(\pi=1) \end{cases} \end{aligned}$$

where $\Gamma \equiv qkV + (1-q)p(1-\epsilon)$ and $\theta \leq s^*(\pi = 0)$.[41] The separating demand strategy is well-defined iff: $s(\pi = 1) \leq 1 \Leftrightarrow k \leq k'$

- *Case 2:* $k'' \leq k$. In any pooling equilibrium, settlement demands take the form $s(\pi) = s^P$ for all $\pi \in [0,1]$. So player D learns nothing about the type of his opponent after observing the demand s^P. Player D is willing to accept a pooling demand $s^P = 1$ iff:

$$\begin{aligned} 0 \quad &\geq \quad (1-q)[p(1-w\epsilon) + (1-p)(1-b)]v_D + q(1-a)E[\pi]v_D \\ &\quad +q(1-c)(1-E[\pi])v_D - qk \quad \Leftrightarrow \quad k'' \leq k \end{aligned}$$

Since all types of P achieve their maximum possible payoff of v_P from this strategy profile, there is never incentive for any type to deviate.

- *Case 3:* $k \in (k', k'')$. After observing a demand of $s = 1$ sent by types $\pi \in [\hat{\pi}, 1]$ for $\hat{\pi} \in (0,1)$, D is indifferent between accepting and rejecting iff:

$$\begin{aligned} 0 \quad &= \quad \int_0^1 \{(1-q)[p(1-w)\epsilon + (1-p)(1-b)]v_D + q\pi(1-a)v_D \\ &\qquad +q(1-\pi)(1-c)v_D - qk\}\, g(\pi|s=1)d\pi \\ \Leftrightarrow 0 \quad &= \quad \frac{(1-q)[p(1-w)\epsilon + (1-p)(1-b)]v_D + q(1-c)v_D - qk}{q(a-c)v_D} - \left[\frac{\int_{\hat{\pi}}^1 \pi f(\pi)d\pi}{1-F(\hat{\pi})}\right] \equiv \Psi \end{aligned}$$

Note that:

$$\begin{aligned} \frac{\partial \Psi}{\partial \hat{\pi}} \quad &= \quad -\frac{\partial}{\partial \hat{\pi}}\left[\frac{\int_{\hat{\pi}}^1 \pi f(\pi)d\pi}{1-F(\hat{\pi})}\right] = \frac{\hat{\pi}f(\hat{\pi})[1-F(\hat{\pi})] - f(\hat{\pi})\int_{\hat{\pi}}^1 \pi f(\pi)d\pi}{[1-F(\hat{\pi})]^2} \\ &= \quad \frac{f(\hat{\pi})}{[1-F(\hat{\pi})]^2}\int_{\hat{\pi}}^1 (\hat{\pi} - \pi)f(\pi)d\pi < 0 \\ \Psi(\hat{\pi} = 0) \quad &= \quad \frac{(1-q)[p(1-w)\epsilon + (1-p)(1-b)]v_D + q(1-c)v_D - qk}{q(a-c)v_D} - E[\pi] > 0 \end{aligned}$$

[41] The choice of $\theta = s^*(\pi = 0)$ on efficiency grounds is justified in the Technical Appendix.

$$\begin{aligned}
&\Leftrightarrow \quad (1-q)[p(1-w)\epsilon + (1-p)(1-b)]v_D + q(1-c)v_D - qk \\
&\qquad\qquad - E[\pi]q(a-c)v_D > 0 \quad \Leftrightarrow \quad k < k'' \\
\Psi(\hat{\pi}=1) \quad &= \quad (1-q)[p(1-w)\epsilon + (1-p)(1-b)]v_D + q(1-a)v_D - qk < 0 \Leftrightarrow k' < k
\end{aligned}$$

So monotonicity of Ψ in $\hat{\pi}$ ensures that for any set of parameters satisfying $k \in (k', k'')$, there exists a unique value of $\hat{\pi} \in (0,1)$ such that $\Psi(\hat{\pi}) = 0$. By the derivations above, full separation for the interval $\pi \in [0, \hat{\pi})$ requires that:

$$\begin{aligned}
s^*(\pi) \quad &= \quad (1-q)[p(1-\epsilon+w\epsilon) + (1-p)b] + q\pi a + q(1-\pi)c + \frac{qk}{v_D} \text{ for all } \pi \in [0, \hat{\pi}) \\
r^*(s) \quad &= \quad 1 - exp\left(-\frac{s-\sigma}{\Gamma}\right) \text{ for all } s \in [s^*(0), s^*(\hat{\pi})) \text{ where } \sigma \leq s^*(\pi=0)
\end{aligned}$$

By definition of $\hat{\pi}$ and the fact that $\hat{\pi} < \int_0^1 \pi g(\pi|s=1)d\pi$:

$$\begin{aligned}
0 \quad &= \quad (1-q)[p(1-w)\epsilon + (1-p)(1-b)]v_D + q(1-c)v_D - qk \\
&\qquad\qquad - q(a-c)v_D \int_0^1 \pi g(\pi|s=1)d\pi \\
&< \quad (1-q)[p(1-w)\epsilon + (1-p)(1-b)]v_D + q(1-c)v_D - qk - q(a-c)\hat{\pi}v_D \\
\Leftrightarrow \hat{s} \quad &= \quad (1-q)[p(1-\epsilon+w\epsilon) + (1-p)b] + q\hat{\pi}a + q(1-\hat{\pi})c + \frac{qk}{v_D} < 1
\end{aligned}$$

So there exists an interval of messages $[\hat{s}, 1)$ that are not sent in equilibrium. Universal divinity requires that conditional on observing such a message, D believes that P is of type $\hat{\pi}$. This means that $r(s) = 1$ is D's best-response for off-the-eqm-path demands $s \in (\hat{s}, 1)$ and D is indifferent when she observes $s = \hat{s}$. Given the definition of $\hat{\pi}$, D is indifferent over the choice of $r(s=1)$. Player $\pi \in [\hat{\pi}, 1]$ has no incentive to deviate to $s(\pi')$ for $\pi' \in [0, \hat{\pi})$ iff:

$$\begin{aligned}
&r(s=1)R_P(\pi) + [1 - r(s=1)]v_P \geq r(s(\pi'))R_P(\pi) + [1 - r(s(\pi'))]s(\pi')v_P \\
\Leftrightarrow\ &R_P(\pi)[r(s=1) - r(s(\pi'))] - [1 - r(s(\pi'))]s(\pi')v_P + [1 - r(s=1)]v_P \geq 0
\end{aligned}$$

Since $r(s=1) - r(s(\pi')) > 0$ in equilibrium, the temptation to deviate is largest for $\hat{\pi}$.

Continuity of the type space ensures that in order for this equilibrium to hold, player $\hat{\pi}$ must be indifferent between demanding $s = 1$ and playing according to the separating strategy. This is true iff:

$$r(s=1)R_P(\hat{\pi}) + [1 - r(s=1)]v_P = \left[1 - exp\left(-\tfrac{\hat{s}-\sigma}{\Gamma}\right)\right] R_P(\hat{\pi}) + exp\left(-\tfrac{\hat{s}-\sigma}{\Gamma}\right)\hat{s}v_P$$
$$\Leftrightarrow r(s=1)[v_P - R_P(\hat{\pi})] = v_P - R_P(\pi) - exp\left(-\tfrac{\hat{s}-\sigma}{\Gamma}\right)[\hat{s}v_P - R_P(\hat{\pi})]$$
$$\Leftrightarrow r(s=1) = 1 - exp\left(-\tfrac{\hat{s}-\sigma}{\Gamma}\right)\tfrac{\hat{s}v_P - R_P(\hat{\pi})}{v_P - R_P(\hat{\pi})} \in (0,1)$$

For such values of $r(s = 1)$, no type $\pi \in [\hat{\pi}, 1]$ has incentive to deviate from $s = 1$ to another on-the-eqm-path-demand. Indifference of $\hat{\pi}$ for this value of $r(s = 1)$ ensures that no type $\pi \in [0, \hat{\pi})$ has incentive to deviate to $s = 1$.

□

Proof of Proposition 3. Suppose $k < k'$ or $k'' < k$. Then full separation and pooling occur, respectively. Suppose $k \in (k', k'')$. Then by the Proof of Proposition 2, there exists a value $\hat{\pi} \in (0, 1)$ such that $\Psi(\hat{\pi}) = 0$. By the implicit function theorem:

$$\frac{\partial \hat{\pi}}{\partial q} = -\frac{\frac{\partial \Psi}{\partial q}}{\frac{\partial \Psi}{\partial \hat{\pi}}} \quad \text{where} \quad \frac{\partial \Psi}{\partial \hat{\pi}} = \frac{f(\hat{\pi})}{[1 - F(\hat{\pi})]^2}\int_{\hat{\pi}}^{1}(\hat{\pi} - \pi)f(\pi)d\pi < 0$$
$$\frac{\partial \Psi}{\partial q} = -\left[\frac{p(1-w)\epsilon + (1-p)(1-b)}{q^2(a-c)}\right] < 0 \;\Rightarrow\; \frac{\partial \hat{\pi}}{\partial q} < 0$$

Suppose $k = k'$. Then $\Psi(\hat{\pi} = 1) = 0$. So an increase in q yields a continuous change from the fully separating equilibrium to a semi-separating equilibrium. Suppose $k = k''$. Then $\Psi(\hat{\pi} = 0) = 0$. So an increase in q yields a continuous change from the semi-separating equilibrium to a pooling equilibrium. □

Proof of Proposition 4.

$$\frac{\partial r^*(s^*(\pi))}{\partial a} = \frac{\partial}{\partial a}\left\{1 - exp\left(-\frac{\Delta_x}{\Gamma}\right)\right\} = exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left[\frac{q\pi}{\Gamma}\right]$$
$$\Rightarrow \quad \frac{\partial r^*(s^*(\pi))}{\partial a} > 0 \text{ if } \pi > 0, \text{ and } \frac{\partial r^*(s^*(\pi))}{\partial a} = 0 \text{ if } \pi = 0$$

$$
\begin{aligned}
&\Rightarrow \quad \frac{\partial T^*}{\partial a} > 0 \text{ and } \frac{\partial W^*}{\partial a} > 0 \\
\frac{\partial r^*(s^*(\pi))}{\partial c} &= \frac{\partial}{\partial c}\left\{1 - exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\right\} = exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left[\frac{-q\pi}{\Gamma}\right] \\
&\Rightarrow \quad \frac{\partial r^*(s^*(\pi))}{\partial c} < 0 \text{ if } \pi > 0, \text{ and } \frac{\partial r^*(s^*(\pi))}{\partial c} = 0 \text{ if } \pi = 0 \\
&\Rightarrow \quad \frac{\partial T^*}{\partial c} < 0 \text{ and } \frac{\partial W^*}{\partial c} < 0
\end{aligned}
$$

□

Proof of Corollary 1. Follows directly from Proposition 4. □

Proof of Proposition 5.

$$
\begin{aligned}
\frac{\partial r^*(s^*(\pi))}{\partial q} &= \frac{\partial}{\partial q}\left\{1 - exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\right\} = exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\frac{\partial}{\partial q}\left[\frac{q\pi(a-c)}{\Gamma}\right] \\
&= exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\frac{\pi(a-c)}{\Gamma^2}p(1-\epsilon) \\
&\Rightarrow \quad \frac{\partial r^*(s^*(\pi))}{\partial q} > 0 \text{ if } \pi > 0 \text{ and } \frac{\partial r^*(s^*(\pi))}{\partial q} = 0 \text{ if } \pi = 0 \;\Rightarrow\; \frac{\partial T^*}{\partial q} > 0 \\
\frac{\partial W^*}{\partial q} &= p\left[(1-q)\int_0^1 \frac{\partial r^*(s^*(\pi))}{\partial q} f(\pi)d\pi - \int_0^1 r^*(s^*(\pi))f(\pi)d\pi\right] \\
&= p\left[\int_0^1 exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left(\frac{\pi(a-c)p(1-q)(1-\epsilon)+\Gamma^2}{\Gamma^2}\right)f(\pi)d\pi - 1\right] \\
\Rightarrow \frac{\partial^2 W^*}{\partial q^2} &= p\int_0^1 \frac{\partial}{\partial q}\left[exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left(\frac{\pi(a-c)p(1-q)(1-\epsilon)}{\Gamma^2}+1\right)\right]f(\pi)d(\pi)
\end{aligned}
$$

Consider the integrand:

$$
\begin{aligned}
I(\pi,q) &\equiv exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left(\frac{\pi(a-c)p(1-q)(1-\epsilon)}{\Gamma^2}+1\right) \\
\Rightarrow \frac{\partial I(\pi,q)}{\partial q} &= exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left[\frac{-\Gamma^2\pi(a-c)p(1-\epsilon) - \pi(a-c)p(1-q)(1-\epsilon)2\Gamma\frac{\partial\Gamma}{\partial q}}{\Gamma^4}\right] \\
&\quad + \left[\frac{\pi(a-c)p(1-q)(1-\epsilon)}{\Gamma^2}+1\right]exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left(-\frac{\Gamma\pi(a-c) - q\pi(a-c)\frac{\partial\Gamma}{\partial q}}{\Gamma^2}\right) \\
&= exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\frac{\pi(a-c)}{\Gamma^4}\left\{\left[q\frac{\partial\Gamma}{\partial q} - \Gamma\right]\left[\pi(a-c)p(1-q)(1-\epsilon)+\Gamma^2\right]\right. \\
&\qquad \left. - \Gamma^2 p(1-\epsilon) - p(1-q)(1-\epsilon)2\Gamma\frac{\partial\Gamma}{\partial q}\right\}
\end{aligned}
$$

$$
\begin{aligned}
&= exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\frac{\pi(a-c)}{\Gamma^4}[-p(1-\epsilon)]\left\{\pi(a-c)p(1-q)(1-\epsilon)+2\Gamma^2+(1-q)2\Gamma\frac{\partial\Gamma}{\partial q}\right\}\\
&= exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\frac{\pi(a-c)}{\Gamma^4}[-p(1-\epsilon)]\left\{\pi(a-c)p(1-q)(1-\epsilon)+2\Gamma kV\right\}\\
&\Rightarrow \frac{\partial I(\pi,q)}{\partial q}=0 \text{ for } \pi=0 \text{ and } \frac{\partial I(\pi,q)}{\partial q}<0 \text{ for } \pi>0
\end{aligned}
$$

So $\frac{\partial^2 W^*}{\partial q^2}<0$ for all $q\in[0,1]$. Consider the first derivative at $q=0$ and $q=1$:

$$
\begin{aligned}
\frac{\partial W^*}{\partial q}(q=0) &= p\left[\int_0^1 exp\,(0)\left(\frac{\pi(a-c)p(1-\epsilon)}{p^2(1-\epsilon)^2}+1\right)f(\pi)d\pi-1\right]\\
&= p\int_0^1\frac{\pi(a-c)}{p(1-\epsilon)}f(\pi)d\pi=\frac{a-c}{1-\epsilon}\int_0^1\pi f(\pi)d\pi>0\\
\frac{\partial W^*}{\partial q}(q=1) &= p\left[\int_0^1 exp\left(-\frac{\pi(a-c)}{kV}\right)\left(\frac{0}{\Gamma^2}+1\right)f(\pi)d\pi-1\right]\\
&= p\left[\int_0^1 exp\left(-\frac{\pi(a-c)}{kV}\right)f(\pi)d\pi-1\right]
\end{aligned}
$$

Consider the integrand:

$$
\begin{aligned}
I(\pi) &\equiv exp\left(-\frac{\pi(a-c)}{kV}\right) \Rightarrow I(\pi=0)=exp(0)=1\\
\frac{\partial I(\pi)}{\partial\pi} &= exp\left(-\frac{\pi(a-c)}{kV}\right)\left(\frac{-(a-c)}{kV}\right)<0
\end{aligned}
$$

So $\int_0^1 I(\pi)f(\pi)d\pi<1$, which implies $\frac{\partial W^*}{\partial q}(q=1)<0$. □

Proof of Proposition 6.

$$
\begin{aligned}
\frac{\partial s^*(\pi)}{\partial k} &= \frac{q}{v_D}>0\\
\frac{\partial r^*(s^*(\pi))}{\partial k} &= \frac{\partial}{\partial k}\left\{1-exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\right\}=-exp\left(-\frac{\Delta_x}{\Gamma}\right)\left[\frac{\Delta_x}{\Gamma^2}\right]\frac{\partial\Gamma}{\partial k}\\
&\Rightarrow \frac{\partial r^*(s^*(\pi))}{\partial k}<0 \text{ if } \pi>0 \text{ and } \frac{\partial r^*(s^*(\pi))}{\partial k}=0 \text{ if } \pi=0
\end{aligned}
$$

$$
\begin{aligned}
&\Rightarrow \quad \frac{\partial T^*}{\partial k} < 0 \text{ and } \frac{\partial W^*}{\partial k} < 0 \\
\frac{\partial s^*(\pi)}{\partial \epsilon} &= (1-q)p(w-1) < 0 \\
\frac{\partial r^*(s^*(\pi))}{\partial \epsilon} &= exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\frac{\partial}{\partial \epsilon}\left[\frac{\Delta_\pi}{\Gamma}\right] = exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left(\frac{\Delta_\pi}{\Gamma^2}\right)p(1-q) \\
&\Rightarrow \quad \frac{\partial r^*(s^*(\pi))}{\partial \epsilon} > 0 \text{ if } \pi > 0 \text{ and } \frac{\partial r^*(s^*(\pi))}{\partial \epsilon} = 0 \text{ if } \pi = 0 \\
&\Rightarrow \quad \frac{\partial T^*}{\partial \epsilon} > 0 \text{ and } \frac{\partial W^*}{\partial \epsilon} > 0
\end{aligned}
$$

□

Proof of Proposition 7.

$$
\begin{aligned}
\frac{\partial r^*(s^*(\pi))}{\partial p} &= exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\frac{\partial}{\partial p}\left[\frac{\Delta_\pi}{\Gamma}\right] = exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left(-\frac{\Delta_\pi(1-q)(1-\epsilon)}{\Gamma^2}\right) \\
&\Rightarrow \quad \frac{\partial r^*(s^*(\pi))}{\partial p} < 0 \text{ if } \pi > 0 \text{ and } \frac{\partial r^*(s^*(\pi))}{\partial p} = 0 \text{ if } \pi = 0 \;\Rightarrow\; \frac{\partial T^*}{\partial p} < 0 \\
\frac{\partial W^*}{\partial p} &= (1-q)\left[p\int_0^1 \frac{\partial}{\partial p} r^*(s^*(\pi))f(\pi)d\pi + \int_0^1 r^*(s^*(\pi))f(\pi)d\pi\right] \\
&= (1-q)\left[1 - \int_0^1 exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left(\frac{\Delta_\pi p(1-q)(1-\epsilon)+\Gamma^2}{\Gamma^2}\right)f(\pi)d\pi\right]
\end{aligned}
$$

Consider the integrand:

$$
\begin{aligned}
I(\pi) &\equiv exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left(\frac{\Delta_\pi p(1-q)(1-\epsilon)+\Gamma^2}{\Gamma^2}\right) \;\Rightarrow\; I(\pi=0) = exp(0) = 1 \\
\frac{\partial I(\pi)}{\partial \pi} &= exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left(\frac{q(a-c)p(1-q)(1-\epsilon)}{\Gamma^2}\right) \\
&\quad + \left(\frac{\Delta_\pi p(1-q)(1-\epsilon)+\Gamma^2}{\Gamma^2}\right)exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\left(\frac{-q(a-c)}{\Gamma}\right) \\
&= exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\frac{q(a-c)}{\Gamma^2}\left[p(1-q)(1-\epsilon) - \frac{\Delta_\pi p(1-q)(1-\epsilon)}{\Gamma} - \Gamma\right] \\
&= exp\left(-\frac{\Delta_\pi}{\Gamma}\right)\frac{q(a-c)}{\Gamma^2}\left[-\frac{\Delta_\pi p(1-q)(1-\epsilon)}{\Gamma} - qkV\right] < 0
\end{aligned}
$$

So $\int_0^1 I(\pi)f(\pi)d\pi < 1$, which implies $\frac{\partial W^*}{\partial p} > 0$. □

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Table 1: Descriptive Statistics for Settlement and Litigation in the ICJ

	Pooled Cases	Jurisdictional Claim	
		Special Agreement	Other Basis
Cases initiated	83	15	68
Jurisdiction challenged	56	1	55
Cases settled	19	0	19
Cases not settled	64	15	49
- Case dismissed	27	0	27
- Substantive ruling	37	15	22

Note: Requests for interpretation and revision, open cases, and unreciprocated claims under Article 38 (5) of the Rules of the Court are excluded. "Other Basis" includes claims raised under compromissory clauses and/or Article 36 (2) of the ICJ Statue.

Table 2: Hypothesis Tests with Two Measures of Strength of Court Authority to Rule (q)

	Proxy for q			
	Special Agreement		Jurisdictional Challenge	
	Yes	No	Yes	No
Settle	0	19	12	1
Don't Settle	15	49	44	20
Total	15	68	56	21
Pearson χ^2	5.435		25.756	
p-value	0.020		0.000	

Note: The total number of cases under "Jurisdictional Challenge" adds to 77 rather than 83 because six cases were settled before jurisdictional challenges could be lodged.

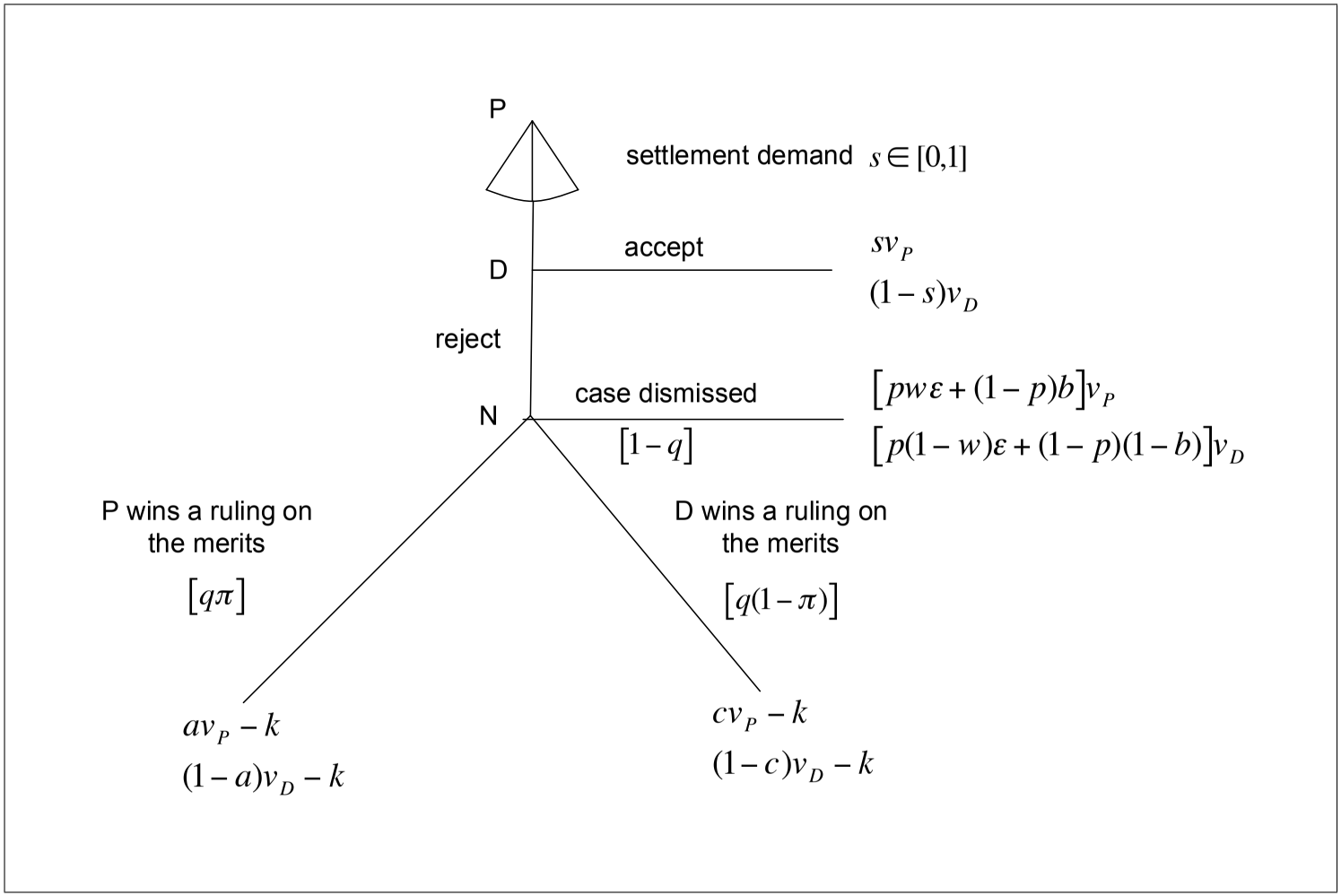

Figure 1: Structure of the Model

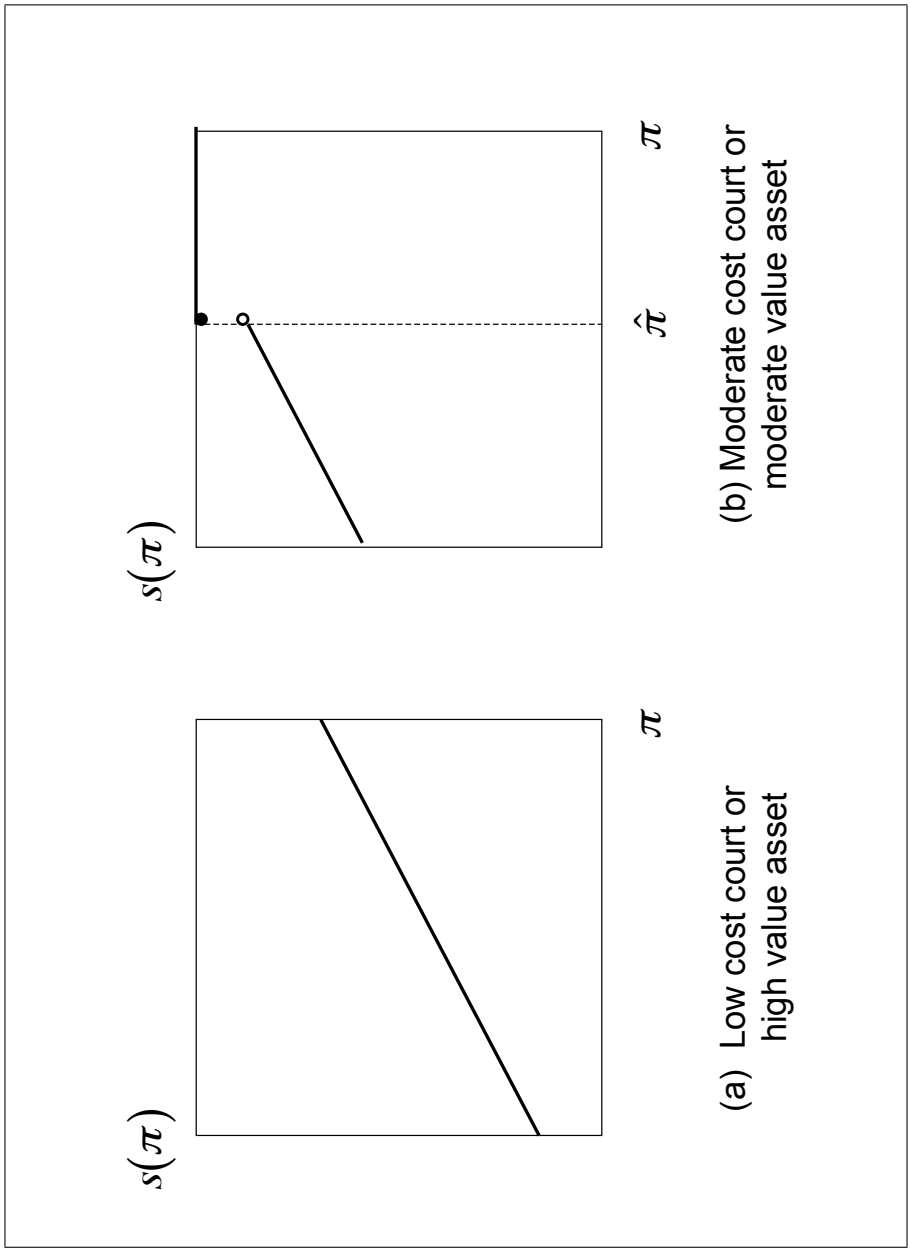

Figure 2: Universally Divine Separating and Semi-Separating Equilibria

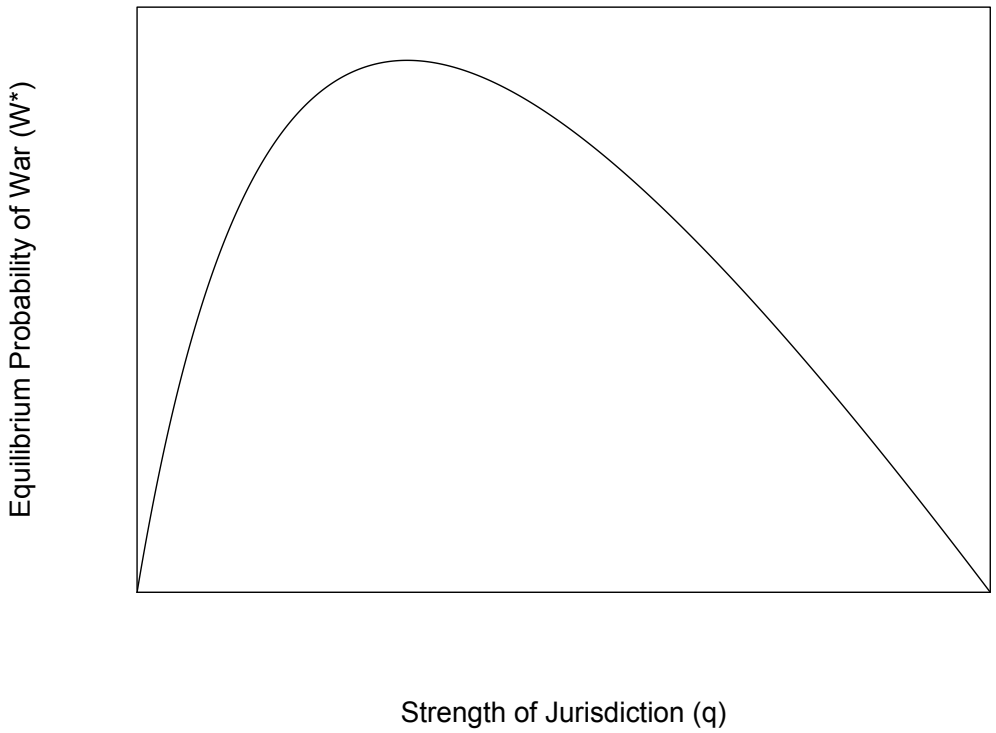

Figure 3: Impact of Jurisdiction on the Equilibrium Probability of War