Sanctions, Uncertainty, and Leader Tenure

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Abstract

What determines whether states impose sanctions on their rivals? We develop a formal model of domestic power consolidation, threats, escalation, and imposition of sanctions. With complete information, the target regime’s consolidation of power determines the result—leaders with stable control can weather sanctions and thus deter their imposition, while vulnerable leaders concede the issue. However, when an imposer is uncertain of a foreign leader’s consolidation, vulnerable types have incentive to bluff strength. Foreign powers sometimes respond by imposing sanctions, even though the parties would have resolved the crisis earlier with complete information. We then hypothesize that opponents of newer leaders are more likely to suffer from this information problem. Employing the Threat and Imposition of Sanctions (TIES) dataset and carefully addressing selection problems common to the sanctions literature, we show that sanctioners are indeed more likely to follow through on threats against such leaders.

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1 Introduction

In 1963, a coup led by Oswaldo López Arellano put the military in control of the Honduran government. The United States quickly demanded elections and threatened sanctions if López Arellano failed to follow through. However, Honduran officials believed that Washington overestimated how sensitive the new regime would be to sanctions and expected that economic relations would return to the status quo within six months (Euraque 1996, 113-114). They were right—López Arellano stayed in office for eight years, while the futile sanctions faded away after five months.

Although the Honduran coup crisis is but a single case, it highlights the importance of asymmetric information in understanding sanctions behavior. Indeed, we argue that knowledge of a rival’s consolidation of power helps explain the variance in threats and the imposition of sanctions. Although economic sanctions can destabilize a leader’s power base and lead to higher rates of leadership turnover (Marinov 2005), foreign powers may overestimate the effectiveness of sanctions in the shadow of uncertainty. In turn, inefficient sanctions can occur despite the availability of Pareto improving resolutions.

To develop this argument, we construct a model of complete information, power consolidation, and sanctions. When a leader is extremely vulnerable to sanctions, foreign powers seize the opportunity and threaten their rival. Internalizing the danger, the leader concedes the issue, knowing that failure to comply will lead to an even worse outcome. On the end of the spectrum, if a leader holds a tight grip on power, sanctions are unlikely to coerce compliance. Foreign powers thus do not threaten sanctions, as they know that the strategy will prove ineffective. In either case, the result is efficient.¹

However, leaders are more likely to know how strong their hold of office is than foreign opposition. The corresponding incomplete information environment gives weaker leaders incentives to bluff strength. Under such conditions, upon a foreign power issuing a threat, weaker leaders sometimes concede the conflict and sometimes continue the crisis. Strong types, in contrast, always continue. In turn, continuation of the crisis is not an unambiguous sign of the target leader’s strength. Foreign powers respond to the signal by sometimes giving up and sometimes calling potential bluffs by implementing sanctions. Because stronger types are more likely to escalate the crisis all the way to the sanctions stage, foreign powers

¹We also identify a middle region in which sanctions occur if the foreign power is willing to engage in a crisis. Here, the parties reach “deadlock”; the leader continues the opposed policy knowing that sanctions will result. Nevertheless, the policy persists because the leader expects to perform even worse otherwise. A leader, for example, may suppress political opposition within the country knowing that this will incur the wrath of the international community because not suppressing opponents is even more likely to result in regime change. Without a better alternative, foreign powers impose sanctions in response.
counter-intuitively impose sanctions against leaders most capable of surviving them.²

We then test our theory that uncertainty is a critical determinant of sanctions imposition against the empirical record. Previous work (Wolford 2007; Rider 2013) has indicated that leader tenure is a useful proxy for incomplete information. As Wolford (2007, 784) states, “private information is introduced each time a new leader enters office,” as foreign intelligence organizations must discard their knowledge of the previous leader and build a profile of the new leader’s preferences. Consequently, we would expect the information mechanism to be most prevalent earlier in a leader’s tenure and then dwindle as foreign powers fully understand the leader’s preferences and reputation.

Given that hypothesis, we compile leader data from Archigos (Goemans et al 2009) and sanctions data from the Threat and Imposition of Sanctions (TIES) dataset (Morgan et al 2014). Controlling for other critical factors, we find that increasing the length of leader tenure decreases the likelihood of the imposition of sanctions. The effects are substantively significant. Indeed, holding other independent variables at their medians, we estimate that the probability that foreign powers impose sanctions on a leader is 22% less likely if the crisis occurs during the leader’s fourth year in office rather than if the crisis occurred following the leader’s entrance into power.

Our work speaks to three disparate but important literatures in international relations. First, scholarship from the past twenty years or so has indicated that incomplete information is a major cause of many types of inefficient behaviors.³ Yet incorporating incomplete information into statistical models is notoriously difficult, and its absence risks invalidating results due to omitted variable bias. While some researchers have investigated other proxies (Huth, Bennett, and Gelpi 1992; Kaplow and Gartzke 2013), leader tenure appears to be a viable option. Our theoretical results and empirical verification underscore Wolford’s (2007) theoretical claim and Rider’s (2013) empirical results on arms races. We thus provide further evidence of tenure as an effective proxy for uncertainty.

Second, a growing number of scholars over the past decade have argued that leaders are the central actor in international relations, not states.⁴ Our results indicate some state-level indicators such as international opposition, democratic institutions and alliance portfolios have an impact on dispute resolution. Nevertheless, leaders also play a critical role in economic coercion.

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²This holds empirically, with observed sanctions often resulting in brutally repressive countermeasures (Wood 2008).


Lastly, we make a theoretical contribution to the literature on sanctions. Early research on sanctions suggested that their imposition only occasionally (Huffbauer et al. 2007) or almost never (Pape 1997) coerces enemies into changing policy positions. This led to an important puzzle: if sanctions are costly and rarely effective, why are they in states’ foreign policy toolboxes? Game theoretical modeling of threats, escalation, and sanctions pointed to a selection effect (Smith 1996; Nooruddin 2002; Drezner 1999; Drezner 2003; Lacy and Niou 2004). When sanctions are most useful, their threat alone will convince rivals to back down. Thus, we observe sanctions targeting the strongest or most resolved opponents. Looking at those cases unfairly biases our perception of the usefulness of sanctions, as the biggest successes never enter the dataset.

With selection bias a real problem, we push forward in two ways. Primarily, we move away from strength and resolve of the state and focus instead on the targeted leader’s grip on power. If rivals impose sanctions to destabilize leadership, then then uncertainty over consolidation of power ought to affect the likelihood of realized sanctions. But since weaker types concede at the threat stage, rivals impose sanctions more frequently against robust leaders than they would via a random draw. Additionally, the theoretical model allows the parties to resolve the conflict before the crisis stage. As a result, we can analyze the comparative statics of the game given that the states are in a crisis (Wolford and Ritter 2014). Indeed, the TIES dataset gives us a way to test hypotheses about sanction imposition even without knowing what the full domain of relevant cases is.  

We proceed as follows. The next section develops the game theoretical model, first describing the equilibria of the complete information game before moving to the critical incomplete information scenario. We use the equilibrium results to generate comparative statics and testable hypotheses. The following section builds the empirical model, showing that uncertainty (via the leader tenure proxy) increases the probability of sanctions imposition. A brief conclusion ends the paper.

2 Modeling Sanctions and Consolidation

To obtain a better understanding of how leader vulnerability affects the imposition of sanctions, we turn to a formal model. This section begins with a complete information model of sanctions in the shadow of potential regime change. The complete information model makes the strong assumption that foreign powers have equal knowledge of the target regime’s stability as that target regime. Consequently, we next investigate an incomplete information version of the model. Using the equilibria, we then derive theoretical expectations about the

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5We nevertheless run robustness checks using selection models and find that our central claims still hold.
frequency of sanction imposition.

2.1 Complete Information Preliminaries

As Figure 1 illustrates, the game consists of two states, F(oreign) and H(ome) in an escalating crisis that could result in the imposition of sanctions. F begins by choosing whether to quit or to threaten to impose sanctions. We conceptualize this as F attempting to coerce H into yielding on some policy issue. Quitting ends the game, while threatening forces H to back down and concede the policy issue or continue the crisis. Backing down also ends the game, while continuing the crisis leads F to decide whether to impose sanctions or not. This is the final strategic move of the game. However, if F imposes sanctions, Nature selects F to win the crisis and secure the policy with probability \( p \) and H to prevail with probability \( 1 - p \).

Whether H can uphold the policy throughout the crisis or not could depend on many things, though we conceptualize this as H’s sensitivity to domestic challengers. When \( p \) is high, sanctions could cause domestic challengers to overthrow the current regime. Similarly, the increased likelihood of regime change might cause the current leader to concede the policy issue and maintain control of the government. Either way, F obtains its policy desire. Meanwhile, if \( p \) is low, H’s regime has consolidated power and F is unlikely to obtain its policy goals.

Payoffs are as follows. Without loss of generality, we standardize a state’s success in a sanctions showdown to be worth 1 while failure is worth 0. If F quits immediately, the states’ respective payoffs are \( x_F \) and \( x_H \); if F threatens and H backs down, the respective payoffs are \( y_F \) and \( y_H \); and if F threatens, H continues, and F declines to impose sanctions, the respective payoffs are \( z_F \) and \( z_H \).

F’s preference ordering is \( y_F > 1 > x_F > z_F > 0 \). That is, F most prefers issuing the threat and forcing H to back down. It next most prefers prevailing in a sanctions crisis since it still obtains the outcome it wants, though the process results in some inefficiency. Its middle outcome is to maintain the status quo and not issue a threat. The second to worst outcome is if it backs down after H continues the crisis. F’s worst possible outcome is to impose sanctions and lose the showdown, as F pays for the trade inefficiency but fails to obtain its policy goal.

H’s preference ordering is \( x_H > z_H > 1 > y_H > 0 \). That is, H most prefers the status quo, since that allows H to maintain its preferred policy, while avoiding both sanctions and a crisis. H next most prefers the crisis occurring but F ultimately not imposing sanctions. The next best outcome is for H to prevail in the sanctions showdown. Finally, H prefers backing down after F has issued a threat to losing the sanctions showdown.
2.2 Complete Information Equilibria

Since this is a sequential game with complete information, we search for its subgame perfect equilibria (SPE). An SPE is a set of strategies such that the strategies form a Nash equilibrium in every proper subgame.\(^6\)

Before jumping to the propositions, it is worth noting that we can collapse Nature’s move to the expected outcome. Thus, if F imposes sanctions, its expected utility equals \(p(1) + (1 - p)(0) = p\) while H’s expected utility equals \(p(0) + (1 - p)(p) = 1 - p\).

We break up the propositions’ parameter spaces by \(p\), the probability F will achieve its policy desires if it implements sanctions. To begin, consider when when H is highly vulnerable:

\(^6\)For the complete information game, we omit all proofs because they are trivial applications of backward induction.
Proposition 1. If $p > \max\{z_F, 1 - y_H\}$, $F$ issues a threat. $H$ backs down because $F$ imposes sanctions if given the opportunity.

Intuitively, if $H$ is extremely vulnerable, $F$ will prefer imposing sanctions in the final stage. This forces $H$ to back down in the stage prior. Knowing that $H$ cannot credibly threaten to continue the crisis, $F$ safely issues a threat in the opening stage. $F$ prevails because of $H$’s weakness. However, note $F$ need not impose sanctions to emerge victorious. For these parameters, the outcome in which $H$ backs down Pareto dominates the sanctions outcome. The states successfully locate this Pareto dominant outcome through the escalation process.

Proposition 2. If $p \in (z_F, 1 - y_H)$, the parties reach deadlock if $F$ issues a threat. If $p > x_F$, $F$ accepts the deadlock and issues a threat; $H$ follows by continuing the crisis, leading $F$ to impose sanctions. If $p < x_F$, $F$ prefers the status quo to sanctions. Thus, it does not issue a threat because $H$ would respond by continuing the crisis, leading $F$ to impose unfavorable sanctions.

When $p$ falls in this middle range, both parties find sanctions preferable to backing down once $F$ has issued the threat. This is because $F$ earns $z_F$ for not imposing sanctions but can obtain $p$ from sanctioning, which is better for this parameter space. Anticipating that $F$ will impose sanctions, $H$ nevertheless continues the crisis; it would earn $y_H$ for backing down, which (for this parameter space) is less than the $1 - p$ it receives for continuing the crisis. The parties are deadlocked, as neither post-threat outcome is Pareto superior to the sanctions outcome.

The remaining question is whether $F$ would want to issue a threat to begin with. If $p$ is sufficiently large (that is, if $p > x_F$), $F$ still prefers the deadlock outcome. But because $F$ prefers quitting to not imposing sanctions later, smaller values of $p$ exist (that is, $p < x_F$) for which $F$ chooses to quit and maintain the status quo. In this latter case, the states again manage to find a Pareto improving alternative to sanctions.

This “deadlock” outcome accurately reflects many instances in which foreign powers know that sanctions will not alter an opponent’s behavior but impose them anyway. Often times, such deadlock is the result of human rights abuses. Leaders of the sanctioned country continue the abuses as a means to stay in power; they might not enjoy the sanctions but they find compliance even costlier. Meanwhile, foreign powers continue the sanctions as a means to limit the damage and cutoff the abuser’s economic base. Sanctions are inevitable as a result.

Proposition 3. If $p < z_F$, $F$ quits. Off the path, $H$ would continue the crisis and $F$ would not impose sanctions.

When sanctions are highly ineffective, $F$ will not impose them in the final stage, lest it pursue a costly and mostly hopeless policy. $H$ recognizes this and continues the crisis if $F$
threatens it. Understanding that the crisis will ultimately end in failure, F quits without
issuing a threat.

As with Proposition 1 and a portion of Proposition 2’s parameter space, the escalation
process allows the states to reach a Pareto improving outcome short of sanctions. Unlike on
the other end of the spectrum, H’s strength allows it to prevail without conflict and grants
H its greatest payoff possible. While F’s payoff is not ideal, it cannot improve given its weak
circumstances.

Overall, the complete information model shows that if a Pareto improving alternative
sanctions exist, the states will locate it and avoid the inefficiency. Sanctions only appear if
the states are deadlocked and cannot find a mutually preferable alternative. In contrast, in the
incomplete information extension below, rational gambles can lead to sanctions even though
both might prefer less conflictual outcomes. Put differently, uncertainty leads to sanctions.

2.3 How Uncertainty about Consolidation Leads to Inefficiency

Now consider the same game with a slight tweak to the informational structure. This time,
Nature begins the interaction by choosing whether H is “strong” with probability \( q \) or “weak”
with probability \( 1 - q \). The only difference between these two types is their ability to weather
sanctions. If imposed, the weak type loses with probability \( p' \) while the strong type loses
with probability \( p \), where \( p' > p \). Thus, the strong type is more likely to come out victorious
than the weak type. Consistent with the observation that leaders better understand their
consolidation of power than foreign adversaries, H observes its true strength after the draw
but F only has the prior. F must therefore update its belief about H as the game progresses.

Going forward, we restrict our attention to when \( p' > max\{z_F, 1 - y_H\} \) and \( p < z_F \), which
come from Proposition 1 and Proposition 3. We do this because this situation is the most
strategically interesting and empirically compelling. Strategically, these parameters mean
that F would not impose sanctions if it knew H was the strong type and thus F would choose
not to issue a threat in the first place. On the other hand, the weak type of H would back
down if F knew its type. As such, F would ultimately not impose sanctions with complete
information in either case. However, the possibility that H might be weak could compel F to
issue a threat against the strong type, while the weak type has incentive to bluff strength by
continuing the crisis. Consequently, it is unclear initially how the game will proceed.

These parameter spaces also ensure that the parties would not want actively seek the dead-
lock outcome described in Proposition 2. While the deadlock outcome has empirical validity,
the circumstances that lead to deadlock are less likely to suffer from incomplete information
problems and appear to be more likely the result of general intransigence. After all, deadlock
represents situations in which the foreign power threatens the target states despite knowing
that the target state will not back down. Often times, this is the result of internationally
evident conflicts within the state, which cause the leader to pursue objectionable policies to
maintain control of the country. It is much harder to misjudge the target regime’s intentions
in this case, and thus our investigation of incomplete information focuses on more moderate
circumstances.

As is standard for these types of signaling games, we search for strong perfect Bayesian
equilibria (PBE). A strong PBE is a set of strategies and beliefs such that the strategies are
sequentially rational and players update beliefs through Bayes’ rule wherever possible both on
and off the equilibrium path. Ordinarily, PBE yields multiple equilibria because various off
the path beliefs can justify a variety of different moves. The situation we analyze, however,
lacks this problem because the strong type of H has a strictly dominant strategy to continue
the crisis. This ensures that all information sets will be reached with positive probability once
updating becomes necessary. In turn, the equilibria we describe are unique to their parameter
spaces.

We organize the three propositions below by \( q \), the prior probability that H is strong. As
\( q \) decreases, F’s incentive to challenge H by issuing a threat increases.

**Proposition 4.** If \( q > \frac{p' - z_F}{p' - p} \), F quits without issuing a threat. Off the equilibrium path, both
types of H pool on continuing the crisis. Afterward, D’s posterior is its prior and it does not
impose the sanction.

The appendix contains a full proof. The key is that the strong type of H has a strictly
dominant strategy to continue the crisis; this is because the worst it can do if it continues
\((1 - p)\) is still better than what it earns from withdrawing from the conflict \((y_H)\). So the
weak type can deduce that the strong type will continue if threatened. The weak type can
also reason that with \( q \) high, F believes that H is very likely to be the strong type. Thus,
the weak type can pool with the strong type. F is then unable to update its prior. Imposing
sanctions is costly if H is actually strong but desirable if H is actually weak. Since the prior
is that H is very likely strong, F chooses not to impose sanctions even though the weak type
is attempting to bluff strength. Realizing that it will inevitably lose the showdown, F elects
not to initiate the crisis in the first place.

Note that F never implements sanctions here, as the crisis never begins. This is in contrast
to the other end of the spectrum when \( q \) is low:

**Proposition 5.** If \( q < \left( \frac{p' - z_F}{p'} \right) \left( \frac{y_F - x_F}{y_F - z_F} \right) \), F issues a threat. The strong type continues the
crisis with certainty while the weak type continues with probability
\[ q \left( 1 - \frac{p' - z_F}{p'} \right) \left( 1 - q \frac{p' - z_F}{p'} \right). \] When D
chooses whether to impose sanctions, its posterior equals $\frac{p' - z_F}{p - p'}$. $D$ then imposes sanctions with probability $\frac{z_H - y_H}{z_H - (1 - p')}$.

Again, the appendix details the full proof. For intuition, consider the subgame beginning with $H$’s decision whether to back down or continue the crisis. As before, the strong type must continue due to strict dominance. Unlike before, however, the weak type cannot successfully pool with the strong type because the weak type is sufficiently more likely than the strong type this time. As such, $D$ would impose sanctions if its posterior equals its prior. In turn, the weak type would prefer not to pool, since the bluff will not payoff.

Likewise, the weak type cannot credibly separate from the strong type. If it did, $F$ would update that $H$ is strong with certainty given that $H$ had continued the crisis. Internalizing this, $F$ would not impose sanctions. But this means the weak type would prefer mimicking the strong type and tricking $F$ into giving up.

The game is finite and therefore must have an equilibrium. Since it is not pooling or separating strategies, it must be in semi-separating strategies. The weak type thus sometimes continues the crisis and sometimes backs down. To prevent the weak type from being too aggressive, $F$ occasionally calls what could be a bluff. The mixing probabilities in Proposition 5 meet the indifference conditions required to make such strategies rational.

The final question is whether $F$ prefers engaging in the weak type’s potential deception or quitting the interaction immediately. Although $H$ may occasionally be strong and the weak type will sometimes successfully trick $F$, the probability that $H$ is weak is so high that $F$ is willing to take the risk. This is because the weak type will often times back down, and that compensates for the potential problems $F$ can face by not preserving the status quo.

These two propositions solve the extreme cases. The remaining question is what happens when $q$ takes on a value in the middle range. Our last proposition addresses this:

**Proposition 6.** If $\left(\frac{p' - z_F}{p - p'}\right) \left(\frac{y_F - x_F}{y_F - z_F}\right) < q < \frac{p' - z_F}{p - p'}$, $F$ quits at the start to preserve the status quo. Off the path, strategies and beliefs follow Proposition 5.

The proof is nearly identical to the proof for Proposition 5 and is also in the appendix. Intuitively, the weak type’s deception and $F$’s necessary countermeasures makes pursuing the threat costlier for $F$. Although $F$ is willing to bear that burden when $H$ is very likely to be weak, the status quo remains preferable when the probability that $H$ is strong is relatively high. Consequently, Proposition 6’s observed result matches Proposition 4’s: $F$ maintains the status quo because the costs and risks of pursuing conflict are not worth the trouble.
2.4 Comparative Statics: Selection and Information

Before investigating the empirical record on sanctions, two notes about the model are in order. First, the incomplete information model picks up on an important selection problem. Sanctions are most useful when the foreign power never has to impose them; they are least useful when the crisis turns into conflict. For this model and the analyzed parameter spaces, note that F only imposes sanctions in Proposition 5’s parameter space. If F were to randomly assign its imposition of sanctions—which would be necessary to make conclusions naively based off the empirical record—strong types would receive \( q \) portion of sanctions while weak types would receive \( 1 - q \) portion.

Nonetheless, strategic play alters the actual distribution of sanctions. Recall that the strong type always continues the crisis while the weak type only continues with probability \( q \left( \frac{1 - \frac{p' - z_F}{p' - p}}{(1-q) \frac{p' - z_F}{p' - p}} \right) \). In turn, the portion of sanctions targeting strong types equals F’s posterior, which is \( \frac{p' - z_F}{p' - p} \). But \( q < \frac{p' - z_F}{p' - p} \) for that parameter space. Thus, F systematically imposes sanctions on the stronger types disproportionately more often.

Why does F implement sanctions against stronger types more often than a random draw would dictate? While seeming irrational at first thought, the crisis process convinces a portion of the weak types to reveal themselves as vulnerable and concede the issue. Enough weak types remain that F is still willing to impose the sanctions. Often times, F will be sanction the stronger opponent, but the information problem prevents any better targeting.

Second, and critical to the empirical section we develop below, F will not impose sanctions if its information is sufficiently great. To conceptualize this, note that \( q = \frac{1}{2} \) represents the most uncertain situation; F’s knowledge of H’s type is no better than a coin flip. Values close to 0 or 1, on the other hand, mean that F is almost certain that H is one of the types, with some (slim) possibility that it could be wrong.

Recall from Proposition 4 and Proposition 6 that F never issues a threat if \( q > \left( \frac{p' - z_F}{p' - p} \right) \left( \frac{y_F - x_F}{y_F - z_F} \right) \). So \( q \) is sufficiently great, the high potential that H is strong ensures that F never imposes sanctions. On the other hand, if \( q < \left( \frac{p' - z_F}{p' - p} \right) \left( \frac{y_F - x_F}{y_F - z_F} \right) \), D issues a threat and sanctions occur with positive probability. Specifically, that probability is the probability that H is strong plus the probability H is weak but continues, all multiplied by the probability that F’s mixed strategy calls for sanctions. As a formula:

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q + (1 - q) \left( \frac{q \left( 1 - \frac{p' - z_F}{p' - p} \right)}{(1-q) \frac{p' - z_F}{p' - p}} \right) \left( \frac{z_H - y_H}{z_H - (1-p')} \right)
\]
Although bulky, this expression decreases as $q$ decreases and approaches 0 as $q$ goes to 0. Thus, as F’s prior becomes sufficiently informative that H is weak, the probability that F imposes sanctions decreases. So as $q$ approaches 0 or 1, the probability of sanctions occurring is 0. We base our main hypotheses in the next section on this observation.\footnote{To be clear, in some instances, increasing uncertainty can increase the probability of sanctions imposition. Specifically, if \( \left( \frac{p' - z_F}{p' - z_F} \right) \left( \frac{z_H - y_H}{z_H - (1 - p')} \right) \) is greater than .5, the increases to $q$ will increase the expected probability of sanctions until $q$ exceeds that threshold and the probability drops to 0. However, our argument focuses on the limiting case—as $q$ goes to the 0 or 1 extremes. Increasing certainty can also increase the probability of sanctions in cases where the H has deadlock preferences, but this is substantively less important because those cases should be well-understood anyway.}

3 Empirical Evidence of Sanctions and Uncertainty

We now turn to investigating the empirical record on sanctions, beginning by detailing our hypotheses and explaining our strategy to overcome potential hurdles. After, we describe the data and present the results of our statistical analysis. We conclude this section by addressing potential concerns about the robustness of these results and the causal inferences we draw from them.

3.1 Research Design and Hypotheses

Our central theoretical argument states that uncertainty leads to the implementation of sanctions. Empirically evaluating such an argument, however, requires special care, as the true effect of uncertainty on the imposition of sanctions is notoriously difficult to tease out empirically.

The primary obstacle in assessing these theoretical propositions lies in operationalizing a sanctioning state’s uncertainty about its target country. This problem is not unique to our inquiry, as it has plagued empirical researchers in international relations over the past twenty years. Related works from Fearon (1994; 1995) pointed to uncertainty as a major cause of conflict in international relations, and since then empirical researchers have grappled with how to measure uncertainty in various contexts.

Fortunately, recent theoretical advances point to leader tenure as a suitable proxy for uncertainty (Rider 2013). As leaders advance in their tenure, they inevitably carry out publicly observable actions. These actions may be peaceful or conflictual, they make take place on the international stage or domestically, and they may or may not occur within the forum provided by an international institution. In any case, the important point for present purposes...
is that leaders, even those who head extremely closed states such as North Korea, cannot entirely avoid publicly observable actions. As a leader’s tenure grows longer, these publicly observable actions accumulate to produce patterns of behavior ready for analysis by the intelligence services of observing states. This enables foreign powers to be more confident in their estimations of power consolidation. Thus, it is reasonable to expect that information is increasing in tenure length.

**Hypothesis 1.** *Sanctions are less likely to be imposed as tenure increases.*

Given the complexity of the international system and the flexibility states enjoy in terms of choosing how to pursue a given international action, it is reasonable to expect that multiple factors influence the information structure of potential sanctions cases. Because of this, we evaluate a second hypothesis consistent with the informational mechanism outlined in the theoretical section. More specifically, we expect that when an international institution is involved in a conflict, sanctions are less likely to be imposed. This argument crucially relies on our expectation that, in general, international institutions serve to increase the level of information sanctioning states possess about potential targets.8

This expectation is consistent with the existing literature on transaction costs and international institutions. Generally, the literature argues that international institutions are rationally designed by states and one of the functions that they perform is in reducing transaction costs (Koremenos et al 2001). A clear way in which institutions are assumed to reduce transaction costs is by facilitating the transfer of information. So, building on our game-theoretic model’s guidance and the expectations of this literature, we have our second empirical expectation:

**Hypothesis 2.** *Sanctions are less likely to be imposed if the threatener works through an international institution.*

We also must consider the number of sanctioners in play in any given crisis. At first pass, it might seem that more potential imposers mean greater costs to the target, which increase the likelihood of compliance at the threat stage. However, Proposition 2 argues that foreign powers may impose sanctions because no mutually preferable alternative exists. While it is hard to directly measure when sanctions are in the Pareto set, the number of sanctioners provides some assistance. As issues become increasingly important (and potentially irreconcilable), imposers form larger coalitions (Drezner 2000, 74; Hufbauer 2007). Meanwhile, cases with flagrant human rights abuses—such as Saddam Hussein’s Iraq immediately following

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8We do, however, acknowledge that this information may itself be strategically manipulated. In spite of this, our theoretical argument only relies upon the degree of uncertainty, and as a result we expect the effect of institutions to hold even if they provide poor or biased information.
the Persian Gulf War—draw international condemnation and many sanctioners despite little chance of affecting endogenous policy choices. Thus, we expect greater numbers of sanctioners to correlate with instances of deadlock and in turn correlate with a higher frequency of sanction imposition.

**Hypothesis 3.** Sanctions are more likely to be imposed as the number of potential sanctioners increases.

Finally, we present a fourth hypothesis that is consistent with the informational explanation produced in the formal model of sanctions. A large body of literature has tied domestic political institutions to conflict outcomes. While some of this literature focuses on the ability of domestic institutions to create “audience costs” (Fearon 1994), a second strand argues that domestic political institutions might influence conflict outcomes by mediating the process of information transmission. Schultz (1998, 2001), for example, provides both theoretical and empirical support for an argument demonstrating that democratic institutions facilitate credible information transmission that can allow states to avoid conflict. Thus, we expect that the relatively open nature of democratic institutions allows democratic targets to more effectively bargain their way out of sanctions imposition. This leads to our final hypothesis:

**Hypothesis 4.** Sanctions are less likely to be imposed against more democratic states.

### 3.2 Data & Statistical Model

We draw data primarily from three sources. The base set of sanctions cases we analyze are from the Threat and Imposition of Sanctions (TIES) dataset, version 4.0 (Morgan et al 2014). This dataset compiles information on both conflicts in which one or more states imposed sanctions on a target and lower level conflicts in which the crisis ended at the threat stage. Thus, the population of cases includes conflicts that exhibit the variation necessary to evaluate our theoretical claims regarding the imposition of sanctions.

Additionally, we draw data from two sources that international relations scholars should be familiar with. Leadership data comes from the Archigos dataset (Goemans et al 2009), which contains information relevant to the duration of a given leader’s tenure as well as the means through which they obtained office. Finally, we draw on a set of standard control variables from the Correlates of War (COW) project.

**Dependent Variable**

Our dependent variable is a dichotomous outcome entitled *Imposition* that takes a value of 1 if sanctions were imposed and a value of 0 if they were not. This variable originates from
the aforementioned TIES 4.0 dataset. According to the TIES coding manual, a case appears in the data if a threat of sanctions is made or if sanctions are imposed. Approximately 61% of the cases in the sample analyzed here resulted in the imposition of sanctions. Clearly, the coding rule raises concerns over sample selection issues, as the mention of sanctions by a threatening state is necessary for inclusion in the data. We address these concerns in the robustness section below.

**Independent Variables**

**Tenure.** The first independent variable of substantive interest in this analysis, which allows us to evaluate Hypothesis 1, is the tenure of leaders. While we implement several measures as robustness checks (none of which alter the results), the main measure that we include is the common log of days in office at the time of crisis. This measure comes from Archigos (Goemans et al, 2009), and simply reflects a measure of the tenure of a target state’s leader at the time the case was included in the TIES 4.0 dataset.

We opt for days because information transmission is very fine-grained. There is a major substantive difference between a leader having spent 30 days in office at the time of crisis versus 300. Yet a less fine-grained measurement such as years in office would treat this identically. In this regard, we are lucky that the Archigos dataset records the exact date of the beginning of tenure. The TIES dataset similarly records exact dates of crises, though some cases only include the beginning of the month or the year. We exclude these cases in our initial analysis but discuss them further in the robustness checks.

Note that we log days in office for theoretical reasons. Information gathering has diminishing marginal returns. For intelligence organizations, a rival’s first day in office provides more information than the second, the second provides more than the third, and so forth. Naturally, then, the derivative of the information accumulation function should be positive while its second derivative should be negative. Logging days in office ensures that our measure of tenure has these features. It also reduces the long right tail of the distribution.

**Institutions.** Use of an institution is our second independent variable of interest and evaluates Hypothesis 2. *Institutions* is thus a dichotomous measure of whether an international institution was involved in the crisis. It originates from the TIES 4.0 data. According to the TIES 4.0 coding rule, this variable is coded as a 1 if, during the conflict, there was explicit mention of sanctions or support for sanctions among members of an international institution (including formal military alliances such as NATO) or the sanctions were carried out multilaterally through a formal international institution.

---

9We add 1 to the day count to ensure that all values of the tenure measure are greater than 0.
Senders. To evaluate our third hypothesis, we include the variable *Senders*, which is a count of the number of states involved in threatening or imposing sanctions. This variable is also drawn from the TIES 4.0 data. Senders range from 0 to 5. Values 1 through 4 reflect that number of senders. A value of 5 means five or more countries issued threats or imposed sanctions. Cases receiving a 0 involve an institution sending the threat, except for cases involving the European Economic Community or the European Union. To use dyadic controls, we omit observations with 0 cases in the initial analysis. The robustness section verifies that the results do not change if we code the institutional senders differently.

Polity. Hypothesis 4 stated that democratic transparency ought to reduce uncertainty about the crisis. To address this in the model, we include a *Polity* score from the POLITY IV dataset. Polity scores normally range between -10 (complete autocracy) to 10 (complete democracy). To keep the values consistent in magnitude with our other key independent variables, we rescale these scores between 0 and 1, still increasing in democratic institutions.

Controls. We also control for several factors that might be reasonably expected to influence the imposition of sanctions. First, to account for the possibility that sanctions are more likely to be levied against states whose leaders have obtained office through “irregular” means such as military coups or subversion of election results, we include the variable *Regular*, which is a dichotomous variable that takes a value of 1 if a leader obtained office through regular means and 0 otherwise. This variable appears in Archigos and is coded according to each individual country’s laws at the time of each observation. Next, we control for the military strength of the target by including CINC scores from the COW data. Finally, to account for the possibility that the sanctions process might play out differently for similar states than for those that are dissimilar, we include the S-Score (Signorino and Ritter 2002) of the target country and the primary sender as identified in the TIES data.

Statistical Model

The analysis we present in the next section implements a logit model to estimate the relationships outlined in the previous sections. However, because of the nature of this data (and international relations data more generally), we note the importance of accounting for sample selection issues in our estimation.

To avoid the problems associated with selection bias, we also estimate a bivariate probit selection model (Dubin and Rivers 1989). Although the strategic nature of the selection in this substantive application is apparent, we do not use a strategic model (Signorino 1999; Signorino 2002) because the multilateral nature of many crises makes it quite difficult to identify...
a “first mover” in many cases. As identifying the sequence of moves is absolutely crucial to identifying a strategic model, we forgo an explicit statistical modeling of the strategic nature of the selection process in favor of avoiding the imposition of unnecessary structure on the problem. Consequently, we view the probit selection model as sufficient to address concerns with sample selection while also not requiring unnecessary and potentially unjustifiable assumptions necessary for estimation. We provide a more thorough discussion of this selection model in the robustness section. While we demonstrate robustness of the results with the selection model later in the paper, we utilize the simpler model for the analysis in the following section.

3.3 Results

The results provide broad support for our hypotheses. Figure 2 presents point estimates of the coefficients on our four main explanatory variables of interest, along with the bounds of a 95% confidence interval. The point estimates and confidence intervals presented in this plot originate from a logistic regression including all controls described in the previous section, the results of which are presented in the fifth column of Table 1.
Consistent with our hypotheses, Figure 2 indicates a negative relationship between leader tenure and sanctions. Additionally, the negative coefficients on institutional involvement and polity score are consistent with Hypotheses 2 and 4. Furthermore, the bounds of the 95% confidence interval does not cross zero on either of these coefficient estimates. As such, these results provide initial support for both Hypotheses 1 and 2. Taken together, support for these hypotheses is consistent with our theoretical argument that an increase in the quality of information reduces the probability that sanctions will be imposed in an international crisis.

Next, consider the coefficient estimate on number of senders, which is both positive and significant. This result indicates support for Hypothesis 3, which states that the number of senders should increase the probability that sanctions are enacted, reflecting the deadlock outcome from Proposition 2. Looking to Table 1 presents a fuller picture of the results across a variety of model specifications including each individual explanatory variable of interest. The primary takeaway from this table in terms of our argument is that the sign and significance of our three explanatory variables of substantive interest remain unchanged across these model specifications, with the exception of Polity, which only attains significance in the full model found in the fifth column. This provides an initial indication of the robustness of the results presented below.

However, sign and statistical significance do not necessarily indicate real substantive importance. To address this concern, we consider some predicted probabilities, generated from the full model to demonstrate the influence of these variables on the probability of sanction imposition.

First, holding all other variables at their median, a move across the interquartile range of polity scores in the data results in a 9.3% reduction in the probability of sanction imposition. Thus, increasing levels of democratization do in fact have a non-negligible influence on the probability that sanctions are imposed under the full model.

Next, to demonstrate the influence of leader tenure, Figure 3 shows predicted probabilities of sanction imposition across five years in office, holding all other variables at their medians. We obtained predicted probabilities from the full model, including all controls. The plot illustrates how our main empirical model predicts a substantively significant impact of leader tenure on the probability of sanction imposition, as moving across the full range of values results in a 30% reduction in the probability of observing sanctions. Thus, in a typical case, the reduction in uncertainty that accompanies an increase in leader tenure has a substantively important impact on the probability of sanction imposition according to our model.

In addition to the visual representation in the plot, considering some predicted probabilities across substantively interesting values of leader tenure is also instructive. For example, one might be interested in how the predicted probability of sanction imposition differs for a
Table 1: Logit Results

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenure</td>
<td>−0.256**</td>
<td>−0.347***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.109)</td>
<td>(0.119)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senders</td>
<td>0.302***</td>
<td></td>
<td></td>
<td></td>
<td>0.634***</td>
</tr>
<tr>
<td></td>
<td>(0.085)</td>
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<td></td>
<td></td>
<td>(0.122)</td>
</tr>
<tr>
<td>Polity</td>
<td>−0.201</td>
<td>−0.618**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.214)</td>
<td>(0.272)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institution</td>
<td></td>
<td>−0.366**</td>
<td>−1.400***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.182)</td>
<td>(0.279)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular</td>
<td>−0.372*</td>
<td>−0.308</td>
<td>−0.259</td>
<td>−0.394*</td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>(0.219)</td>
<td>(0.210)</td>
<td>(0.238)</td>
<td>(0.209)</td>
<td>(0.271)</td>
</tr>
<tr>
<td>CINC</td>
<td>2.326</td>
<td>1.485</td>
<td>1.530</td>
<td>1.246</td>
<td>1.887</td>
</tr>
<tr>
<td></td>
<td>(1.580)</td>
<td>(1.403)</td>
<td>(1.391)</td>
<td>(1.389)</td>
<td>(1.668)</td>
</tr>
<tr>
<td>S-Score</td>
<td>0.370</td>
<td>0.528**</td>
<td>0.514**</td>
<td>0.482*</td>
<td>0.586**</td>
</tr>
<tr>
<td></td>
<td>(0.271)</td>
<td>(0.256)</td>
<td>(0.262)</td>
<td>(0.256)</td>
<td>(0.292)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.350***</td>
<td>0.052</td>
<td>0.545**</td>
<td>0.623****</td>
<td>0.999**</td>
</tr>
<tr>
<td></td>
<td>(0.422)</td>
<td>(0.268)</td>
<td>(0.240)</td>
<td>(0.241)</td>
<td>(0.486)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<tbody>
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<td>894</td>
<td>−580.871</td>
<td>1,171.742</td>
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<tr>
<td></td>
<td>1,015</td>
<td>−659.732</td>
<td>1,329.465</td>
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<td></td>
<td>1,003</td>
<td>−658.900</td>
<td>1,327.801</td>
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<tr>
<td></td>
<td>1,003</td>
<td>−655.154</td>
<td>1,320.308</td>
</tr>
<tr>
<td></td>
<td>873</td>
<td>−542.479</td>
<td>1,100.958</td>
</tr>
</tbody>
</table>

Note: *p<0.1; **p<0.05; ***p<0.01
Figure 3: Fitted values of the probability of sanctions by a leader’s tenure in office, holding all other independent variables at their medians. As tenure increases, the probability that threats escalate to sanctions decreases greatly. Rug indicates distribution of tenure measure in the data used.
leader that has only just been elected (spending one day in office) versus a leader that has been in office for four years. Holding all other variables at their medians, the model predicts that a new leader will have sanctions imposed against them with probability 0.814, while a leader that has held office for four years will have sanctions imposed against them with probability 0.594. Thus, maintaining office for four years leads to a 22% reduction in the probability that sanctions are imposed against a given leader, all else held equal. This provides further evidence of the substantial impact that leader tenure, and the reduction in uncertainty that accompanies it, has on the outcome of crises in which sanctions may be imposed.

3.4 Robustness

While the results presented in the previous section are consistent with the hypotheses that were informed by our formal theoretical argument, it is worthwhile to subject these empirical results to additional checks to guard against the possibility that some alternative mechanism is driving them. Accordingly, in this section, we discuss several robustness checks to our empirical analysis in order to demonstrate the validity of the inferences we draw from the data and the plausibility of our theoretical claims. We include more complete results in this paper’s supplementary materials.

First, the results are robust to multiple measures of leader tenure. In addition to the specifications above, we conducted analyses using year, months, and weeks, and non-logged days in office, and the substantive results are unchanged. Additionally, one potential issue is that, for some cases in the data, sanctions are imposed without an identified threat. If we exclude these cases, regressing only on observations that had a recorded threat, resulted in the observation being included in the data, the results are unchanged.

Next, the TIES dataset have a number of cases missing the specific date or month of sanctions imposition. We omitted these cases in the original model, as we cannot calculate a precise leader tenure without that information. However, we tried using the first date of the period, the middle date of the period, and the last day of the period as the date of sanctions imposition to obtain data for leader tenure in the cases where we know the leader in office at the time of sanctions. These alternative coding rules do not influence the results.

One other issue is that the likelihood of sanctions is driven not only by the mechanisms we outline above, but rather by the particular issue under dispute. For example, perhaps security issues are more likely to result in sanctions in comparison to disputes centered on economic disagreements or human rights concerns. To account for this possibility, we exploit the issue variable as coded in the TIES data, controlling for issue area. When issue area is controlled for in the model, our results of interest are unchanged. Furthermore, and somewhat surprisingly, the issue dummies themselves do not achieve statistical significance at any conventional level
Another concern for the findings presented above is that the results may be driven not by an informational mechanism but rather by the possibility that sanctions are more effective against leaders early in their tenure, before they have been able to consolidate power. This concern is especially relevant for our estimation strategy, as the use of leader tenure as a proxy for uncertainty is cast into doubt if this alternative explanation holds. To address this concern, we repeated the analysis from the previous section, dropping all observations in which the leader’s tenure was less than one year. This guards against the possibility that the result is entirely driven by sanctions imposed on leaders very early in their tenure, when leaders are especially vulnerable and have not yet had time to consolidate power. The results of this analysis are substantively identical to those presented above, suggesting that while consolidation of power in the target state may be a relevant feature of the sanctioning process, it does not confound the inferences we draw about leader tenure and uncertainty.

A final concern for the robustness of our results stems from the nature of the data that we implement. In particular, as is usual in international relations data, the set of cases represents a selection process through which, prior to considering whether to impose sanctions, states face a decision over whether to escalate or initiate a crisis to the point which sanctions become a viable option. To account for this possibility, we employ a bivariate probit selection model (Dubin and Rivers 1989) as a robustness check. In this model, the base set of cases is the set of directed-dyad years, and the selection equation includes the controls discussed above, as well as a measure of political relevance and distance between the target state and the primary sender. The results of the outcome equation are substantively identical to those of the models presented in the earlier sections, and thus in the interest of brevity we omit these results.

4 Conclusion

Why can’t states settle disputes short of economic sanctions? This paper identified uncertainty about a leader’s consolidation of power as an important independent variable. When foreign opponents are certain of a leader’s relative strength, the parties can reach a mutually preferable outcome short of sanctions, if such a mutually preferable outcome exists. However, leaders know their own security better than international opposition. Given the asymmetry, weaker leaders have incentive to bluff strength and escalate crises. Faced with this uncertainty, foreign powers sometimes impose sanctions to catch potential bluffers.

Our formal model demonstrated that those foreign powers are least likely to impose sanctions when their uncertainty diminishes. We then tested this theory using leader tenure as

\[^{10}\text{See Wolford 2012 for a similar argument about war onset.}\]
a proxy for uncertainty. As predicted, threats are less likely to escalate to sanctions when leaders have been in office for longer periods of time. The results persist when controlling for other factors that could cause a connection between shorter tenures and more sanctions and are robust to alternative specifications of leadership tenure. In addition, and consistent with the informational logic, sanctions are less likely versus democracies and when the crisis involves international institutions.

Moving forward, our statistical findings suggest that leader tenure is a useful proxy for incomplete information in international environments. The connection has strong theoretical support (Wolford 2007) and prior empirical application (Rider 2013). We recommend that empirical scholars of inefficient international conflict consider utilizing the Archigos dataset for this purpose.

5 Appendix

This appendix provides proofs for the incomplete information game. The proofs for Proposition 5 and Proposition 6 are grouped together because the strategy is mostly identical.

5.1 Proof of Proposition 4

Let $r$ be $F$’s posterior belief that $H$ is strong at its information set where it chooses whether to impose sanctions. Not imposing sanctions yields a flat $z_F$ regardless of the posterior. In contrast, $F$ earns $p$ if $H$ is strong and $p'$ if $H$ is weak. Weighing these payoffs by their respective likelihoods, $F$’s expected utility equals $rp + (1 - r)p'$. Thus, $F$ strictly prefers imposing sanctions if:

$$rp + (1 - r)p' > z_F$$
$$r < \frac{p' - z_F}{p' - p}$$

By analogous argument, $F$ strictly prefers not imposing sanctions if $r < \frac{p' - z_F}{p' - p}$ and is indifferent if $r = \frac{p' - z_F}{p' - p}$.

Now consider $H$’s decision to back down or continue the crisis. If $H$ is strong, it receives $y_H$ for backing down and at least $1 - p$ for continuing. Recall that $1 - p > y_H$ for this parameter space. Consequently, continuing strictly dominates backing down. The strong type must therefore continue with probability 1 in every strong PBE.

In turn, the weak type makes its decision with the knowledge that the strong type will continue and $F$ will take its action according to the above posterior. If $q > \frac{p' - z_F}{p' - p}$, which holds
for this parameter space, then F will back down regardless of the weak type’s strategy—the probability that H is strong is too high for F to take the gamble. Since \( z_H > y_H \), the weak type’s unique optimal strategy is to continue.

Moving back to the initial move, if F issues a threat, both types pool, and F must ultimately back down. This yields a payoff of \( z_F \). On the other hand, F can quit and receive \( x_F \) instead. Since \( x_F > z_F \), F takes this action. The game ends immediately with F quitting and maintaining the status quo.

5.2 Proof of Proposition 5 and Proposition 6

If \( q < \frac{p' - z_F}{p' - p} \), the weak type’s action can manipulate F’s best response. If the weak type pools, then \( r < \frac{p' - z_F}{p' - p} \) and so F imposes sanctions. This cannot be an equilibrium because the weak type could profitably deviate to backing down. If the weak type separates, \( r = 1 \) and so F does not impose sanctions. This again cannot be an equilibrium as the weak type could profitably deviate to continuing the crisis, knowing that F will back down.

As such, the equilibrium must be in semi-separating strategies. The weak type earns \( y_F \) for backing down. Let \( \sigma_I \) be F’s probability of imposing sanctions. Then the weak type’s expected utility for continuing the crisis equals \( \sigma_I(1 - p') + (1 - \sigma_I)(z_H) \). Therefore, the weak type’s indifference condition is:

\[
\sigma_I(1 - p') + (1 - \sigma_I)(z_H) = y_H \\
\sigma_I = \frac{z_H - y_H}{z_H - (1 - p')}
\]

This is valid; \( z_H > y_H \) and \( z_H > 1 - p' \) ensure both the numerator and denominator are positive, while \( y_H > 1 - p' \) ensures that the denominator is greater than the numerator.

Since the weak type’s indifference condition requires F to mix, F must be indifferent between imposing sanctions and not. From earlier, that indifference condition is \( r = \frac{p' - z_F}{p' - p} \). Let \( \sigma_C \) be the weak type’s probability of continuing the crisis. With the strong type continuing with probability 1, F calculates its posterior through Bayes’ rule as follows:

\[
r = \frac{q(1)}{q(1) + (1 - q)(\sigma_C)}
\]

Substituting \( r \) with the indifference condition yields:

\[
\frac{p' - z_F}{p' - p} = \frac{q(1)}{q(1) + (1 - q)(\sigma_C)}
\]
\[ \sigma_C^* = \frac{q(1 - \frac{p' - z_F}{p' - p})}{(1-q)\frac{p' - z_F}{p' - p}} \]

All that remains is to check whether F prefers issuing the threat to begin with or stay out entirely. Staying out yields a flat \( x_F \). F’s payoff for threatening is significantly more complicated. With probability \((1-q)(1-\sigma_C^*)\), F faces the weak type and it gives up, giving F a payoff of \( y_F \). The remaining portion of the time, F receives a combination of \( z_F \), 0, and 1. Fortunately, F’s indifference condition simplifies this to just \( z_F \). As such, F threatens if:

\[ (1-q)(1-\sigma_C^*)(y_F) + [1 - (1-q)(1-\sigma_C^*)](z_F) > x_F \]

Substituting \( \sigma_C^* = \frac{q(1 - \frac{p' - z_F}{p' - p})}{(1-q)\frac{p' - z_F}{p' - p}} \) and solving for \( q \) yields:

\[ q < \left( \frac{y_F - x_F}{y_F - z_F} \right) \left( \frac{p' - z_F}{p' - p} \right) \]

So if \( q \) is less than that critical threshold, F stays out of the crisis. If not, it threatens. Strong opponents continue the crisis while some portion of weak opponents drop out. F then sometimes imposes sanctions and sometimes does not.

Works Cited


