Sanctions, Uncertainty, and Leader Tenure

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Abstract

When do 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—particularly in autocracies—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 half of a year (Euraque 1996, 113-114). They were right—López Arellano stayed in office for eight years, while the futile sanctions faded away after five months.

While the Honduran coup crisis is but a single case, it highlights the importance of asymmetric information in understanding sanctions behavior. Past research has recognized the role of uncertainty in sanctions imposition. What is missing is precision: What kind of uncertainty leads to sanctioning behaviors? And how do we empirically measure such uncertainty?

Undoubtedly, there are many valid answers to these questions. Our research focuses on a single issue: uncertainty about a rival's consolidation of power. 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 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 other 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 because they know that the strategy will prove ineffective. In either case, the result is efficient.

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. As a result, it is not immediately clear how uncertainty affects the outbreak of sanctions, as much of the learning could take place during the threat stage. We therefore formally investigate such an environment. 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

counter-intuitively impose sanctions against leaders more capable of surviving them.[1]

We then test whether environments with greater uncertainty are more likely to escalate to sanctions given the observation of a threat. Ordinarily, such tests about uncertainty are difficult to conduct due to selection problems. Fortunately, comparative statics from our theoretical model allow us to make predictions about how states act once in a crisis. In turn, we employ the Threat and Imposition of Sanctions (TIES) dataset (Morgan et al 2014) to empirically test a number of hypotheses.

In particular, following Wolford (2007) and Rider (2013), we use leader tenure as a useful proxy for incomplete information. As Wolford (2007, 784) states, "private information is introduced each time a new leader enters office" because 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 TIES. 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 percentage points 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.

We further measure uncertainty by noting that as the "bandwidth" of possible sanctions outcomes converges to the same outcome, the probability of observing sanctions goes to 0. This type of measurement is possible across many formal models but is often ignored. Yet it leads to rich empirical predictions. Here, we provide microfoundational support for the idea that the bandwidth of possible sanctions outcomes is significantly greater for autocratic targets than democratic targets. Our empirical analysis confirms the hypothesis. Moreover, and again in line with our theoretical expectations, leader tenure matters more in these autocratic cases than the democratic cases. We believe that international relations scholars regardless of substantive focus can exploit this measure of uncertainty in both their theoretical and empirical arguments.

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.[2] Yet incorporating incomplete infor-

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

[2] For a non-exhaustive list, see Fearon 1994, Fearon 1995, Schultz 1998, Schultz 2001, Wagner 2000, and

mation 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 (Wolford 2007, Rider 2013). Second, a growing number of scholars over the past decade have argued that leaders are the central actor in international relations, not states.[3] Our results indicate some state-level factors have an impact on dispute resolution, but we highlight the critical role that leaders play in economic coercion. Finally, we make both theoretical and empirical contributions to the literature on sanctions. Early research on sanctions suggested that their imposition rarely influenced the behavior of targets (Huffbauer et al 2007, Pape 1997). A second strand of game-theoretic work pointed to selection effects as an explanation for this ineffectiveness (Smith 1996; Nooruddin 2002; Drezner 1999; Drezner 2003; Lacy and Niou 2004). However, this literature has neglected the role of uncertainty in the sanctioning process. By modeling uncertainty both theoretically and empirically, we contribute clarity to the literature on economic sanctions.

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 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.[4]

2 Modeling Sanctions and Consolidation

Due to selection effects arising from strategic interaction, the correlates of sanction episodes are not always obvious. Thus, to obtain a valid understanding of how private information about leader vulnerability affects the imposition of sanctions, we turn to a formal model. Game theory provides a useful tool for the analysis of strategic interaction, allowing for the development of arguments that clearly tie assumptions about preferences and strategic interdependence to conclusions about rational behavior. Our goal here in implementing a

Slantchev 2003.

[3]For a non-exhaustive list, see Bueno de Mesquita et al 2004, Goemans 2000, Goemans and Fey 2009, Debs and Goemans 2010, and Chiozza and Goemans 2011.

[4]We nevertheless run robustness checks using selection models and find that our central claims still hold.

formal model is to establish "accounting standards" (Powell 1999, 32-33) that map uncertainty to expectations about sanction behavior during a crisis. Specifically, 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 frequency of sanction imposition which we subject to statistical testing.

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 sanctions. F begins by choosing whether to quit or threaten 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. The game then ends.[5]

We model H as a political leader seeking to maintain office and who is responsive to her selectorate. To represent this, we use the function $\mathcal{S}(x)$ to reflect the probability that the leader stays in power at the end of the game. This function is a mapping $\mathcal{S} : \mathbb{R} \to [0, 1]$, and as such produces a probability of reelection for each value of its argument. The leader only derives utility from office rents, which we standardize to 1, so her payoff at each information set can be represented by the value of $\mathcal{S}$.[6] Additionally, let $\mathcal{S}$ be strictly increasing and continuous.

We parameterize the game with arguments for the function $\mathcal{S}$, which shift the probability of maintaining office after a given set of actions. First, the argument q determines a leader's baseline level of office security. More precisely, H survives with probability $\mathcal{S}(q)$ if F maintains the status **Q**uo. Next, l parameterizes the **L**oss of office security that a leader suffers if they back down from threatened sanctions. Formally, H earns $\mathcal{S}(q - l)$ if it loses the crisis by backing down. The parameter r denotes the amount that H's selectorate **R**ewards its leader for winning the crisis. Thus, H's payoff is $\mathcal{S}(s + r)$ if F does not apply sanctions after issuing a threat. Finally, the value s parameterizes the loss of office security that results from the

[5]This general set of moves is common in the literature on sanctions (Drezner 2003).

[6]Throughout, we assume that the leader's utility is represented by a von-Neumann Morgenstern representation u (sometimes also referred to as a "cardinal utility function"), and we normalize u(holding office) = 1 and u(losing office) = 0 and assume that the leader is risk neutral over these two outcomes. Therefore, the leader's utility over any lottery between these two outcomes is equal to her utility of the expectation of the lottery, which allows us to simply write the leader's payoffs as equal to the probability of maintaining office.

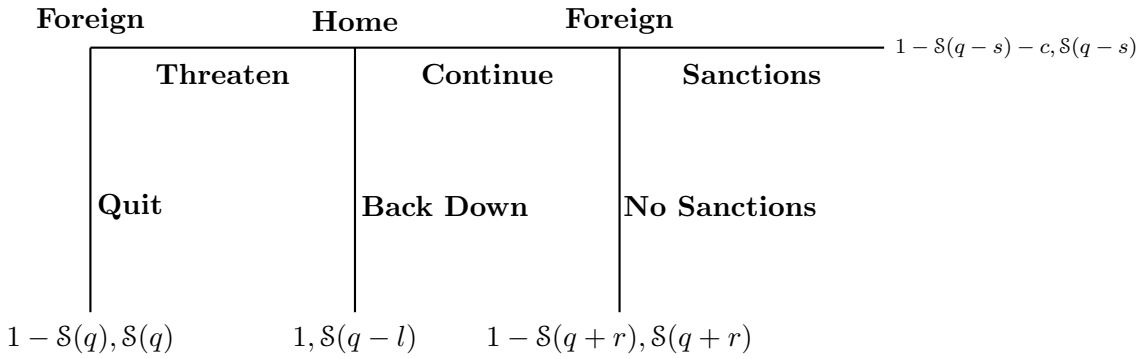

Figure 1: The complete information game's extensive form.

imposition of **S**anctions. Formally, H receives $\mathcal{S}(q-s)$ if F ultimately imposes sanctions. Throughout, we assume that the values q, l, r, and s are all strictly positive. Because $\mathcal{S}(x)$, is strictly increasing in x, the leader is intuitively more likely to survive if she prevails in the crisis than if F maintains the status quo and is more likely to survive if F maintains the status quo than if H loses the crisis. Whether the leader is more likely to survive sanctions than if she backs down can vary and will partially determine the equilibrium outcome of a given parameter space. Table 1 presents these parameters and their substantive descriptions in an organized format.

These payoffs reflect our empirical understanding of sanctions and crises. Sanctions may never deterministically remove leaders from power. Rather, their economic ramifications shift selectorate preferences, which triggers turnover in leadership or forces the current government to terminate the policy. American sanctions on the Israeli military, for example, tipped the electoral scales in favor of the Labor party in 1995 (Drezner 1999, 2). In a more grizzly case, American sanctions against Rafael Trujillo's regime in the Dominican Republic helped inspire a group of political opponents to assassinate him. Thus, while sanctions may never be the most important factor in leadership turnover and may in fact only exploit preexisting weaknesses, they have a non-negligible effect on regime survival (Kirshner 1997, 59), though their strength may vary by regime type (Escribà-Folch and Wright 2010). This is also borne out in Marinov's (2005) large-n study, which showed that the imposition of sanctions increases the likelihood of removal from office by 28%. Our model operationalizes this by having sanctions with stronger effects on the selectorate increase the value of s and in turn decrease $\mathcal{S}(q-s)$.[7]

[7]Of course, and as our formal analysis will later corroborate, the situations where leaders are most fearful of sanctions are also the situations where crises end during the threat stage. This is perhaps most apparent in attempts to keep South Korea (Drezner 1999, 260-261; Pollack and Reiss 2004, 262-263) and Ukraine (Drezner 1999, 199-202; Reiss 1995, 122) from developing nuclear weapons. In both cases, economic development was too important domestically to risk sanctions. The threat of losing power also influences behavior during sanctions

Notation	Description
$\mathcal{S}(\cdot)$	$H's$ office security function, which is continuous and strictly increasing
q	H's status quo level of office security
l	H's loss of office security after backing down from a threat
r	H's office security reward for winning sanctions episode
s	H's loss of office security after sanctions are imposed
c	F's cost of implementing sanctions

Table 1: Notation of the sanctions game

Meanwhile, F wants to achieve its policy goals, which we standardize to value 1.[8] If H maintains power and keeps the policy, F's payoffs are therefore zero. In contrast, if H loses power or concedes the policy issue, F obtains 1.[9] Additionally, if F imposes sanctions, it suffers a cost $c > 0$ to reflect lost economic productivity (Martin 1992). Given H's likelihood of staying in power for each outcome, F therefore most prefers H backing down and least prefers not imposing sanctions after a crisis starts. Whether F prefers quitting or imposing sanctions depends on the effectiveness of sanctions and their cost to implement, which we allow to vary in the model.[10]

2.2 Description of Complete Information Equilibria

Since the game requires a trivial application of backward induction to solve for its subgame perfect equilibria, we instead focus on the substantive results. Figure 2 illustrates equilibrium outcomes as a function of H's payoff for sanctions and its payoff for backing down.[11]

On the right side, when the sanctions are unlikely to sway H's selectorate much (or the costs of imposing them are too high), F cannot credibly threaten their imposition. H then knows it can continue the crisis and force F to give up. Anticipating this, F maintains the status quo to avoid trapping itself in an unwinnable conflict.

episodes. Following World War II, Yugoslavia under Josip Broz Tito began drifting away from Moscow's foreign and domestic policy agenda. Joseph Stalin's response was to cut trade and aid to Yugoslavia. Facing deep economic upheaval at a time of reconstruction, Tito eventually reached a compromise to avoid risking destabilization of his regime (Freedman 1970, 33).

[8]This may be because F is also trying to appeal to some selectorate that values the policy goal. However, the model is general on this—F could also be a traditional unitary actor.

[9]This assumes that H's successor will certainly concede the policy issue. We could obtain similar results by relaxing this assumption. The net effect is that sanctions look comparatively more valuable in the case we analyze.

[10]Most critically, this means that sanctions are completely instrumental—F receives no benefits for expression or gains by using sanctions as costly signals (Kirshner 1997, 34).

[11]Note that throughout we assume that the cost of sanctions are sufficiently high to avoid "deadlock" scenarios in which sanctions occur even under complete information. Formally, we assume that $c > \mathcal{S}(q) - \mathcal{S}(q-s)$. Deadlock represents situations in which the foreign power threatens the target state despite knowing that the target state will not back down.

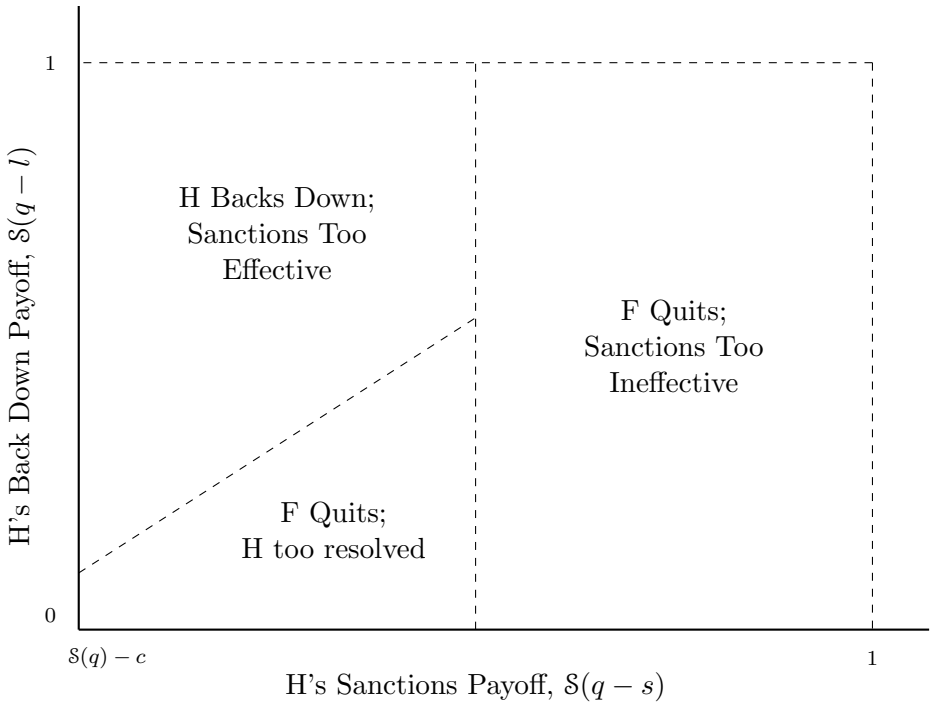

Figure 2: Equilibrium outcomes of the complete information game as a function of H's payoffs for sanctions and backing down.

The interaction becomes more interesting when the probability of H surviving sanctions is small. Indeed, on the left side of the figure, F prefers imposing sanctions if H challenges it by continuing the crisis. When sanctions bring H's leader a worse fate than backing down, as in the top left of the figure, H responds by conceding the issue and accepting the selectorate's punishment. Knowing that it can obtain its goals, F initiates the crisis.

In the contrasting case, which appears in the bottom-left of the figure, H's payoff of backing down is so low that it would prefer to weather sanctions. Knowing this, F does not impose sanctions as H is simply too resolved; similar to the right-hand side of the figure, sanctions are not worth their cost in this case.

2.3 How Uncertainty Leads to Sanctions

Unfortunately, the complete information model only provides a partial story. It assumes that F precisely knows the effectiveness of sanctions in triggering leadership turnover. Yet, in practice, such knowledge is not readily forthcoming. As Kirshner (1997, 42) states, "[i]dentifying and targeting the right groups is the key to maximizing the chances the sanctions will be successful." Such identification is not always easy. Foreign powers consequently must weigh the possibility that sanctions will only have a minimal impact. We now consider such a dynamic.

Nature begins the interaction by choosing whether H is "strong" with probability p or "weak" with probability $1 - p$. The only difference between these two types is their ability to weather sanctions. If imposed, the strong type and weak types maintain power with respective probabilities $\mathcal{S}(q - s)$ and $\mathcal{S}(q - s')$, with $s' > s$. Put differently, the strong type is more likely to stay in power than the weak type if and only if F imposes sanctions. 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.

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 in the non-trivial cases. 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.

First, note that we restrict attention to regions of the parameter space in which strong and weak types behave differently in equilibrium. In particular, if both types of H prefer suffering sanctions to backing down, F knows that the crisis is a losing battle even if it is

actually facing the weak type. As a result, F quits. On the other hand, if both types of H prefer backing down to sanctions, F knows that initiating a crisis will pay off regardless of its specific opponent. In turn, both types back down, and the interaction again ends without sanctions.[12] Put differently, it takes a very specific type of incomplete information for the crisis to end in sanctions—namely, the strong type must prefer imposed sanctions to backing down while the weak type must prefer backing down to imposing sanctions, which is the case that we will focus on throughout the remainder of the paper. This observation leads to a critical testable hypothesis below, as it indicates that incomplete information only leads to sanctions when F cannot distinguish the consequences of sanctions on H's subsequent behavior.

Given our focus on the case in which types differ substantively, with the strong type preferring to weather sanctions and the weak type preferring to back down, we now consider equilibrium outcomes under incomplete information. We organize these outcomes below by p, the prior probability that H is strong:

Proposition 1. *If the probability H is strong is sufficiently low, F issues a threat. The strong type continues the crisis with certainty while the weak type mixes between backing down and continuing the crisis (bluffing strength). F responds by sometimes imposing sanctions (calling the potential bluff) and sometimes conceding.*

The appendix details the full proof. For intuition, consider the subgame beginning with H's decision whether to back down or continue the crisis. Since the strong type prefers suffering sanctions to backing down, it must escalate the conflict. It appears that the weak type has incentive to pool with the strong type and bluff its strength. However, this will not work. Weak types sufficiently outnumber strong types for Proposition 1's parameter space. Consequently, if all weak types pool by continuing the crisis, F would impose sanctions, and the weak type would be better off in retrospect by backing down instead. The weak type responds to this strategic constraint by only sometimes bluffing strength.

Knowing that the weak type is tempted to bluff more frequently, F responds by sometimes imposing sanctions if the game reaches its final stage. This successfully deters the weak type from bluffing any further. However, it also comes at the cost of sometimes mistakenly imposing sanctions against the strong type. Notably, since some percentage of the weak types have filtered themselves out after the threat stage, F is more likely to impose sanctions on stronger types in equilibrium than it would if it blindly imposed sanctions at the start.

Additionally, the probabilistic bluffing and sanctioning behavior in Proposition 1 helps explain why foreign powers sometimes threaten sanctions but fail to follow through even

[12] We omit proofs for each of these cases because they follow the analogous situations of the complete information game.

though the opponent has maintained the undesirable policy.[13] Given that such actions only further stabilize the opposing position, F would never fail to follow through with complete information. Nevertheless, when F contends with potential bluffers, it sometimes issues threats it will ultimately regret.

Proposition 2. *If the probability H is strong is sufficiently high, F quits without issuing a threat.*

The appendix contains a full proof. Essentially, the relatively high frequency of strong types creates two possible dynamics. First, the population of strong types might be so great that weak type of H can pool with the strong type and always feign strength. This forces F to give up without imposing sanctions; even though H is possibly weak, the more likely possibility that F is strong does not justify the cost of sanctioning. In more moderate cases, issuing the threat leads to the occasional bluff from weak types as described in the intuition for Proposition 1. However, the probability that H is strong is still relatively high in this case. This inflates the cost of scaring away weaker types and causes F to quit. In either case, no sanctions occur since the crisis never begins.

2.4 Comparative Statics: Sanctions and Uncertainty

Deeper analysis of the incomplete information model allows us to draw three key implications from the model, which we test empirically in the following section. More specifically, we first derive results showing that, for two reasonable conceptualizations of uncertainty, the probability that sanctions occur in equilibrium approaches zero as uncertainty vanishes. Additionally, we derive a result from the model that demonstrates that, counter to the logic of deterrence, the probability of sanctions increases as H's cost of backing down increases.

We start with measuring uncertainty based on F's prior about H's type:

Proposition 3. *As F's uncertainty about H's type goes to 0 (i.e., as p goes to 0 or 1), the probability F imposes sanctions goes to 0.*

Put differently, as F's belief ventures away from the greatest uncertainty (i.e., $p = \frac{1}{2}$) and approaches the extremes that have the least uncertainty, the probability of observing sanctions goes to 0.[14] While the appendix includes a detailed proof, the intuition as follows. Per Proposition 2, if F believes that H is sufficiently likely to be strong, the expected ineffectiveness of sanctions compels F to quit the crisis. Therefore, F never imposes sanctions. The more

[13] Such an outcome is surprisingly frequent. The TIES dataset contains 1413 cases of sanctions crises. 567 ended without sanctions. Of these, 207 (36.5%) saw the sender fail to gain any ground against their targets.

[14] $p = \frac{1}{2}$ maximizes uncertainty because the variance of a Bernoulli distribution maximizes at that value.

interesting case is on the other end of the spectrum, when F believes H is almost certainly a weak type. Here, sanctions still occur with positive probability. Per Proposition 1, weak types sometimes bluff strength by continuing the crisis. F combats this behavior by sometimes imposing sanctions. However, the mixing probabilities show that the likelihood F imposes sanctions still goes to 0 in this case. Intuitively, this is because only a very small minority of weak types can attempt a bluff if H is almost certainly weak. In turn, F is very unlikely to reach its decision whether to impose sanctions.

Note, though, that the value of F's prior belief about H is only one measure of uncertainty. Another equally valid conceptualization of uncertainty involves the degree of dissimilarity between the possible types of H that F faces. In the context of the model, this quantity is the variance in the effectiveness of sanctions, which $\mathcal{S}(q-s)-\mathcal{S}(q-s')$ measures. Using this conceptualization of uncertainty, we draw a second comparative static similar to Proposition 3:

Proposition 4. *As the effectiveness of sanctions against both types approaches being identical (i.e., as $\mathcal{S}(q-s)-\mathcal{S}(q-s')$ goes to 0), the probability F imposes sanctions goes to 0.*

Unlike Proposition 3's result, which is a simple calculation of equilibrium probabilities, the mechanism behind Proposition 4 is not immediately apparent. However, the logic that differentiates the behavior of each type in equilibrium helps. Recall that F does not impose sanctions in equilibrium if both types prefer sanctions to backing down or both sides prefer backing down to sanctions. In essence, a cutpoint that separates these two preferences exists. For sanctions to occur with incomplete information, the sanctions payoffs for the types must be on separate sides of this cutpoint. But as the bandwidth of possible sanctions outcomes approaches 0, the probability of straddling a single point goes to 0. The game then folds into the complete information case, with F quitting if both types prefer sanctions and F forcing H to back down in the other case.

Overall, these comparative statics assure us that regardless of whether one conceptualizes the degree of uncertainty as the distance of F's prior belief from 0 or 1 or the difference in the types of possible targets F faces, the influence of decreasing uncertainty remains the same: sanctions become less likely.

Next, we turn from information to another interesting implication of the model that runs counter to the traditional logic of deterrence. Typically, the logic of deterrence suggests that as the payoff of backing down decreases for a target state, the credibility of a threat to fight increases, reducing the attractiveness of initiating a conflict against the target. The logic of deterrence might lead one to expect that leaders with low payoffs for backing down should be more able to credibly commit to hold firm, deterring F from issuing a threat in the first

place. However, Proposition 5 demonstrates that this intuition does not hold in this case.

Proposition 5. *As H's payoff of backing down from the threat of sanctions decreases, the probability of observing sanctions in equilibrium increases.*

While this result is counterintuitive, it follows immediately from the equilibrium strategies outlined in Proposition 1. The intuition for this result relies on the logic of H and F's rational gambles in this equilibrium. Because the weak type of H probabilistically bluffs to mimic the strong type, F must probabilistically implement sanctions to prevent the weak type of H from mimicking the strong type with probability 1. To do this, F's probability of sanctions must strike a balance, making H indifferent between continuing and backing down. Because H's payoff for backing down is worse than its payoff if F subsequently declines to impose sanctions, a decrease in the payoff of backing down requires F to increase the probability that it imposes sanctions to maintain H's indifference. Thus, Proposition 5 demonstrates how, counter to the logic of deterrence, the probability that sanctions occur in equilibrium increases as backing down becomes less attractive for H.

3 Empirical Evidence of Sanctions and Uncertainty

We now turn to investigating the empirical record on sanctions, beginning by detailing our hypotheses and their connection to the theoretical results of the previous section. Next, we outline an empirical strategy which allows us to operationalize concepts that have proven difficult to measure in previous research on international crises. 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, ultimately demonstrating that our results hold under a bevy of alternative model specifications.

3.1 Research Design and Hypotheses

The analytical results derived from our theoretical model provide a set of clear implications. First, Propositions 3 and 4 indicate that as uncertainty about the leader of a target state's preferences becomes present, sanctions become more likely. Next, Proposition 5 indicates that as the leader of a target state's cost for backing down in the face of threatened sanctions increases, the probability of observing sanctions increases. In this section, we take these clear theoretical results and, using the existing literature as a guidepost for operationalizing uncertainty and costs, tie them to specific, empirically testable hypotheses which we evaluate with a statistical analysis.

The primary empirical obstacle in assessing these theoretical propositions arises in evaluating the first implication, which requires us to operationalize 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. 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 accumulation of information allows foreign powers to be more confident in their assessment of the preferences of a target state's leader. Thus, it is reasonable to expect that information about the preferences of a target state is increasing in tenure length. This allows us to evaluate our prediction concerning uncertainty with the following hypothesis:

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.[15]

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

[15]We acknowledge, however, that this information may itself be strategically manipulated. Despite 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.

transaction costs is by facilitating the transfer of information.

To tie this expectation more explicitly to the implications of our game-theoretic model, it is useful to conceptualize the foreign state, F, as working through an international institution. In this case, the guidance of the literature on international organizations suggests that, by working in conjunction with an institution, the foreign state should gain information about the preferences of the sanctions target that would not have been available otherwise. 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.*

While our primary interest is in empirically evaluating the role of uncertainty in sanctions episodes, the analytical results derived from the game theoretic model demonstrate that sanctions are more likely both when uncertainty about a leader's preferences is high and when a leader's payoff from backing down in the face of threatened sanctions, denoted $\mathcal{S}(q-l)$, is low. While Hypotheses 1 and 2 focused on our theoretical finding that uncertainty over a leader's payoff once sanctions are levied increases the probability of observing sanctions, neither of these hypotheses are designed to test the model's implication that sanctions are more likely to be observed when a target state's leader has a low payoff for backing down, embodied in Proposition 5.

Testing this implication introduces an additional difficulty, as it requires us to operationalize a leader's payoff for backing down. Fortunately, the existing literature on the incentives of leaders in international crises provides us with a guidepost for empirically testing this prediction. A large body of existing work has tied regime type to the incentives of leaders in interactions with external states. This literature has shown that these regime-type effects, which influence the incentives of leaders, influence a broad range of international interactions such as foreign aid provision (Licht 2009), war (Goemans 2009, Chiozza & Goemans 2011), and international trade agreements (Mansfield et al. 2002). Of particular use for present purposes, previous work has indicated that the consequences of failure in foreign policy crises are quite different for the leaders of democratic and autocratic states, with autocratic leaders faring worse (Debs & Goemans 2010).

Existing work has established a relationship between leader incentives, regime type and economic sanctions (Allen 2008a 2008b). Taken along with Debs & Goemans's (2010) argument that the consequences of failure in foreign policy crises are much more severe for autocratic leaders than democratic ones, this suggests that regime type should play a significant role in determining a leader's payoff for backing down from sanctions. Furthermore,

autocratic leaders often engage in behavior that results in the imposition of sanctions in order to consolidate power domestically. For example, as Lake (2010) argues, Saddam Hussein likely valued a reputation for possessing WMDs as a means of suppressing domestic threats to his regime such as coups or a potential Shiite rebelion. Thus, in this case, backing down would have resulted in the withdrawal of sanctions, but would also have revealed information about Hussein's actual WMD capabilities, which might have served to undermine his regime's ability to deter internal challenges. In sum, the payoff of backing down in the face of threatened sanctions appeared bleak, and as a result Hussein stood firm and sanctions were imposed.

The above discussion indicates that, relative to autocratic leaders, a leader of a democratic state's payoff for backing down should be high and the difference in possible utilities in the event of sanctions should be low. Therefore, the implications of Proposition 5 suggest the following hypothesis:

Hypothesis 3. *Sanctions are less likely to be imposed against more democratic states.*

In addition to the influence of regime type in determining a leader's payoff for backing down, regime type should also influence the information structure of a given sanctioning episode. In particular, the existing literature on democracy and international conflict, combined with our theoretical expectations about uncertainty, suggest an *interactive* effect between the level of democratization and leader tenure.

A large body of literature has tied domestic political institutions to conflict outcomes (e.g. Leeds & Davis 1999, Reiter & Stam 2003). 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. Furthermore, the literature on political media coverage has demonstrated that free presses in democratic states result in media coverage that reveals more information about preferences at the elite level versus closed, autocratic regimes (Alexseev and Bennett 1995, Zaller and Chiu 1996).

An example supporting this basic argument appears in Kirschner's (1997) discussion of the failure of US sanctions against Panamanian dictator Manuel Noriega. Kirschner argues that while the US anticipated that sanctions would devastate Noriega, they ultimately failed to sufficiently harm his domestic allies. This indicates that the bandwidth of possible outcomes in this case was relatively great, and the closed nature of the Panamanian regime during this time likely attributed to Washington's overly optimistic beliefs. In the absence of such uncertainty, the US likely would not have imposed sanctions in the first place. In a similar ar-

gument applied to US sanctions against Slobodan Milosevic, Brooks (2002) demonstrates that sanctioning states' miscalculations about this autocratic leader's ability to weather sanctions contributed to the failure of the policy in contrast to the success of similar sanctions levied against South Africa during the same time. Thus, we expect that the openness of democratic institutions contributes to the provision of information about foreign policy leader's preferences in the manner Proposition 4 discusses, which means that an autocrat's tenure should provide relatively more information than a democrat's.

In short, this discussion suggests that democratic states have smaller bandwidths of uncertainty because information is available through channels other than a leader's publicly observable actions. As such, leader tenure should provide less information against a democracy relative to an autocratic state. Thus, Proposition 4's bandwidth argument (combined with results from the existing literature) indicates that leader tenure should have the strongest effects when the state in question is autocratic. Since we theorize that uncertainty about the bandwidth of effectiveness of sanctions against a democracy is smaller than against an autocracy, each extra day of tenure should be more important in resolving a crisis versus autocracies.

Hypothesis 4. *There is an interaction effect between tenure and regime type: The marginal effect of tenure in reducing the probability of sanctions is greater for more autocratic targets.*

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.[16]

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

[16] In relating the empirical analysis to our model, one potential issue is that sanctions are sometimes imposed without an identified threat. If we exclude these cases, regressing only on observations that had a recorded threat, the results are unchanged.

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.[17] 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

[17] We add 1 to the day count to ensure that all values of the tenure measure are greater than 0.

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.

Polity. Hypothesis 3 stated that democracy serves to both raise a leader's payoff for backing down from sanctions while simultaneously reducing 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.[18]

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. Additionally, we control for the number of states involved in threatening or imposing sanctions in a particular case by including the variable *Senders*, which is a simple count of sanctioning states pulled form the TIES 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 below 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

[18] We also run robustness checks by differentiating autocratic regimes (personalist, monarchic, military, and party) from Geddes, Wright, and Frantz (2014) and find that our results hold.

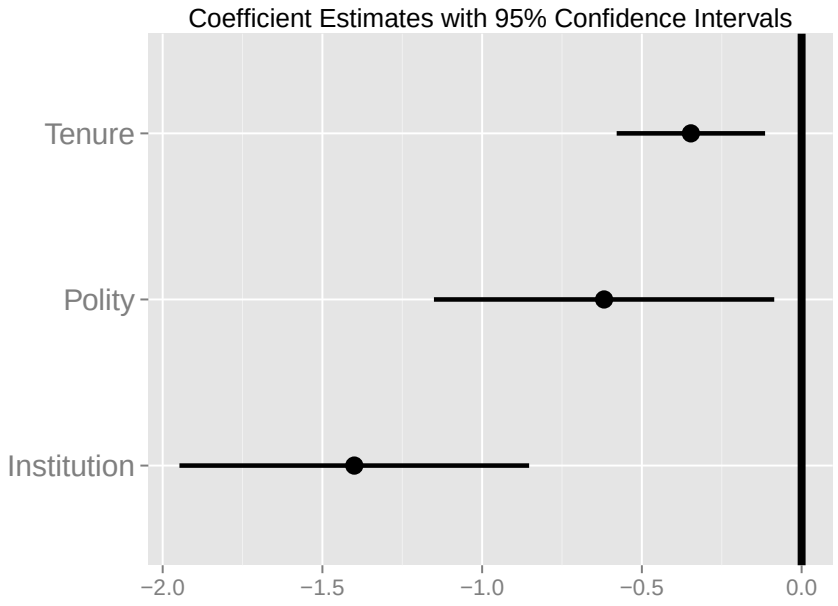

Figure 3: Coefficient estimates of our three independent variables of interest with 95% confidence intervals. The empirical model supports each of our hypotheses.

selection model (Dubin and Rivers 1989).[19] 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 3 presents point estimates of the coefficients on our three 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 2.

Consistent with our hypotheses, Figure 3 indicates a negative relationship between leader

[19] 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.

tenure and sanctions. Additionally, the negative coefficients on institutional involvement and polity score are consistent with Hypotheses 2 and 3. 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 of observing sanctions.

Looking to Table 2 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 fourth 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 percentage point reduction in the probability of sanction imposition. Thus, increasing levels of democratization has a non-negligible influence on the probability of a sanctions episodes under the full model, providing support for Hypothesis 3.

Next, to demonstrate the influence of leader tenure, Figure 4 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 percentage point 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, lending support to Hypothesis 1.

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

Table 2: Logit Regression Results

	Dependent variable:				
	Sanction Imposition				
	(1)	(2)	(3)	(4)	(5)
Tenure	−0.282**			−0.347***	−0.874***
	(0.110)			(0.119)	(0.276)
Institution		−1.154***		−1.400***	−1.408***
		(0.238)		(0.279)	(0.281)
Polity			−0.095	−0.618**	−3.065***
			(0.218)	(0.272)	(1.140)
Regular	−0.290	−0.324	−0.232	0.041	0.085
	(0.224)	(0.214)	(0.241)	(0.271)	(0.276)
Senders	0.328***	0.567***	0.299***	0.634***	0.639***
	(0.091)	(0.108)	(0.085)	(0.122)	(0.124)
CINC Score	2.174	1.290	1.408	1.887	2.204
	(1.604)	(1.435)	(1.407)	(1.668)	(1.682)
S Score	0.433	0.578**	0.560**	0.586**	0.608**
	(0.274)	(0.263)	(0.264)	(0.292)	(0.294)
Tenure*Polity					0.766**
					(0.342)
Constant	0.902**	−0.105	0.042	0.999**	2.674***
	(0.442)	(0.278)	(0.276)	(0.486)	(0.945)
Observations	894	1,003	1,003	873	873
Log Likelihood	−572.966	−637.505	−651.609	−542.479	−539.806
Akaike Inf. Crit.	1,157.931	1,287.009	1,315.218	1,100.958	1,097.612
Note:					*p<0.1; **p<0.05; ***p<0.01

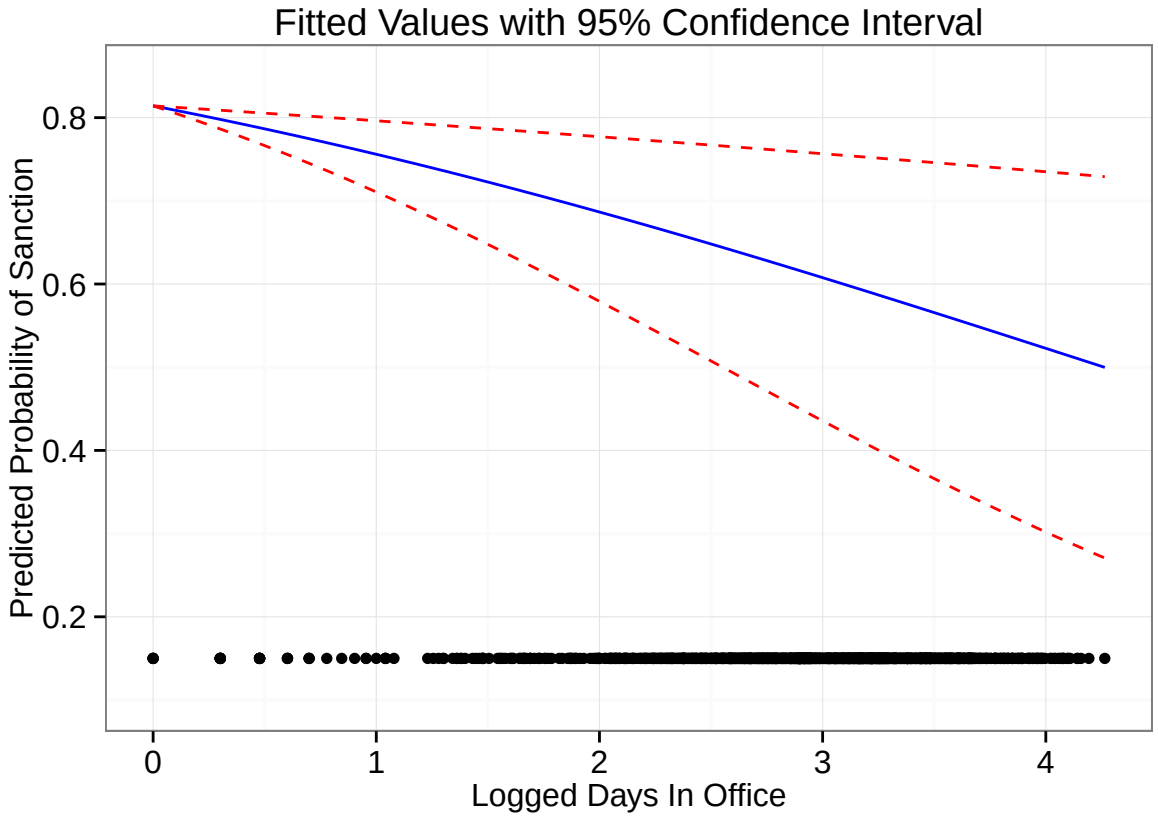

Figure 4: Fitted values of the probability of sanctions by a leader's tenure in office, holding all other independent variables at their medians. As tenure increases, the probability that threats escalate to sanctions decreases greatly. Rug indicates distribution of tenure measure in the data used.

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 percentage point 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.

Interaction Effects: Democracy, Autocracy, and Information Transmission

We now turn to the interaction between tenure and regime type. In particular, we evaluate Hypothesis 4 by including an interaction of democracy and leader tenure in our statistical model. The fifth column of Table 2 contains the results. They are somewhat difficult to interpret due to the interaction term, so we opt for the graphical representation of Figure 5. It presents predicted probabilities of sanction imposition across the full range of tenure for the 25th and 75th percentile values of Polity. The plot indicates that, although increases in tenure reduce the probability of sanctions against both autocratic and democratic states, the influence is much sharper for autocracies, as the relatively steep slope of the line corresponding to autocratic states in Figure 5.

To elaborate further, the data are consistent with our theoretical understanding of the informational consequences of autocracy and democracy. While the intelligence services of sanctioning states can take advantage of the relative openness of democratic states to ascertain information with regard to the consequences of sanctions for a targeted leader of a democratic states, the same does not hold for targeted autocratic leaders. As a result, intelligence analysts in sanctioning states must rely on alternative sources of information such as publicly observable actions by autocratic leaders. As we have argued, leader tenure provides a proxy for this type of information transmission. These statistical results indicate that leader tenure indeed appears to have more of an influence on the probability that sanctions are observed against autocratic states relative to democratic states.

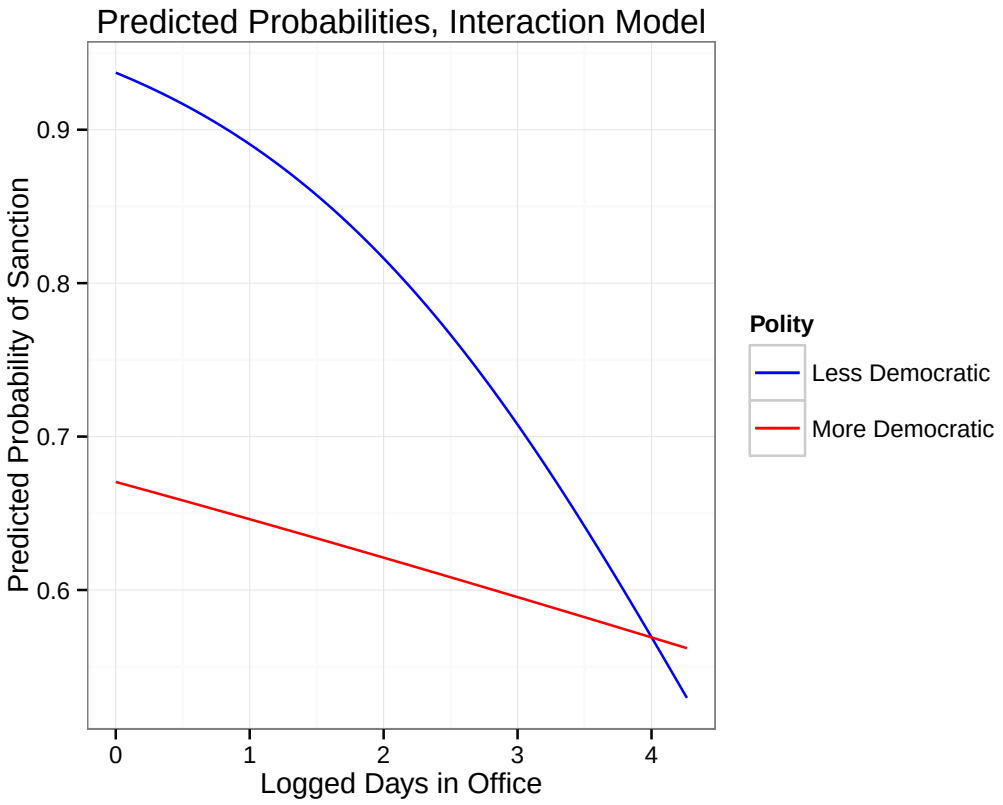

Figure 5: Fitted values of the probability of sanctions for the 25th and 75th percentile values of Polity, all other variables held at their respective medians. As this plot indicates, tenure's influence on the probability of sanctions is much stronger for autocracies than for democracies.

3.4 Robustness

While the results presented in the previous section are consistent with our hypotheses, it is worth checking alternative specifications to guard against the possibility that another mechanism drives them. Accordingly, in this section, we discuss several robustness checks to our empirical analysis 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. Beyond the specifications above, we conducted analyses using year, months, and weeks, and non-logged days in office. The substantive results are unchanged.

Next, the TIES dataset has a number of cases missing the specific date or month of sanctions imposition. We omitted these cases in the original model because we cannot calculate a precise leader tenure without that information. However, we tried using the first, the middle, 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.

A possible issue with our finding that institutions reduce the likelihood of sanctions by transmitting information is that there may be an interaction between the presence of an institution and the number of senders, as Morgan and Miers (2002) argue. To guard against this possibility, we fit a model that included an interaction term between senders and institutions. In this model, our institutions variable remained negative and statistically significant, while the interaction term did not achieve statistical significance at any conventional level. Thus, interacting institutions and the number of senders does not influence our results.

Another concern may be the particular issue under dispute. Recent studies have considered both the likelihood of observing sanctions as well as the influence of sanctions across specific issue areas such as human rights (Peksen 2009, Nielsen 2013, Peterson 2014) and democratization (Peksen & Drury 2010, Grauvogel & Soest 2014). A survey of this work suggests that the issue under dispute may have unique influences on the probability that sanctions are observed, as well as the incentives created by the imposition of sanctions for leaders of target states. To account for this possibility, we exploit the issue variable from TIES. When the model controls for issue area, our results of interest are unchanged. Furthermore, and somewhat surprisingly, the issue dummies themselves do not achieve statistical significance at any conventional level in the model. As another check to guard against the possibility that issue area might drive our result, we also subset the data by issue area and run our analysis on each subset. In each of these regressions, our substantive findings persist.

Although we focus on the incentives of a target state's leader, which the economic costs

imposed upon a state by sanctions may or may not affect, it is worthwhile to consider whether the anticipated cost of sanctions, to the sender and receiver, might be related to the probability that sanctions are imposed. While the data coverage is lacking, TIES does include measures of the anticipated cost of sanctions. We utilize both of these measures and find that the substantive results of the models presented earlier in the paper are unchanged as a result.

Another concern for the findings is the possibility that sanctions are more effective against leaders early in their tenure, before they have been able to consolidate power.[20] This concern is especially relevant for our estimation strategy because the use of leader tenure as a proxy for uncertainty is in 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 findings are entirely a consequence of 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. 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

[20] See Wolford 2012 for a similar argument about war onset.

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 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.

As such, our findings provide theoretical and empirical contributions both to the literature on economic sanctions, as well as the international relations literature more broadly conceived. A primary contribution of this study is related to Wolford's (2007) argument that while asymmetric information plays a crucial role in models of international relations, scholars rarely consider the origins of asymmetric information explicitly. By developing a theoretical argument that ties a specific source of asymmetric information, namely leader tenure, to expectations about outcomes, we account for uncertainty when we turn to data analysis. As a result, the connections between our theoretical expectations and empirical findings are significantly stronger. This suggests that, when possible, future work should look to identify and measure the origins of uncertainty in international interactions.

In addition, we exploited the "bandwidth" of possible types to measure uncertainty. As the bandwidth converges to a particular value, the probability of observing the inefficient behavior through our mechanism went to 0. This motivated our empirical hypothesis about autocracies. However, such a bandwidth measurement of uncertainty is possible for formal models of most substantive interests. Scholars across international relations should therefore consider interpreting their theoretical results in this manner to derive empirically testable hypotheses.

More broadly, we believe that the empirical approach we adopt has potential across a broader range of substantive applications. 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 in the future.

Beyond our contribution to the academic literature on economic sanctions, we note that our results have implications for policymakers as well. In particular, both our theoretical and empirical findings suggest that policymakers should be especially wary when making decisions to levy sanctions against leaders who have recently obtained office. As our arguments

suggest, uncertainty is likely to be greatest when a leader has just entered office. Correspondingly, intelligence reports concerning the expected behaviors of new leaders require additional scrutiny. This implication is especially important when one considers how economic sanctions may have dire consequences for the publics of states subjected to them (Gibbons & Garfield 1999).

In sum, this study has provided clarity to the literature on economic sanctions. By explicitly considering the origins of asymmetric information, our analysis has established plausible links between theory and empirics that were lacking in previous studies of economic sanctions. By providing evidence of the utility of explicitly considering this source of uncertainty, we hope to encourage scholars to take similar steps in future work, unifying theory and empirics in novel and fruitful ways.

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Appendix

This appendix provides proofs for the complete information game, incomplete information game, and the comparative statics of the incomplete information game.

Proof of the Complete Information Game

We break the complete information game down into three cases. First, suppose $\mathcal{S}(q-s) > \mathcal{S}(q+w)-c$. Then sanctions are so ineffective that F prefers not imposing sanctions at its final information set. Working backward, H prefers to continue over backing down since it knows it will prevail in the crisis. This causes F to forgo the crisis entirely. All of these decisions hold regardless of the values of the rest of the parameters, so we analyze all other cases assuming $\mathcal{S}(q-s) < \mathcal{S}(q+w)-c$.

Second, suppose $\mathcal{S}(q-l) > \mathcal{S}(q-s)$. This means that H is more likely to maintain power if it backs down than if it suffers through sanctions. Since F imposes sanctions at the final decision node for all remaining cases, H works backward and chooses to back down. Therefore, at the start, F chooses to issue a threat, knowing that it will prevail in the crisis.

The remaining case is where $\mathcal{S}(q-l) < \mathcal{S}(q-s) < \mathcal{S}(q+w)-c$. Here, if F issues a threat, H continues the crisis and F imposes sanctions. So F's decision is to issue the threat and ultimately earn $1-\mathcal{S}(q-s)-c$ or accept the status quo and earn $1-\mathcal{S}(q)$. Recall that earlier we have assumed that $\mathcal{S}(q-s) > \mathcal{S}(q)-c$, so F quits in this case. □

Proof of Proposition 1

Let t 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 $1-\mathcal{S}(q+r)$ regardless of the posterior. In contrast, F earns $1-\mathcal{S}(q-s)-c$ if H is strong and $1-\mathcal{S}(q-s')-c$ if H is weak. Weighing these payoffs by their respective likelihoods, F's expected utility equals $t(1-\mathcal{S}(q-s)-c)+(1-t)(1-\mathcal{S}(q-s')-c)$. Thus, F strictly prefers imposing sanctions iff:

$$t(1-\mathcal{S}(q-s)-c)+(1-t)(1-\mathcal{S}(q-s')-c) > 1-\mathcal{S}(q+r)$$

$$t < t^* = \frac{\mathcal{S}(q+r)-\mathcal{S}(q-s')-c}{\mathcal{S}(q-s)-\mathcal{S}(q-s')}$$

By analogous argument, F strictly prefers not imposing sanctions iff $t > t^*$ and is indifferent iff $t = t^*$.

Now consider H's decision to back down or continue the crisis. If H is strong, it receives $\mathcal{S}(q-l)$ for backing down and *at least* $\mathcal{S}(q-s)$ for continuing. Recall that $\mathcal{S}(q-s) > \mathcal{S}(q-l)$

for this parameter space.[21] Consequently, continuing strictly dominates backing down. The strong type must therefore continue with probability 1 in every strong PBE.

This means we only need to solve for the weak type's strategy. If $p < t^*$, the weak type's action can manipulate F's best response. If the weak type pools, then $t < t^*$ 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, $t = 1$ 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 $\mathcal{S}(q-l)$ for backing down. Let σ_I be F's probability of imposing sanctions. Then the weak type's expected utility for continuing the crisis equals $\sigma_I(\mathcal{S}(q-s')) + (1-\sigma_I)(\mathcal{S}(q+r))$. Therefore, the weak type's indifference condition is:

$$\sigma_I(\mathcal{S}(q-s')) + (1-\sigma_I)(\mathcal{S}(q+r)) = \mathcal{S}(q-l)$$

$$\sigma_I^* = \frac{\mathcal{S}(q+r) - \mathcal{S}(q-l)}{\mathcal{S}(q+r) - \mathcal{S}(q-s')}$$

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 $t = t^*$. Let σ_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:

$$t = \frac{p(1)}{p(1) + (1-p)(\sigma_C)}$$

Substituting t with the indifference condition yields:

$$\frac{\mathcal{S}(q+r) - \mathcal{S}(q-s') - c}{\mathcal{S}(q-s) - \mathcal{S}(q-s')} = \frac{p(1)}{p(1) + (1-p)(\sigma_C)}$$

$$\sigma_C^* = \frac{p(\mathcal{S}(q-s) - \mathcal{S}(q+w) + c)}{(1-p)(\mathcal{S}(q+w) - \mathcal{S}(q-s') - c)}$$

All that remains is to check whether F prefers to issue the threat to begin with or stay out entirely. Staying out yields a flat $1 - \mathcal{S}(q)$. F's payoff for threatening is significantly more complicated. With probability $(1-p)(1-\sigma_C^*)$, F faces the weak type and it gives up, giving F a payoff of $\mathcal{S}(q-l)$. The remaining portion of the time, F receives a combination of $1-\mathcal{S}(q+r)$, $\mathcal{S}(q-s) - c$, and $\mathcal{S}(q-s') - c$. Fortunately, F's indifference condition simplifies this to just $1 - \mathcal{S}(q+r)$. As such, F threatens if:

[21] If this were not true, both types of H would prefer backing down to sanctions, and incomplete information becomes trivial.

$$(1-p)(1-\sigma_C^*)(1-\mathcal{S}(q-l)) + [1-(1-p)(1-\sigma_C^*)](1-\mathcal{S}(q+r)) > 1-\mathcal{S}(q)$$

Substituting $\sigma_C^* = \frac{p(\mathcal{S}(q-s)-\mathcal{S}(q+w)+c)}{(1-p)(\mathcal{S}(q+w)-\mathcal{S}(q-s')-c)}$ and solving for p yields:

$$p < \left(\frac{\mathcal{S}(q)}{\mathcal{S}(q+r)}\right)\left(\frac{\mathcal{S}(q+r)-c-\mathcal{S}(q-s')}{\mathcal{S}(q-s)-\mathcal{S}(q-s')}\right)$$

So if the probability H is strong is sufficiently low, F initiates the crisis. The strong type continues with certainty; the weak type continues with probability $\frac{p(\mathcal{S}(q-s)-\mathcal{S}(q+w)+c)}{(1-p)(\mathcal{S}(q+w)-\mathcal{S}(q-s')-c)}$ and backs down with complementary probability. At F's final information set, it believes H is strong with probability $\frac{\mathcal{S}(q+r)-\mathcal{S}(q-s')-c}{\mathcal{S}(q-s)-\mathcal{S}(q-s')}$ and imposes sanctions with probability $\frac{\mathcal{S}(q+r)-\mathcal{S}(q-l)}{\mathcal{S}(q+r)-\mathcal{S}(q-s')}$. □

Proof of Proposition 2

There are two cases to consider. First, suppose $\left(\frac{\mathcal{S}(q)}{\mathcal{S}(q+r)}\right)\left(\frac{\mathcal{S}(q+r)-c-\mathcal{S}(q-s')}{\mathcal{S}(q-s)-\mathcal{S}(q-s')}\right) < p < \frac{\mathcal{S}(q+r)-\mathcal{S}(q-s')-c}{\mathcal{S}(q-s)-\mathcal{S}(q-s')}$. Under these parameters, if F issues a threat, the players play the semi-separating equilibrium of the subgame described in the proof for Proposition 1. However, the proof for Proposition 1 also showed that F receives a greater payoff by quitting instead. Thus, F quits.

Second, suppose $p > \frac{\mathcal{S}(q+r)-\mathcal{S}(q-s')-c}{\mathcal{S}(q-s)-\mathcal{S}(q-s')}$. Semi-separation can no longer occur. The strong type must still continue with probability 1 due to strict dominance. The weak type calculates that F will not impose sanctions if it pools because $t > t^*$. As such, the weak type must also continue with probability 1. F then does not impose sanctions. Working backward, F knows that H will continue regardless of its type and F will ultimately have to back down if it issues a threat. Its payoff for this equals $1-\mathcal{S}(q+r)$. But F receives $\mathcal{S}(q)$ for quitting at the start. Thus, F quits.

In turn, if H is sufficiently likely to be the strong type (i.e., $p > \left(\frac{\mathcal{S}(q)}{\mathcal{S}(q+r)}\right)\left(\frac{\mathcal{S}(q+r)-c-\mathcal{S}(q-s')}{\mathcal{S}(q-s)-\mathcal{S}(q-s')}\right)$), F quits. □

Proof of Proposition 3

There are two halves to this claim. The first part is trivial. As p goes to 1, it eventually exceeds the cutpoint $\left(\frac{\mathcal{S}(q)}{\mathcal{S}(q+r)}\right)\left(\frac{\mathcal{S}(q+r)-c-\mathcal{S}(q-s')}{\mathcal{S}(q-s)-\mathcal{S}(q-s')}\right)$. Per Proposition 2, the probability F imposes sanctions equals 0 because it quits at the start of the interaction.

The second part is more complicated. As p goes to 0, the actors play the equilibrium Proposition 1 describes. In turn, the probability F imposes sanctions is the probability that H continues the crisis and F follows through on its sanctions threat. The probability of H continuing equals $p + (1-p)\left(\frac{p(\mathcal{S}(q-s)-\mathcal{S}(q+w)+c)}{(1-p)(\mathcal{S}(q+w)-\mathcal{S}(q-s')-c)}\right)$. The probability F sanctions equals

$\frac{\mathcal{S}(q+r)-\mathcal{S}(q-l)}{\mathcal{S}(q+r)-\mathcal{S}(q-s')}$. The overall probability of sanctions is thus the product of the two. Note that p does not appear in the second expression. After simplifying the first expression, the task is to show that:

$$\lim_{p\to 0}\left(p+\frac{p(\mathcal{S}(q-s)-\mathcal{S}(q+w)+c)}{\mathcal{S}(q+w)-\mathcal{S}(q-s')-c}\right)$$

The value indeed goes to 0 because both portions of it are multiplied by p. Consequently, as p goes to 0, so does the value. □

Proof of Proposition 5

This result follows immediately from the mixing probabilities in Proposition 1. Combining the mixing probabilities to produce a probability of observing sanctions yields:

$$\left(\frac{\mathcal{S}(q+r)-\mathcal{S}(q-l)}{\mathcal{S}(q+r)-\mathcal{S}(q-s')}\right)\left(\frac{p(\mathcal{S}(q-s)-\mathcal{S}(q+w)+c)}{(1-p)(\mathcal{S}(q+w)-\mathcal{S}(q-s')-c)}\right),$$

which increases as $\mathcal{S}(q-l)$ decreases. □