Coercion, Information, and the Success of Sanction Threats

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This article explores when and why sanction threats succeed in extracting concessions from the targeted country. We focus on two different, albeit not mutually exclusive, mechanisms that can explain the success of sanction threats. The first mechanism relates to incomplete information regarding the sanctioner's determination to impose sanctions and suggests that threats help to extract concessions by revealing the sanctioner's resolve. The second mechanism underscores the direct impact of common interest between the two countries and explains the success of sanction threats by the targeted country's greater dependence on this link between the two countries and the sanctioner's ability to exploit this dependence. We test the hypotheses using a new strategic structural estimator. Our results provide no evidence in favor of the informational hypothesis, while lending robust support for the coercive hypothesis.

Why do some economic sanction threats lead to concessions, whereas other threats are followed by sanction imposition?[1] Sanctions often lead to substantial economic losses and even significant humanitarian suffering and human rights violations in the sanctioned country (Escribà-Folch and Wright 2010; Wood 2008). At the same time, previous research suggests that sanctions are often ineffective because they rarely deliver the desired outcome for the sender (Pape 1997). Yet, sanctions remain a commonly used foreign policy instrument (Hufbauer et al. 2007).

Sanction scholars have tackled this empirical puzzle by examining reasons for the frequent use of sanctions in spite of their unimpressive success record.[2] Sanction studies find evidence that governments launch sanctions with signaling and reputational purposes (Lektzian and Sprecher 2007; Nincic and Wallensteen 1983) or with the goal of reaping domestic audience benefits (Daoudi and Dajani 1983; Eland 1995; Smith 1998; Whang 2011). In addition, some scholars argue that the puzzle results from selection effects due to the failure to include the threat stage in models of sender-target interactions (Drezner

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[1]Sanctions are "actions that one or more countries take to limit or end their economic relations with a target country in an effort to persuade that country to change one or more of its policies" (Morgan, Krustev, and Bapat 2006, 1). We refer to the sanctioning country as the sender and the sanctioned country as the target.

[2]Previous research also investigates the conditions under which sanctions do work. Existing studies suggest that sanction effectiveness is shaped by dyadic relations between the sender and target (Drezner 1999; Whang 2010b), international cooperation with the sender or target (Bapat and Morgan 2009; Early 2009; Martin 1992; McLean and Whang 2010; Morgan and Schwebach 1997), domestic political institutions (Allen 2005, 2008; Hart 2000; Lektzian and Souva 2003, 2007), interest group politics (Kaempfer and Lowenberg 1992), the sender's ability to reduce exchanges between national firms and the target (Morgan and Bapat 2003), issue salience (Ang and Peksen 2007), the informational role of sanctions (Hovi, Huseby, and Sprinz 2005), and the type of sanctions imposed (Cortright and Lopez 2002; Dashti-Gibson, Davis, and Radcliff 1997).

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2003; Eaton and Engers 1992; Lacy and Niou 2004; Morgan and Miers 1999; Smith 1995).

Our approach builds on the insights from previous research by recognizing the importance of taking selection effects into account and treating threats as an integral part of strategic interactions between the sanctioning and sanctioned countries. By explicitly taking the threat stage into account, we address the problem of nonrandom sample selection, which may result in a low success rate of imposed sanctions because sanction episodes with the most resilient targets remain in the sample after the threat fails, while successful sanction threats need not be executed (Drezner 2003; Lacy and Niou 2004). An example of such a successful threat that resolves the dispute between two countries without its escalation to economic sanctions and that would be excluded from the sample is the case of a U.S. sanction threat against China when the United States succeeded in extracting concessions from China without the use of sanctions. In 1997, the United States threatened to impose sanctions over violations of intellectual property rights, and China complied by closing a number of pirating factories, creating a reward system for information on the location of pirating factories, and increasing criminal penalties for pirating activities. The United States found the progress on this issue to be substantial, and sanctions were not initiated. Given the pessimistic assessment of sanctions effectiveness and the possibility that sanctions succeed primarily when they do not have to be imposed, the investigation of sanction threats and, more specifically, causal mechanisms of their success in extracting concessions from the target acquires both theoretical and policy significance.

We explain the success of sanction threats by their coercive effect on the target's decision making. The coercive role hinges on the existence and magnitude of common interest between the sender and target: the sender can use the common interest to force the target to change its behavior. Consistently with the theoretical expectation, we find that as the link between the two countries grows, and thus the sender is capable of inflicting considerable damage on the target by severing the link, the target is more likely to comply with the sender's demands before sanctions are imposed. We also formulate and test another hypothesis that expects that the sanction threat helps the sender to reveal its resolve level,[3] but we find no empirical support for the informational hypothesis. Sanction threats convey no new information[4] and appear to have a negligible effect on the target's beliefs about the sender's determination to impose sanctions. While the two roles of threats, informational and coercive, are observationally equivalent in that sanction threats with associated costs should increase the probability of concessions, the underlying causal mechanisms are different. Using the Threat and Imposition of Sanctions dataset and a new structural statistical model that takes the strategic interaction between the sender and target countries into account and treats the threat stage as an integral part of this interaction (Whang 2010a), we are able to determine that the coercive mechanism is at work, and reject the informational hypothesis. Therefore, sanction threats succeed through coercion, rather than learning.

Informational and Coercive Effects of Sanction Threats

Economic sanctions share similarities with military conflict in that, just like military conflict, economic conflict is usually costly either for both countries involved or at least for the sanctioned country. Given that, there must exist a settlement that the two sides would prefer to sanctions (Fearon 1995). The sanctions literature has recognized the incentives for the sender and target to reach a compromise before sanctions imposition: such a compromise would allow the two sides to avoid inefficient economic conflict (Drezner 2003; Eaton and Engers 1999).

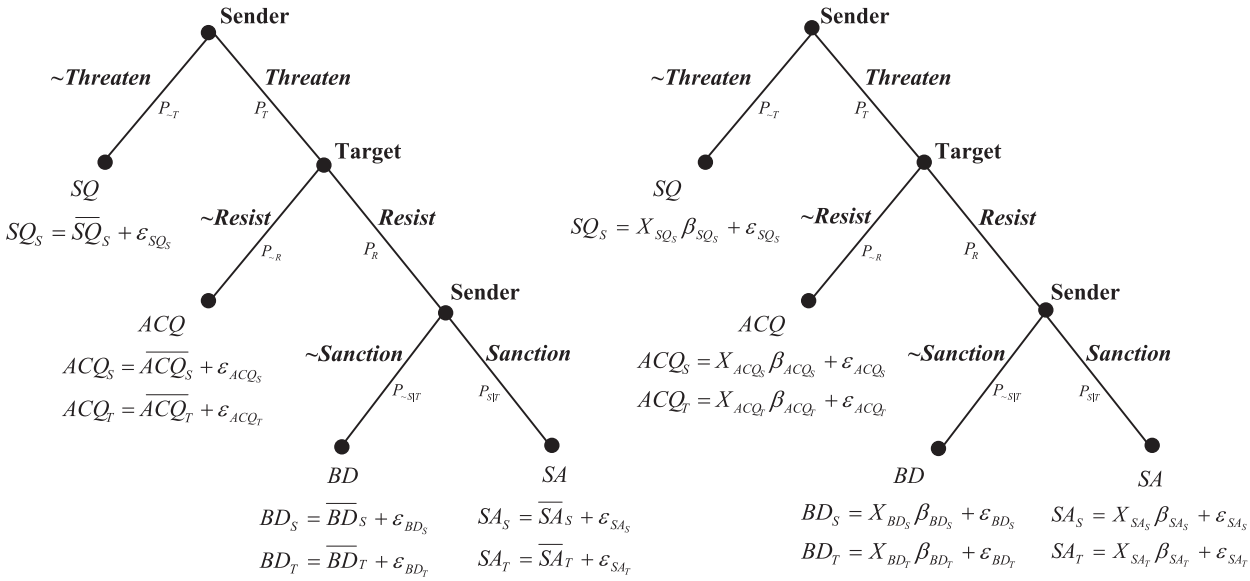
In order to understand when the sender and target can settle their dispute and avoid sanctions, we use a stylized game-theoretic model similar to that of Lacy and Niou (2004) to capture the sender-target interaction and summarize its outcomes. The sender makes the first move, as Figure 1(a) shows, by choosing whether or not to declare its intention to impose sanctions on its opponent unless the opponent offers concessions over a disputed issue. If the sender decides to accept the status quo (SQ: Status quo), the target can keep its controversial policy with impunity and, consequently, receive its highest possible payoff.[5] The sender has to tolerate the undesirable policy implemented by the target, but does not bear any other costs. If the sender threatens to impose sanctions, the target needs to determine its course of action: it can

[3]By resolve, we mean private information that the sender wants to signal using sanction threats. Thus, a more precise expression in a game-theoretical context is the "type" of the sender. Whether the sender is a strong (or more resolved) type depends on the sender's utilities assigned over outcomes in the game.

[4]Note that we only investigate the informational value of sanction threats. Even though threats do not reveal any new information to the target, sanctions themselves may still do so. The question of the informational value of sanctions is beyond the scope of this study.

[5]We use "payoffs" and "utilities" interchangeably.

FIGURE 1 Theoretical Model of Sanction Threats and Its Econometric Representation



(a) The Sanction Threat Model with Uncertainty Concerning Utilities

(b) Specification of Utilities in Terms of Explanatory Variables

- $X_{SQ_S}\beta_{SQ_S} = \beta_1 \cdot$*Sender economic dependence* $+ \beta_2 \cdot$*Sender democracy,* $+ \beta_3 \cdot$*Contiguity* $+ \beta_4 \cdot$*Alliance*
- $X_{ACQ_S}\beta_{ACQ_S} = \beta_5 + \beta_6 \cdot$*Anticipated sender costs*
- $X_{ACQ_T}\beta_{ACQ_T} = \beta_7 + \beta_8 \cdot$*Target economic dependence* $+ \beta_9 \cdot$*Anticipated target cost* $+ \beta_{10} \cdot$ *Contiguity* $+ \beta_{11} \cdot$*Alliance*
- $X_{BD_S}\beta_{BD_S} = \beta_{12} + \beta_{13} \cdot$*Sender democracy*
- $X_{SA_S}\beta_{SA_S} = \beta_{14} + \beta_{15} \cdot$*Sender economic dependence* $+ \beta_{16} \cdot$*Sender democracy* $+ \beta_{17} \cdot$*Capability ratio*
- $X_{SA_T}\beta_{SA_T} = \beta_{18} + \beta_{19} \cdot$*Target democracy* $+ \beta_{20} \cdot$*Capability ratio*

avoid sanctions by giving up its policy (ACQ: Acquiescence), or it can resist, in which case the sender moves next. The sender can follow up on its threat and impose sanctions (SA: Sanctions) or back down (BD: Back down).[6] To emphasize the intuitive nature of our main results and link them to the existing research, we discuss the outcomes of this interaction informally.[7]

Insights from the bargaining literature suggest that the two sides' ability to reach a settlement is affected by incomplete information, in particular uncertainty about the opponent's intentions. Since incomplete information influences both sides' decision making, in this article we consider each country's uncertainty regarding its opponent's resolve. The sender's beliefs are critical for this country's decision to issue a sanction threat, while the target's beliefs shape its compliance decision (Lacy and Niou 2004; Morgan and Miers 1999; Smith 1995). We introduce uncertainty into the model by allowing a hypothetical player, called Nature, to determine the sender's and target's private information regarding their sanction payoffs before the game begins. Consequently, each player's payoff is divided into two components: the public component and the private component determined by Nature, as Figure 1(a) shows. Each country knows the average values of the opponent's payoffs, e.g., $\overline{SA}_S$.

Since the sender country is aware of the target's uncertainty, the sender may seek to signal its resolve to stand firm in the face of resistance. The literature on interstate bargaining suggests that signaling may help to reduce uncertainty and, consequently, lower the likelihood of conflict (e.g., Fearon 1994; Schultz 1999). Existing bargaining studies identify and examine several signaling mechanisms, including troop mobilization (Fearon 1997; Slantchev 2005), generating an autonomous risk of war (or so-called "threat that leaves something to chance";

[6]This sequence of moves is similar to the models presented in Drezner (1999) and Lacy and Niou (2004) and the discussion in Drury and Li (2006).

[7]We provide a complete set-up of the sanction threat game and derive its equilibria in Appendix A of the online supporting information.

Powell 1990; Schelling 1960), and using public diplomatic threats (Kurizaki 2007). A country can use the signaling mechanisms to transmit information to its opponent to make the opponent believe that the country is likely to be resolved.

The signaling effect of sanction threats has important implications for the outcome of sender-target interactions. If the target learns from the threat that the sender is highly resolved, the target will conclude that it faces inevitable sanctions if it resists. As a consequence, the target should be more likely to comply with the sender's demands before sanctions are imposed. If sanction threats indeed transmit information and reduce the target's uncertainty in a way that lowers the probability of economic conflict, the target's assessment of the likelihood that the sender is resolved should increase after a threat, i.e., we should find evidence of the target's positive belief updating. Belief updating, or the difference between the posterior and prior probabilities of sanctions,[8] is thus indicative of the extent to which the target's initial belief about the probability of sanctions changes as a result of threats and represents the role that sanction threats play in the target's learning about the sender's true willingness to sanction upon resistance.

To understand the mechanism that facilitates information transmission, we capture this idea in the model in the following way. We assume that, when countries share some common interest, such as significant economic exchanges, both sides suffer a cost when this common interest is disrupted as a result of sanction imposition. Since this cost is part of the sender's and target's sanction payoffs, this suggests that a stronger link between the sender and target helps the target to determine what the sender is likely to do at the last node. As this cost increases, the target's initial assessment of the sender's resolve must be lower, since the target knows that the sender is more reluctant to sever the important relationship with the opponent. However, after observing a threat, the target recognizes that the cost associated with the common interest is not sufficient to deter the sender's threat and hence updates its belief. Consequently, the gap between the target's prior and posterior beliefs grows as common interest increases in scale. We can summarize the theoretical expectation regarding the informational effect of sanction threats as the following testable hypothesis:

H1 (Informational Hypothesis): Sanction threats should increase the target's belief that the sender will impose sanctions when the magnitude of the sender and target's common interest increases.

Note that this conceptualization of the informational effect of sanction threats gauges how much threats contribute to enhancing the target's belief that the sender will impose sanctions at the last node. If there is a substantial improvement as a result of observing a threat, the target is better able to understand whether it is up against a resolved sender. This interpretation is similar to Fearon's (1994) idea that public commitments and associated audience costs have a signaling value that facilitates learning about opponents' resolve and intentions in international crises. Our conceptualization of informational effects of sanction threats differs from an alternative approach that treats the posterior probability of imposing sanctions as a reflection of informational effects. Unlike belief updating, the posterior by itself fails to verify whether the signal has reduced the target's uncertainty, and if it has, how significant the improvement in the target's knowledge is. Thus, we view the informational effect of sanction threats as the extent to which the sender's sanction threat facilitates the target's learning about the sender's resolve, or more formally, the amount of the target's belief updating.

Other studies suggest that public threats can play a different role in strategic interactions—threats can be utilized as a coercive instrument (e.g., Leventoğlu and Tarar 2005, 2008; Slantchev 2005). Coercion hinges on the ability to impose costs on the opponent in case of the opponent's resistance. Coercion also requires some level of common interest between the two sides: as Schelling points out in his discussion of deterrence, coercion is "as inapplicable to a situation of pure and complete antagonism of interest as it is to the case of pure and complete common interest" (1960, 11). At the same time, if both sides can use their common interest to impose equal costs on each other, neither side can benefit from threatening to damage the link between them. For the sender to be able to engage in coercion effectively, the target must be more vulnerable to the disruption of the sender-target relationship.

Existing literature on crisis bargaining provides some insights on the coercive role that threats can play and emphasizes the difference between the coercive and informational roles. One type of coercive effects that threats may have is elaborated in Tarar and Leventoğlu (2009).[9] They

[8]Priors are defined as the target's belief prior to the threat. Posteriors are, then, defined as the target's belief posterior to, or after, the threat. In more technical terms, the target's prior belief is $\Pr(S) = \Pr[SA_S \geq BD_S]$, and the posterior belief is $\Pr(S|T) = \Pr[SA_S \geq BD_S|A_1 = \text{Threaten}]$, where $A_1 \in \{\text{Threaten, Not Threaten}\}$. Belief updating is then defined as $\Pr(S|T) - \Pr(S)$ or the difference between the posterior and prior probabilities of sanctions.

[9]Note that there is currently an extremely small number of studies that examine the coercive and informational effects together: e.g., Kurizaki and Whang (2011). Therefore, we build on research that explores the coercive and informational effects of threats (or challenges) in international disputes separately.

show that, when threats reduce the probability of conflict, it is because of their coercive, rather than informational, effect: the threatened country offers concessions that are more likely to satisfy all "types" of opponents, both resolved and less resolved. Threats can serve as a coercive tool even in private bargaining. Kurizaki (2007) demonstrates that private threats can be successful in extracting concessions from the threatened country: threats lead to better bargaining outcomes and reduce the ex ante risk of conflict. Similarly, the coercive effect of threats has been demonstrated in sanction research. Eaton and Engers (1992) show that high sanction costs to the target can lead to compliance before sanctions are imposed. Therefore, the sender achieves its goals due to the coercive effect of threats rather than by revealing any private information to the target.

The coercive perspective underscores the target's calculations of the damage that it will suffer due to the sender's decision to initiate sanctions, and these calculations coerce the target into offering concessions. When the sender publicly challenges the target's policy, the sender eliminates one outcome of the sanction game—the status quo. The sender's move means that only one possible outcome remains that can give the target the highest payoff in this game—i.e., when the sender backs down after a threat. The public threat, however, also means that backing down is not an attractive option for the sender because of audience costs associated with public commitments (Tomz 2007). In this setting, the cost associated with the disruption of the link between the sender and target is expected to have a direct effect on the target's choice between resistance and acquiescence. As this cost increases, the target's expected utility from resistance declines due to the lower sanction payoff. Consequently, when the target compares its expected utility from resistance and its acquiescence payoff, concessions become more attractive. The coercive approach yields the following hypothesis:

H2 (Coercive Hypothesis): Sanction threats should increase the likelihood of the target's concessions when the magnitude of the sender and target's common interest increases.

Note that the coercive and informational roles of threats are not mutually exclusive, and in fact they are observationally equivalent, but are underpinned by different causal mechanisms. The coercive effect can exist independently of the informational effect, while the informational effect only occurs when the coercive effect is present. In the case of sanctions, the threat may carry little new information but present the target with the fact that the conflict is taking the path that will be very costly, unless the target complies with the sender's demands. Since the coercive role hinges on the direct effect that the threat of the interrupted link with the sender has on the target's payoffs, the coercive effect does not require belief updating and hence works even under complete information. As the sender and target's common interest grows in scale and importance, and hence the potential damage to the target increases, acquiescence becomes more attractive relative to resistance, and the target is more likely to comply with the sender's demand. The informational effect, defined as belief updating, occurs when sanction threats impose costs resulting from the disruption of the link between the sender and target. Costs associated with common interest enter the target's calculations of the sender's likely behavior at the last node, and the target's learning depends on the presence of such costs. At the same time, common interest and associated costs also underpin the coercive mechanism. Therefore, the informational role of sanction threats occurs when the coercive effects are present.

Statistical Model of Sanction Threats

The fact that coercive and informational effects can exist at the same time and generate the same outcomes means that we need a method that can empirically discriminate between the two effects. Conventional econometric methods of discrete choice cannot capture learning and hence are not suitable for determining which effect, coercive or informational, induces the target's acquiescence because they focus merely on the association between covariates and outcomes but treat the internal workings, i.e., underlying preferences, utilities, and beliefs, as a kind of black box. Conventional discrete-choice models cannot estimate how much sanction threats change the target's prior probability of the sender using sanctions when resisted, because the functional form of these models is too simple to represent complex data-generating processes typical in international crisis bargaining. More generally, as Signorino and Yilmaz note, the problem of functional form misspecification in parametric models "is equivalent to omitting relevant variables, where the omitted variables represent the nonlinearities in the relationship between the dependent and independent variables" (2003, 553). These nonlinearities are especially important in cases when the data-generating process results from countries' strategic choices. Consequently, we need a different empirical research strategy to test the informational and coercive hypotheses correctly—a strategy that builds on a game-theoretic model to create the functional form that resembles the true data-generating process of sanction

threats. Existing sanctions studies indicate the need for such a research strategy by pointing out that the sender's and target's decisions are interrelated and should be analyzed together (Drury 2001; Lacy and Niou 2004; Lektzian and Souva 2003, 2007; McLean and Whang 2010; Morgan and Schwebach 1997; Nouruddin 2002; Whang 2010b). Our strategic model is constructed with this strategy in mind: the model incorporates the internal workings of crisis bargaining, i.e., the sequence of moves, underlying preferences, utilities, and beliefs. As a result, we can evaluate the informational hypothesis because we can derive the amount of belief updating from the probability model that we develop directly from our theoretical model.

To examine the coercive and informational effects of sanction threats, we rely on the latest version of a structural statistical model (Whang 2010a), which advances the structural estimation approach developed by Lewis and Schultz (2003) and Wand (2006). This model addresses important issues in testing the effects of sanction threats: it (1) distinguishes the coercive role of sanction threats from their informational role, (2) includes the selection stage when the sender chooses to issue a sanction threat, and (3) incorporates strategic interactions between the sender and target directly into the statistical estimation. When the threat of sanctions affects the target's decision making through associated costs, our coercive hypothesis indicates that the target should be better off if it offers concessions. When the threat of sanctions facilitates learning, as in our informational hypothesis, the target realizes that the sender is resolved, which should make the target prefer to accept the ACQ outcome rather than resist. Our model is set up to allow learning and, if learning does occur, to capture its amount very accurately. The amount of learning depends on how our model parameters are realized, and, therefore, the players' utilities are determined from estimation.

Four Steps of Fully Structural Estimation

There are four steps of structural estimation that integrate theory and empirics. The two theoretical steps consist of (1) setting up a game-theoretic model (Figure 1a) and (2) deriving the equilibrium probabilities of outcomes.[10] The two empirical steps consist of (3) assigning explanatory variables to the players' payoffs (Figure 1b)[11] and (4) deriving a log-likelihood function based on the outcome probabilities to run maximum-likelihood estimation (Equation 1).

To elaborate on the theoretical steps of estimation, we first set up a two-sided incomplete information game between two players, the sender and target, as discussed in the previous section and shown in Figure 1(a). To introduce incomplete information that each player has regarding the opponent's payoffs, we divide the payoffs of the sender and target into two components: (1) public components that can be observed by the opponent and (2) private components that are not observed by the opponent. Each country knows the average values of the opponent's payoffs, e.g., $\overline{SA}_S$, but has only a distributional understanding of the payoffs' additional values that are unknown to the country, e.g., ε_{SA_S}. We assume that the private components are distributed normally with mean zero, e.g., $\varepsilon_{SA_S} \sim N(0, Var(SA_S))$. Thus, for example, the sender's full sanctions payoff is defined as $SA_S = \overline{SA}_S + \varepsilon_{SA_S}$.[12] This set-up implies that Nature determines the vector of private components, i.e., all $\varepsilon's$, for each player. Moreover, the use of unbounded shocks for the private components of the payoffs allows us to use the game-theoretical model for statistical estimation since it addresses the zero-likelihood problem.[13]

As a second step, we solve for the perfect Bayesian equilibrium (PBE) condition of the model. In particular, we derive four outcome probabilities of the model: Pr(SQ), Pr(ACQ), Pr(BD), and Pr(SA), which are a function of action (or choice) probabilities, i.e., Pr(T), Pr(R|T), and Pr(S|T). The action probabilities, in turn, are a function of each player's payoffs.[14]

The empirical steps of the structural estimation process should explain the connection between the theoretical and empirical models. The theoretical steps enable us

[10]We derive the equilibrium probabilities in Appendix C of the online supporting information.

[11]Appendix B of the online supporting information describes and summarizes our explanatory variables.

[12]The number and location of the payoffs that contain private components have been previously discussed by Lewis and Schultz (2003, 2005) and Wand (2006). We include the private components in all payoffs of the model unless normalized to a constant because we have to estimate variance and covariance of the stochastic components of the payoffs.

[13]There are two modeling strategies that are different from our uncertainty assumption. One approach is to assume symmetric uncertainty, i.e., stochastic components are unknown to both actors (e.g., Signorino 1999, 2003). We cannot use this approach mainly because symmetric uncertainty does not allow us to analyze belief updating. The other is to assume asymmetric uncertainty but reduce the number of stochastic terms to a minimum (e.g., Lewis and Schultz 2003). We do not use this approach because while it allows us to estimate updating, the amount of updating is substantially biased downward (see Whang 2010a for details). Thus, our uncertainty assumption is necessary for estimating the amount of belief updating correctly.

[14]We provide a detailed derivation of outcome probabilities in Appendix C of the online supporting information.

to derive four outcome probabilities as a function of the sender's and target's payoffs. When we find these probabilities, we know how payoffs map onto four equilibrium probabilities. That is, the PBE of the theoretical model allows us to link a vector of eight payoffs (i.e., SQ_S, SQ_T, ACQ_S, ACQ_T, BD_S, BD_T, SA_S, and SA_T) to the four outcome probabilities. We use this mapping as the probability density function from a statistical perspective to run maximum-likelihood estimation.

As a third step, we reverse the theoretical process such that we move from the probability density function to estimate the payoffs, given our data. When we estimate payoffs, we express the sender's and target's payoffs as a function of explanatory variables that measure the characteristics of actors and their interactions. While we link the payoffs to the explanatory variables primarily to explain the effects of the variables on the payoffs of the theoretical model, we can also infer from a coefficient (i.e., β's) how a variable of theoretical interest is associated with probabilities of outcomes. Thus, we aim to identify coefficients (i.e., β's)associated with the explanatory variables (as well as constant terms and variance-covariance parameters). To that end, we assume that each payoff is a linear combination of explanatory variables and its stochastic component. Figure 1(b) displays how the payoffs of the model are defined to allow for empirical estimation.

The fourth step of strategic structural estimation is to run maximum-likelihood estimation using a log-likelihood function based on the set of explanatory variables and four outcome probabilities. While we define the parameters and probability model, we also have samples of threats and sanctions. For i^{th} observation of the data, we have a vector of explanatory variables, X_i, and an outcome (dummy) variable, $y_i \in \{SQ, ACQ, BD, SA\}$. Formally, the theoretical steps give us PBE outcome probabilities: $\Pr(y|\beta, X)$. Since we want to estimate β's given the data (i.e., X and y) and probability model (i.e., $\Pr(y|\beta, X)$), we define a likelihood function that reverses the data and β's: $L(\beta|y, X)$. The log of this likelihood function, as presented in Equation (1), shows how likely we are to have the β coefficients, given that we have already observed the data.

$$\ln L = \sum_{i=1}^{N} \left[y_{SQ_i} \ln \Pr(SQ_i) + y_{ACQ_i} \ln \Pr(ACQ_i) + y_{BD_i} \ln \Pr(BD_i) + y_{SA_i} \ln \Pr(SA_i) \right] \quad (1)$$

Using the data and log-likelihood function, we can run maximum-likelihood estimation. When we find the β coefficients for the explanatory variables included in the payoffs, we obtain the probability distribution that makes the observed data most likely.

Data and Variables

For sanctions data, we rely primarily on the Threat and Imposition of Sanctions (TIES) dataset, in which the unit of observation is a sanctions episode.[15] TIES identifies sanction threats that did not lead to the imposition of economic sanctions as well as threats that resulted in sanctions.[16] The information on the threat stage is critical for testing hypotheses linking sanction threats and the target's decision to comply.

In order to avoid selection bias, we modify the TIES dataset by adding cases with status quo outcomes, i.e., cases in which the sender chooses not to threaten sanctions. This modification is motivated by previous findings regarding selection bias: recent empirical sanctions studies point out that sanctions success cannot be properly evaluated without taking into account the sender's strategic choice of initiating sanctions (e.g., Drezner 2003; Drury 2001; Lektzian and Souva 2007; Marinov 2005; Nooruddin 2002). While it is in no way a trivial exercise to conceptualize and measure status quo cases, we follow other IR studies, such as studies of territorial disputes (Huth and Allee 2002) and military conflict (Lewis and Schultz 2005), that have utilized similar procedures for generating status quo observations. These procedures address the problem generated by the inclusion of all possible non-threat dyad-years: in such an all-inclusive dataset, threat cases would be extremely rare, and empirical estimation would yield less reliable results and unmeasured heterogeneity (Green, Kim, and Yoon 2001). Existing research recognizes the need to be more selective when identifying SQ observations and introduces the idea of "politically relevant" dyads (Maoz and Russett 1993).

We rely on the following criteria for inclusion of SQ cases in our data. We regard the temporal and spatial domains of the TIES data as the population, i.e., we focus on the sender-target dyads in the TIES data from 1971 to 2000. These are "politically relevant" dyads for the purposes of our analysis. We divide the 30-year period in TIES into three decade periods: 1971–80, 1981–90, and 1991–2000. For every sender-target dyad that appears in the data, once a decade has elapsed without sanction threats, we code one status quo outcome. For example, if

[15]For more information, see http://www.unc.edu/bapat/TIES.htm.

[16]The classic sanction dataset by Hufbauer et al. (2007) does not provide systematic information on the use of sanction threats.

sender country A issued a single threat to impose sanctions against target country B from 1975 to 1976 in the TIES data, two status quo outcomes will be generated for the two subsequent decades: 1981–90 and 1991–2000. As a result of this process, we coded 582 status quo observations.[17] In sum, the dataset has 1,147 observations with threat initiation years ranging from 1971 to 2000.

While our approach to identifying non-threat observations is justifiable for the purposes of this analysis, we collected additional sets of status quo cases using alternative data sources to ensure the robustness of our results. We looked for status quo observations outside of the set of country dyads included in the TIES dataset. The new nonthreat observations are country dyads that may have some conflict potential, captured by a high degree of countries' preference divergence (measured by the Affinity of Nations Index), by a high level of hostility between the two sides (measured by the hostility variable in the Militarized Interstate Disputes dataset), or by the idea of politically relevant dyads, i.e., dyads that are territorially contiguous or with at least one major power (Maoz and Russett 1993).[18]

Dependent Variables. Our binary dependent variables represent four outcomes of country interactions: Status quo (*SQ*: 582 observations), Acquiescence (*ACQ*: 88 observations), Back down (*BD*: 95 observations), and Sanctions (*SA*: 382 observations). The *SQ* dummy is coded to take the value of 1 for all status quo observations that we added, and 0 otherwise.[19] For the remaining variables, *ACQ*, *BD*, and *SA*, we rely on values of the *Final Outcome* variable coded in TIES as our primary guide. *ACQ* is a dummy variable that is equal to 1 when the target country concedes after a sanction threat, and 0 when the target resists. We code $ACQ = 1$ when the *Final Outcome* variable takes the value of 1, 2, or 5, which represent "Partial or Complete Acquiescence by Target to Threat" or "Negotiated Settlement."[20] *BD* indicates whether or not the sender backs down from a sanction threat without imposing sanctions. We code $BD = 1$ when the *Final Outcome* variable takes the value of 3 or 4, representing cases of "Capitulation by the Sender(s) in Threat Stage" and "Stalemate in the Threat Stage."[21] Finally, *SA* is a dummy variable that takes the value of 1 if sanctions are imposed, and 0 otherwise. For example, for all status quo observations that we were able to identify, *SA* takes the value of 0. Based on the TIES data, *SA* is equal to 1 when the value of *Final Outcome* is in the range from 6 to 10, i.e., "Partial or Total Acquiescence by the Target State Following Sanctions Imposition," "Capitulation by Sender after Imposition," "Stalemate after Sanctions Imposition," and "Negotiated Settlement Following Sanctions Imposition."

Independent Variables. We create explanatory variables that measure the extent to which the sender and target countries depend on their trade relationship and consequently the level of hardship that sanctions would impose on each country. Other regressors are included based on existing sanctions research to control for a range of aspects that may affect the decision making of the sender and target. In particular, we seek to control for dyadic characteristics, as well as each country's domestic political and economic constraints.

In order to gauge common interest between the sender and target, a key concept in our analysis, and capture the target's relative vulnerability to the disruption of the sender-target link, we create a measure of costs associated with severing the economic relationship between the sender and target. Previous studies usually capture sanction costs in terms of overall welfare loss as a share of GNP (Hufbauer et al. 2007). However, our theoretical argument requires a measure that reflects Schelling's (1966, xiii) notion of the power to hurt: "the power to hurt [. . .] is a kind of bargaining power." The power to hurt is simply the country's ability to impose costs on another country. While Schelling was primarily interested in the military

[17] Although originally there were more than 582 status quo observations, we had to delete observations when the values of our key explanatory variables for these observations were missing, or when *Final Outcome* in TIES takes the value of 11, i.e., "Unknown," and *Sanction Type* is equal to −99, i.e., "No Sanctions Imposed." We also lost observations due to robustness checks that utilized UN trade data.

[18] We reran our analyses using the alternative sets of status quo observations, and our main findings remained unchanged. These results are available in the online supporting information.

[19] We also coded cases from TIES with *Sanction Type Threatened* equal to −99, i.e., "No Threat," as SQ observations.

[20] According to the TIES codebook, an outcome is coded as "Negotiated Settlement" if "[t]he target state agrees to alter some of its behavior in exchange for actions taken by the sender(s) prior to the imposition of sanctions. The sender(s) must perform some action in exchange for the target state's compliance for this variable to be coded as 1." Our approach is to code an outcome as ACQ if there is evidence that the target offered any level of concessions. We conducted a robustness check by dropping cases that resulted in "Negotiated Settlement" from our data and rerunning empirical tests using the same model specification; our main results remained unaffected.

[21] When *Final Outcome* takes the value of 4, or "Stalemate in the Threat Stage," this represents a case in which "[a]lthough the issue remains unresolved following the sender's threat, the target does not alter its behavior and the sender does not impose sanctions" (Morgan, Krustev, and Bapat 2006, 11).

aspect of the power to hurt, scholars have long recognized that there are other (in particular, economic) aspects of this power as well. For instance, Slantchev argues that "the power to hurt can take many forms, from military victory, to economic coercion, and humanitarian losses" (2003, 131). Therefore, due to our focus on economic sanctions, our analysis centers on the ability of the sender country to impose economic costs on the target country and that is captured by the scale of direct economic damage that the sender can inflict on the target.[22] We measure the sender's power to impose direct economic costs on the target by looking at the trade relationship between the sender and target. Previous research suggests that when the sender is the target's major trading partner, the sender can generate larger and more immediate economic costs for its opponent (McLean and Whang 2010).

Another reason for choosing trade relationship as a measure of the sender and target's common interest is its double-edged nature, as noted by Odell (1993). Rarely can a country use a foreign policy tool without feeling some consequences of its use at home. Trade links serve as a good example of the dilemma that policy makers face: on the one hand, terminating trade can impose significant and potentially devastating economic costs on the target; on the other hand, trade restrictions may hurt domestic groups that depend on exporting goods to the target and/or importing intermediate inputs from the target. This domestic side effect may weaken the sender's resolve and should be easily calculated by the target.

For our main independent variables representing the concept of common interest, *Sender economic dependence* and *Target economic dependence*, we refer to the Correlates of War Project Trade Data Set, 1870–2006.[23] This source provides us with bilateral trade data between the sender and target countries. We identify the total value of imports and exports for each sender-target dyad (in million dollars) and divide this value by the sender's per capita GDP to create the *Sender economic dependence* variable and by the target's per capita GDP for *Target economic dependence*.[24] On average, sender countries are less economically dependent on the sender-target relationship than targeted countries. We include the measure of economic interdependence at least once at each node in a payoff for the country that makes a decision, i.e., in the sender's SQ and SA payoffs (first and third nodes) to capture the effect of this variable on the sender's decision to issue a threat and to follow up on the threat, and in the target's ACQ payoff (second node) to examine the influence of the sender-target economic relationship on the target's willingness to comply with the sender's demands.[25] This way, we can estimate the effects of the variable on every choice made by the sender and target in the game.

The remaining regressors, while not explicitly presented in our theoretical discussion, are related to the parameters in our model. These variables have also been extensively examined in the existing research as factors that can influence countries' decisions in the context of economic sanctions. To describe the variables briefly, we include regressors to represent economic factors (*Anticipated sender/target costs* and *Contiguity*), domestic political factors (*Sender/Target democracy*), and international strategic factors (*Capability ratio* and *Alliance*).[26]

Finally, when we estimate our model, the identification issue arises primarily because the amount of information in the data (i.e., four mutually exclusive outcomes) is less than the number of parameters to be estimated (i.e., eight payoffs required by the game-theoretic model and ancillary parameters). We address the identification problem in two ways: (1) the inclusion of regressors increases variation in the data, and (2) we normalize the payoffs and variance-covariance parameters.[27]

[22]Note that our concept is different from Wagner's (1988) concept of asymmetric economic interdependence based on market power and the ability to extract better terms of trade.

[23]The trade data that we use here are available at http://correlatesofwar.org.

[24]The resulting measures are continuous variables. We use the natural logarithm of these variables in our statistical analyses.

[25]Two additional points are worth noting. First, it does not matter which of the two payoffs at each node we choose for including this variable: for example, we get the same inference whether we include *Sender economic dependence* in the sender's SA or BD payoff. If *Sender economic dependence* makes the sender less likely to prefer SA to BD as our results suggest, *Sender economic dependence* will be negative in the sender's SA payoff, and it will be positive in the sender's BD payoff if we move *Sender economic dependence* from SA_S to BD_S. Second, the identification rule requires that we do not include a variable or a constant term in every payoff of a country. For example, the variable that measures the sender's economic dependence should be excluded from at least one of the sender's payoffs.

[26]Detailed information on these explanatory variables and summary statistics are provided in Appendix B of the online supporting information.

[27]While we utilize explanatory variables as displayed in Figure 1 to improve our model's ability to distinguish outcomes, we also follow suggestions made in the appendix of Lewis and Schultz (2003) and Whang (2010a). In particular, we normalize payoffs by addition and multiplication while keeping the optimal choices drawn from the equilibrium probabilities intact. We make an assumption regarding the sender's payoffs such that the constant term of SQ_S is equal to zero. For the target, BD_T is normalized to zero. Moreover, no regressor is included in every payoff of any country. Hence, *Sender economic dependence* is included in SQ, ACQ, and SA payoffs of the sender, but excluded from the BD payoff. Finally, SQ_T is not estimated because it is not considered in equilibrium calculations. There is no loss of generality as a result of these restrictions.

TABLE 1 Estimation Results

Outcomes	Payoffs	Variables	Est.	S.E.
Status Quo	SQ_S	*Sender economic dependence*	−0.117*	0.022
		Sender democracy	0.009	0.012
		Contiguity	−0.001	0.003
		Alliance	−0.003	0.007
Acquiescence	ACQ_S	*Constant*	0.254	0.268
		Anticipated sender costs	1.318	0.950
	ACQ_T	*Constant*	0.252	0.356
		Target economic dependence	0.090*	0.024
		Anticipated target costs	0.146*	0.083
		Contiguity	−0.095*	0.030
		Alliance	−0.333*	0.090
Back Down	BD_S	*Constant*	−0.787*	0.124
		Sender democracy	−0.017	0.013
	BD_T	Normalized to zero	0	
Sanctions	SA_S	*Constant*	−0.486	0.027
		Sender economic dependence	−0.124*	0.022
		Sender democracy	0.010	0.012
		Capability ratio	−0.002	0.002
	SA_T	*Constant*	0.522	0.436
		Target democracy	−0.004	0.007
		Capability ratio	−0.076*	0.026
	Variance	$Var(ACQ_S)$	0.254*	0.129
		$Var(SA_S)$	0.001	0.001
	Covariance	$Cov(ACQ_S, SA_S)$	−0.011	0.006
		$Cov(BD_S, SA_S)$	−0.010	0.094
		$Cov(ACQ_S, BD_S)$	0.061	0.896

N = 1147
Log-likelihood = −950.6033
$\chi^2 = 1730.609^*$
$^* = p < 0.08$

Results and Discussion

Table 1 displays our structural estimation results.[28] The five columns indicate outcomes, payoffs, variables, estimates, and their standard errors. We also report the estimates for the ancillary parameters such as variance and covariance among payoffs; we estimate these parameters to prevent belief updating from having downward bias (Whang 2010a) and, hence, to find the unbiased and correct amount of the informational effect of sanction threats.[29] Finally, we include the χ^2 statistic to test whether the set of estimated coefficients in our entire model achieves joint significance under the null hypothesis that all coefficients are equal to zero. It is possible that correlated regressors have significant effects on the payoffs, even though strong correlations among regressors may make it difficult to distinguish the individual effects that each regressor has on its payoffs. The signficant χ^2 value supports our full model against the null model.

Note that estimated effects in Table 1 represent the *direct* effects of the regressors on corresponding payoffs in the sense that the payoffs are assumed to be a function of these regressors. We focus on the direct link between regressors and payoffs to test our coercive

[28] In addition to the results reported in Table 1, we have tried a number of different specifications as robustness checks. Our main findings regarding *Sender/Target economic dependence* have remained unaffected.

[29] When we assume unit variance and zero covariance, i.e., the distribution of stochastic components of the payoffs is identical, as in previous statistical structural models (Lewis and Schultz 2003; Wand 2006), the target country cannot learn which outcome the sender country prefers, SA or BD, when the target observes a sanction threat at the first decision node. See Whang (2010a) for details.

hypothesis (*H2*). At the same time, there is another, *indirect*, way in which these regressors affect countries' behavior in our model. These indirect effects work through countries' beliefs about which action is selected at each decision-making node. The informational function of sanction threats can be effectively measured by the indirect effects, i.e., how changes in regressor values update beliefs that countries have about which outcome the opponent prefers. Therefore, we test our informational hypothesis (*H1*) by examining the indirect link between regressors and outcomes via shifts in beliefs about whether, for example, the sender is willing to use sanctions when the target refuses to acquiesce after the sender's threat.

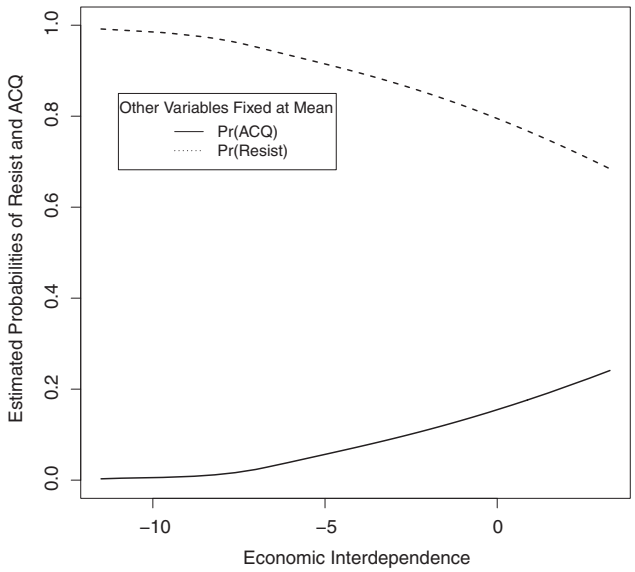
Do Sanction Threats Coerce?

We first turn to the results in Table 1 representing the direct effects of regressors on the payoffs. The estimation results support the coercive hypothesis: the target's economic dependence significantly increases the target's ACQ payoff at the 1% level. Since the target is better off complying with the sender's demands as the target's economy becomes more dependent on the sender, we expect that the target should be more likely to make concessions than resist. This confirms the coercive effect of sanction threats based on the potential economic damage that sanctions could cause due to a strong economic relationship between the sender and target.

Figure 2 shows the estimated action probability that the target resists the sender's demand (dotted line) and the estimated probability of the ACQ outcome (solid line). Consistent with the positive coefficient of *Target economic dependence*, trade dependence has a strong coercive effect on the target's decision making when the sender issues a sanction threat. The figure indicates that, when we hold the values of other variables at their mean values, *Target economic dependence* decreases the estimated action probability of resistance by about 30%, which in turn increases the estimated outcome probability of ACQ by about 20%. In sum, the common interest in the form of economic ties between the sender and target paves a direct way to coerce the target into abandoning its controversial policies.

The target's ACQ payoff includes three other variables that attain statistical significance in expected directions: *Anticipated target costs*, *Contiguity*, and *Alliance*. These results indicate other conditions that make pre-sanction compliance more likely. We find that the target's payoff from ACQ is higher and, therefore, the sanction threat is more likely to be successful, when (1) the target's overall anticipated costs of sanctions increase, (2) the physical distance between the sender and target decreases, and (3)

FIGURE 2 Estimated Probabilities of Resistance (Action) and Acquiescence (Outcome)



the sender and target are not formally allied. As the target anticipates that sanctions will put severe strains on its ability to run its economy, which in turn can make the target's leaders vulnerable politically, concessions are preferred to resistance. When the target's geographic location is close to that of the sender, the impact of sanctions can be more significant than when the target is more distant from the sender because the two countries should have stronger economic links to each other. In addition, the sender may be in a better position to enforce sanctions against a neighbor than a distant target, with the latter being able to engage in smuggling and other forms of sanction circumvention more easily. Finally, a target that does not have a close political and strategic relationship with the sender can expect sanctions to be executed unless the target acquiesces after a sanction threat. Given that, non-allied targets tend to be better off when they comply.[30] These results provide an additional confirmation of the importance of incorporating threats into the analysis of sanction imposition and outcomes.

We also find that *Capability ratio* has a negative effect on the target's SA payoff, SA_T, at the 1% level. If the target lacks a general ability to compete with the sender in a crisis, the target is worse off when the final outcome is SA, which would discourage the target from rejecting the sender's demands at the second decision node. The reason is that the decision to resist would bring the target an

[30]Note, however, that non-allied targets are more likely to resist if they get to the sanctions stage (Whang 2010b).

expected payoff lower than the payoff that the target receives from acquiescence because *Capability ratio* decreases the target's SA payoff.

Turning to the results for the sender's payoffs, *Sender economic dependence* included in two of the sender's payoffs, SQ_S and SA_S, and one of the constant terms included in the sender's payoff from backing down, BD_S, are significantly different from zero at the 1% level. Since we normalize the constant on SQ_S to zero, the result that the estimate of the BD_S constant has a negative sign implies that, relative to the status quo, the sender is likely to be worse off when it fails to implement the threat to impose sanctions after the target decides to resist.

The economic dependence on the part of the sender, *Sender economic dependence*, significantly decreases the sender's payoff from both Status Quo (SQ_S) and Sanctions (SA_S) at the 1% significance level. When the sender has significant economic ties with the target in terms of their trade relationship, the sender is less satisfied with the SA outcome, and, hence, the sender is less likely to enforce its threat when the target resists. Interestingly, *Sender economic dependence* is also negatively associated with SQ_S, which implies that the sender is more likely to make a sanction threat when the level of the economic relationship with the target is greater. This result suggests that it may be politically costly for the sender's leader not to take any action in a dispute with the target when the sender clearly has some economic leverage over the target.

Do Sanction Threats Inform?

We now assess the informational hypothesis (*H1*) by examining the indirect effects of economic interdependence on shifts in the target's prior beliefs regarding the probability that the sender will execute the threat. We focus on the extent to which the target changes its initial assessment of the sender's resolve, i.e., the probability that the sender will impose sanctions at the last decision node. This indicates the amount of learning, or belief updating, on the part of the target regarding how determined the sender is to enforce the threat. In the model, we calculate the amount of belief updating as the difference between the unconditional probability of imposing sanctions (prior: P_S) and the conditional probability of imposing sanctions that takes into account the fact that the threat has been made at the first node (posterior: $P_{S|T}$). By measuring the gap between posterior and prior beliefs, we can understand the informational value of sanction threats from the target's perspective and the impact of the threat on the target's behavior. For example, suppose that at the beginning of the interaction the target doubts that the sender will impose sanctions, i.e., prior P_S is 0.4. When the sender makes a sanction threat, however, the target has new information that the target can utilize to adjust the prior probability that the sender will use sanctions if the target does not offer concessions, which we can expect to be higher than the prior, i.e., posterior $P_{S|T}$ is, say, 0.7. The amount of belief updating is the difference between the posterior and prior and is equal to 0.3. When the amount of updating is large, the target learns substantially from new information, i.e., a threat of sanctions, about the sender's resolve. In this case, the informational hypothesis (*H1*) would be supported. When the amount of updating is close to zero, we can argue that the target does not change its initial evaluation of the sender's "type," and, hence, the informational value of sanction threats is at best minimal. Consequently, signaling does not work because the use of sanction threats cannot distinguish more resolved senders from less resolved ones. In this case, we can reject the informational hypothesis.

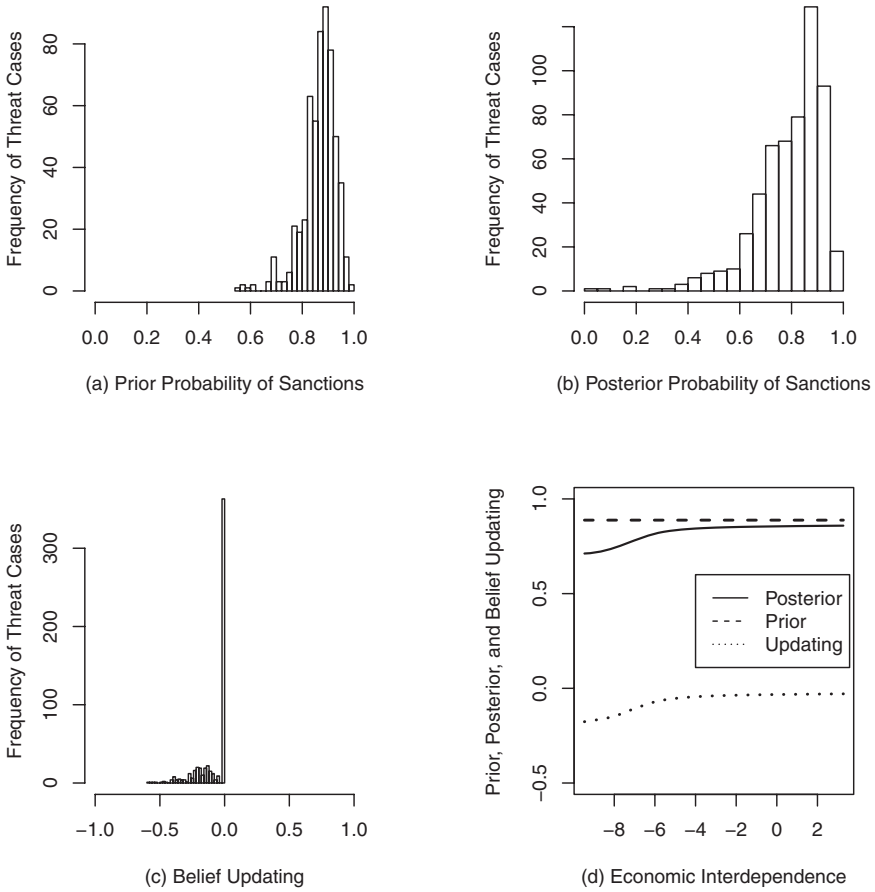
Figure 3(c) displays a histogram that shows the estimated amount of belief updating, i.e., $P_{S|T} - P_S$, for threat observations.[31] The histogram suggests that belief updating does not take place, and thus there is no empirical evidence to support the informational hypothesis. The average value for the estimated amount of updating is -0.075 with the standard deviation of 0.119. When the target observes a sanction threat, the target either keeps its initial assessment regarding the "type" of the sender or lowers the initial assessment that the sender is going to enforce the threat, as negative updating suggests. In either case, the target does not appear to treat a sanction threat as an indicator that can help the target to gauge the sender's true intention at the last decision node.

Figure 3(d) presents another piece of evidence that sanction threats produce negligible belief updating irrespective of the magnitude of the sender and target's common interest. We plot changes in the amount of updating as we vary *Target economic dependence*, while holding all other variables at their mean values.[32] The solid line denotes the target's posterior belief that the

[31]We exclude SQ observations in Figure 3(c) because belief updating for SQ cases represents a counterfactual situation. When we include SQ observations in the belief updating histogram, our finding remains the same, i.e., the amounts of updating for the SQ cases are also negligible.

[32]Figure 3(d) displays belief updating as a function of *Target economic dependence* for the purpose of consistent comparison with Figure 2. However, our main result, i.e., no significant positive updating regardless of the level of common interest, remains unaffected if we replace *Target economic dependence* with *Sender economic dependence*.

FIGURE 3 Estimated Prior and Posterior Probabilities of Sanctions and Amount of Belief Updating by the Target after Sanction Threats



sender will impose sanctions, while the dashed line denotes the target's prior belief about the imposition of sanctions. The dotted line represents the amount of belief updating, and it is clear that updating is near zero for most of the range of *Target economic dependence*.[33] As Figure 3(d) shows, although initially there is a slight increase in updating as *Target economic dependence* increases, the effect of the dependence variable on updating is rather marginal. The evidence presented in Figure 3, therefore, suggests that we can reject the informational hypothesis (*H1*).

Table 2 displays the effects of economic interdependence on the outcome probability of acquiescence and the amount of belief updating that we estimate for three cases, in which *Target economic dependence* takes low, intermediate, and high values. When the target country has a low level of economic dependence on the sender, sanction threats do not work: Sudan's sanction threat had virtually no effect on the compliance decision by Libya, as seen from Pr(ACQ) being close to zero. When the Sudanese president issued a threat to Gaddafi, not only did the threat fail to secure any concessions, but it also led Libya to question Sudan's resolve, which is indicated by negative updating. As we move to the other cases, in which *Target economic dependence* takes intermediate and high values, the target countries, India and China, respectively, did not change their initial assessments of the senders' resolve to impose sanctions after observing sanction threats,

[33]We conducted a test of the size of the difference between the unconditional probability of sanctions and the probability of sanctions conditional on a threat. Since updating values reported in the article are calculated based on estimated coefficients, we find the sampling distribution of average belief updating using a bootstrapping method in order to consider errors around the updating values. We find that the amounts of belief updating in both Figure 3(c) and Figure 3(d) are not positively and statistically distinguishable from zero: the lower bound of the 95% confidence interval in each case is always less than zero. Thus, we cannot reject the null hypothesis of no positive belief updating in favor of the informational hypothesis (i.e., positive updating).

TABLE 2 Effects of *Target economic dependence* on Estimated ACQ Probability and Belief Updating

Target economic dependence		Sender	Target	Years	Pr(ACQ)	Belief Updating
Low	−9.466	Sudan	Libya	1981–1981	0.0009	−0.1493
Intermediate	−1.633	U.S.	India	1974–1976	0.173	−0.0005
High	3.184	U.S.	China	1997–1997	0.342	−0.0001

i.e., the updating amount is close to zero. However, when the economic dependence variable approaches its maximum level, as in the case of the U.S. sanction threat against China in 1997, Table 2 shows a much higher estimated probability of the target's acquiescence (0.342). While the informational effect of the threat was clearly absent in this case, the economic relationship between China and the United States did play a coercive role in increasing the incentive of China's government to offer concessions.

In sum, the presented evidence leads us to the conclusion that, while economic interdependence does have significant *direct* effects on increasing the target's payoff from acquiescence, economic interdependence lacks *indirect* effects of changing the target's beliefs. The fact that the sender with close economic ties to the target issues a sanction threat does not add much to the target's perception of whether the sender is resolved.

While the aforementioned evidence clearly supports the coercive hypothesis and leads us to reject the informational hypothesis, one question remains. Why do we find no evidence of learning, as Figure 3 demonstrates? How can we explain the existence of strong direct effects along with the near absence of indirect effects? To explain the lack of positive updating, we plot the prior and posterior probabilities of sanctions in panels (a) and (b) of Figure 3, respectively. The reason why economic interdependence does not help the target to update its assessment of the sender's resolve when a threat is issued is that at the outset the target already has a good idea of whether the sender will use sanctions or not. Threats are credible: if the sender prefers to carry out the threat at the last node, the sender has no incentive to lie. Our empirical results show that targets believe that senders will actually impose sanctions: the prior probability that the sender is going to impose sanctions is quite high (mean = 0.872). Because the prior is so high to begin with, i.e., the target believes that the sender will actually impose sanctions in case of resistance, there is little room for belief updating after the target observes a sanction threat. Consequently, the amount of belief updating measured as the difference between the posterior and prior is small, and the informational function of sanction threats is limited. In sum, sanction threats are credible, but not informative.

What makes the target believe that there is a high probability that the sender prefers sanctions to backing down at the last node? While traditionally game-theoretic models take priors as a given, our findings are helpful in determining possible explanations of the high priors. Two factors appear to be important in this respect. First, sanctions are not very costly for senders (Smith 1995) and may in fact provide symbolic benefits to the sender's leader (Whang 2011). One conventional measure of sanction costs—the volume of the sender's pre-sanction trade with the target—suggests that the sender suffers the loss of less than 1% of the sender's GDP in most cases. Second, failing to carry out sanction threats generates substantial domestic and international costs for senders. Our estimation results provide evidence of the existence of audience costs. To determine whether audience costs exist for the sender, we need to compare the sender's BD and SQ payoffs. The estimated average SQ payoff for the sender is distributed between 0.379 and 1.422, whereas the estimated BD payoff is equal to −0.855. The sender's average BD payoff is estimated to be strictly lower than the SQ payoff across the entire range of *Sender economic dependence*. Hence, the sender, on average, does suffer audience costs when it makes a threat and subsequently backs down, instead of imposing sanctions. Together, these two factors make target countries generally aware of senders' expected payoff and lead to the expectation that sanctions are highly likely at the last decision node.

Conclusion

This article focuses on the success of sanction threats and investigates two causal mechanisms that can force the target country into compliance without the use of sanctions. Previous research suggests that pre-sanction compliance outcomes can usually be attributed either to informational or coercive effects of threats. If sanction threats serve as an informational tool and convey new information to the target regarding the sender's resolve to impose sanctions, then compliance occurs because the

problem of informational asymmetry is resolved, and the target chooses not to resist the demands of the opponent that is determined to carry out its threat. If, on the other hand, sanction threats are a means of coercion, the target complies because economic sanctions would be too costly, and, consequently, the target's expected utility of resistance is less than the utility of compliance.

The difficulty of disentangling these two causal mechanisms results from the observationally equivalent positive effect that sanction threats are expected to have on the target's compliance. Our empirical approach enables us to address this theoretical challenge. The strategic structural model that we use allows us to estimate both informational and coercive effects of threats on the outcome of sender-target interactions. We find no supporting evidence in favor of the hypothesis that, when significant common interest is at stake, sanction threats increase the target's assessment of the likelihood that the sender is resolved; therefore, we conclude that the informational hypothesis can be rejected. On the other hand, we find robust support for the coercive hypothesis: as the level of common interest in avoiding the disruption of economic ties increases, the target is more likely to comply. Countries use sanction threats as an exercise of power to hurt that stems from economic interdependence and one side's greater ability to exploit this interdependence to achieve certain foreign policy goals.

Our empirical findings that targets do not learn much about the sender's resolve from sanction threats and that threats serve as an instrument to coerce targets into compliance help to determine which causal mechanism is at work when sanction threats succeed. Therefore, these empirical conclusions have important theoretical implications: when sanction threats work, their effectiveness should be attributed to the coercive effect, rather than the informational effect. Existing theoretical accounts focus on one mechanism, or the other, while this article demonstrates the importance of studying the two causal mechanisms within a unified framework.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

- Data
- **Appendix A:** Sanction Threat Game and Its Solution
- **Appendix B:** Explanatory Variables
- **Appendix C:** Derivation of PBE Probabilities of Outcomes
- R and Fortran Codes for Replication
- Alternative Sample Selection for SQ Observations and Robustness Check Results