The Power to Hurt and the Effectiveness of International Sanctions*

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Abstract

Although disruption of trade is the main coercive mechanism for most sanctions, few have explored precisely how it forces a target to concede. Building on bargaining theory, we argue that each side's relative ability to hurt the other and, in turn, adapt to bilateral trade disruption determines the likelihood of sanctions success. We hypothesize that the side enjoying a greater comparative advantage in the traded goods will have the upper hand in harming its adversary and nullifying the adversary's attempts to impose costs in return. We further argue that countries with the ability to produce a greater variety of goods domestically can resist sanctions more successfully. Utilizing a novel nonparametric estimator to account for strategic interaction between the sender and target state, we test our predictions on commodity-level trade data. Our results indicate that sanctions are more likely to succeed when sanctioners have a comparative advantage in their exports to the target, but more likely to fail if the target's export portfolio is diverse or if the target has a comparative advantage in the goods that it exports to the sanctioners.

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Introduction

In the aftermath of the February 2014 Ukrainian Revolution, a crisis began to unfold in the south of the country. Days after Russian-speaking Ukrainians held a series of anti-revolutionary protests in the Crimean city of Sevastopol, Russian forces entered Crimea. By March, the peninsula had joined the Russian Federation, following a fraudulent referendum. The West responded to the territorial grab with a series of economic sanctions intended to force Russia to change its Ukrainian policy. This move was criticized as ineffective[1] or even counterproductive.[2] But then, everything abruptly changed: during the second half of 2014, the global oil glut sent crude oil prices plummeting more than 50%. Russia, the world's second-largest net exporter of oil, found itself plunged into economic crisis, as the value of the ruble tumbled. Suddenly, commentators were much more sanguine about the prospects for the effectiveness of economic sanctions against Russia, crediting the sanctions for Russia's economic woes, arguing that now was the time to press Putin for compromise.[3]

The confidence with which so many commentators immediately denounced the sanctions as ineffective when implemented, and subsequently praised them following the oil crash highlights the fact that we know relatively little about when and why trade sanctions work. This is unfortunate because, at a time when U.S. disagreements with powerful states such as Russia, China, and North Korea are multiplying, economic sanctions present an attractive alternative to the use of military force. One piece of evidence for sanctions' continuing relevance is that, until 2010,

[1]See, for example, Chapman, Steve. 9 March, 2014. "Sanctions on Russia won't work." *Chicago Tribune*. Available http://articles.chicagotribune.com/2014-03-09/news/ct-russia-sanctions-oped-chapman-0309-20140309_1_economic-sanctions-grain-embargo-u-s-economic-embargo; Kahn, Robert and Steven A. Tananbaum. 24 April 2014. "Time to Rethink Sanctions Against Russia and Aid to Ukraine." *Fortune*. Available http://fortune.com/2014/04/24/time-to-rethink-sanctions-against-russia-and-aid-to-ukraine/; Friedman, George. 29 April 2014. "The U.S. Opts for Ineffective Sanctions on Russia." Stratfor Geopolitical Weekly. Available https://stratfor.com/weekly/us-opts-ineffective-sanctions-russia.

[2]Sher, Gerson. 6 March 2014. "Russia, Ukraine And Sanctions: A Double-Edged Sword." *International Business Times*. Available http://www.ibtimes.com/russia-ukraine-sanctions-double-edged-sword-1559910

[3]For example, Saunders, Paul J. 21 August 2014. "When Sanctions Lead to War." *The New York Times*. Available http://www.nytimes.com/2014/08/22/opinion/when-sanctions-lead-to-war.html; Bordoff, Jason and Carlos Pascual. 18 December 2014. "Ukraine is key to resolving Russia's crisis." CNBC Commentary. Available http://www.cnbc.com/id/102280963; Binnendijk, Hans, Christopher S. Chivvis, and Olga Oliker. 30 December 2014. "Rapprochement With Russia?" *The New York Times*. Available http://www.nytimes.com/2014/12/31/opinion/rapprochement-with-russia.html.

sanctions were rarely mentioned in U.S. National Security Strategy documents. In 2015 alone, they received nine mentions. In this context it is clearly important for scholars to analyze the conditions under which economic sanctions succeed.

Scholarly conventional wisdom holds that sanctions success is a function of the ease with which the target can replace its sanctioning trade partners (see, for instance, Galtung 1967; McLean and Whang 2010). While many existing empirical studies of sanctions control for aggregate trade between the sender(s) and target of sanctions, few have explicitly asked about the mechanisms that underlie this relationship, or what makes some trade partners irreplaceable or indispensable for the target.[4] Even a major trade partner will not have much leverage over a target if the latter can easily switch to other suppliers or produce these traded goods domestically. An especially striking example of the possible disconnect between being a major trading partner and having leverage is the United States' unsuccessful grain embargo on the USSR in 1980. Although at the time the U.S. was the largest exporter of grain to the Soviet Union, its unilateral trade embargo only resulted in the USSR buying more grain from Argentina and Europe, and failed to change Soviet behavior (Paarlberg 1980).

We address this gap in the literature by presenting a theoretical model of economic sanctions, grounded in work on conflict bargaining, which explicitly links a trade partner's replaceability to the cost of sanctions. Moreover, we show that measuring the replaceability of trade partners requires the type of commodity-level data that has been used in other areas of international politics (see, e.g., Goenner 2010; Cao and Prakash 2010; Li and Reuveny 2011; Chatagnier and Kavakli 2015), but has not yet been used to examine sanctions.

In our theoretical framework, sanctions are imposed as a means of inflicting pain upon a target. The amount of pain that a sanctioner can cause is driven by its level of market power. Oligopolists that control important resources (OPEC members, for example) have significant sanctioning power; countries that engage in little trade or only sell commodities that are easily obtainable elsewhere

[4] An important exception is Peksen and Peterson's (2016) recent study, where the authors proxy for the cost of replacing trade with sender countries by tallying the GDP of the target state's allies. Employing a similar approach, our study constructs more in-depth measures of the target country's cost of replacing its trade with the sanctioning state(s).

will have little power. A target state can mitigate these costs by searching for new trading partners, as Apartheid South Africa did during the 1980s, which allowed it to recover 86% of its lost export revenue within a year "by redirecting trade to nonsanctioning nations" (General Accounting Office 1992, 14). Alternatively, in the case of an import embargo, the target can try to produce the requisite good at home. This was the route taken by Rhodesia in the 1960s and 1970s, when it pursued a policy of import substitution industrialization, allowing it to prosper even in the face of severe economic sanctions (Chikuhwa 2006).[5] A target state's market power allows it greater latitude to exercise these options for mitigation, making it better able to resist the costs of sanctions.

Our empirical contribution is to operationalize and test explicit linkage mechanisms between commodity trade and sanctions success. To this end, we employ commodity-level data on international trade between 1962 and 2000. We use this information to calculate and determine the effects of four variables: (1) "sender market power," which is associated with the cost of sanctions that a sender can impose on a target; (2) "target market power," which is a measure of the target state's ability to impose costs on sanctioning states via bilateral trade; (3) "target export variety," which measures the number of unique goods exported by the target state; and (4) "target export portfolio concentration," which assesses the *distribution* of the value of these goods within the target's export portfolio. The first two variables aim to measure the cost of finding alternative trade partners for each side by calculating the level of revealed comparative advantage the exporter possesses for each commodity category. The last two variables measure the target's ability to adapt domestically and to raise the sender's transaction costs associated with maintaining the sanction regime.

Our findings suggest that the more market power a state has (sender *or* target), the more likely that that partner will achieve a favorable outcome in a sanction episode. Likewise, it is difficult to achieve sanction success against targets that can offset losses from trade disruptions by adjusting their domestic production. Interestingly, targets whose export portfolios are concentrated on a

[5]Another possible strategy, applicable to export embargoes, is to convince some sanctioners to continue to trade with the target (Early 2009). In this paper, we assume that the sanctioner coalition remains intact. The relationship between the content of trade and sanction-busting within the sender coalition is an interesting area for future research.

small number of goods do not seem to be more vulnerable to sanctions; further analyses indicate that autocratic targets whose export income depends upon a limited number of goods seem to be more resilient to sanctions.

The remainder of the paper is organized as follows. We begin with a brief review of the previous research on the effect of trade ties on sanctions success. We then discuss in greater detail the competing theoretical models of effectiveness, present corresponding testable hypotheses, and develop our measures of economic importance. Next, we analyze the data and interpret the results. Finally, we draw conclusions and make suggestions for future research.

Determinants of Sanction Success

The logic behind economic sanctions is relatively simple. Sanctioning states threaten to limit their economic interaction with a target unless it changes a particular policy. The target compares whatever benefit it gets from the policy to the economic cost of the sanctions and, if the costs from the sanctions exceed the benefits from continuing with the policy, changes it behavior (Tsebelis 1990). Sanctions can be likened to a bargaining process (Hovi, Huseby and Sprinz 2005; McLean and Whang 2010; Bapat and Kwon 2015), similar to that of conflict bargaining (e.g., Fearon 1995; Powell 1999). A "sanction crisis" begins with a threat by a group of one or more sanctioning states (the "senders") to limit their economic interaction with a target unless it changes a particular policy (for example, nuclear proliferation). If the target concedes, then the crisis ends with a policy change and the two parties' utilities reflect this change in policy. If the target resists, then the sender implements sanctions and trade is disrupted until one side gives in. For both the sender and the target, escalating the crisis to this level is a costly gamble: sanctions may succeed in forcing the target to make concessions (a "win" for the sender) or they may fail in this regard (a "win" for the target). However, regardless of the outcome, both sides are hurt economically by trade disruptions.

Given this understanding of the sanction process, previous literature on sanction success tends

to focus on two issues: factors that shape the ability of sanctioners to create an effective sanction regime, and the implications of strategic interaction for measuring and modeling sanction success. In the first case, coalitions of different sizes may face different obstacles to effectiveness. When a small coalition threatens sanctions, the target may find it easy to find other trade partners in the global economy, allowing it to minimize the costs of sanctions. Large coalitions, on the other hand, face collective action problems. The larger the coalition, the greater each sender's incentives to defect and free ride on the others will be (Bapat and Morgan 2009). Researchers have posited that these collective action problems may be mitigated if intergovernmental organizations are involved (Martin 1992; Drezner 2000). The second group of research suggests that *observed* sanction effectiveness may be a result of selection (Nooruddin 2002; Drezner 2003) or strategic incentives (McLean and Whang 2010; Whang 2010), as targets may give in to *threatened* sanctions when they expect them to be effective.

No bargaining-based model is complete without a proper understanding of how actors can harm one another and prevent themselves from being harmed. Indeed, Schelling (1966, v) calls "the power to hurt [. . .] a kind of bargaining power." It aims to compel the other side to make concessions, in order to stave off further punishment. If the power to hurt is bargaining power, then the denial of this power undermines the opponent's bargaining leverage. When a state realizes its inability to gain an advantage through punishment (due to the other side's "ability to bear costs"), it is more likely to yield, especially when punishing the other side is costly for the sender as well (Slantchev 2003).[6] In short, both the power to hurt and the power to bear costs constitute independent sources of bargaining power.

Iran's ability to fend off the pressures brought about by Western sanctions in the immediate aftermath of the Iran Refined Petroleum Sanctions Act of 2009 (subsumed under the Comprehensive Iran Sanctions Act a year later) aptly illustrates the causal link between between sender market power, the target's ability to resist, and the power of sanctions to hurt. Despite its vast crude oil reserves, Iran's limited refining capacity forced the country to import more than 40% of its gasoline

[6]If sanctions have symbolic value and minimal costs for the sender, then they may continue long after they are revealed to be ineffective. The best example is the Cuban embargo, which has lasted more than 50 years.

at the time.[7] Accordingly, the sanction bill specified a ban on the export of refining equipment and technology to Iran. In practice, however, the efficacy of these sanctions was limited. The Western companies had little market power in the global production of refining equipment, as non-Western (mostly Chinese, Indian, and Malaysian) companies readily substituted as exporters of such equipment to Iran. Iran also was able to offset potential shortages in gasoline partially by gearing its petrochemical industry to produce methanol in lieu of gasoline (Luft 2009).

While the power to inflict and bear costs is key in any bargaining model, few sanction studies separate and explicate these costs in detail. The most commonly used sanction datasets, Morgan, Bapat and Kobayashi (2014) and Hufbauer et al. (2007), include ordinal measures of the costliness of sanctions for the target and the sender individually. However, the ordinal nature of these variables makes it difficult to understand which economic factors, in particular, make sanctions more costly. These ordinal variables are also based on subjective assessments of sanction costliness and suffer severely from missing data.[8] As an alternative, some scholars measure a sanction's costliness by the difference in trade levels before and after sanctions are imposed (e.g., McLean and Whang 2010). One important drawback of this measure is that it is only available for "imposed sanctions" and not for cases where sanctions were threatened but not carried out. Additionally, such a measure looks only at the quantity of trade maintained after sanctions and does not measure differences in *quality* between trade partners. More recently, Bapat and Kwon (2015) and Peksen and Peterson (2016) have tried to model costs to parties in a sanction episode explicitly. Bapat and Kwon (2015) incorporate power to hurt by using total trade between the states, but do not disaggregate trade into imports and exports, and hence do not differentiate between the power to inflict costs and the ability to bear costs. Consequently they are unable to separate the sanctioners' and targets' costs from trade disruption, which have opposing effects on sanction success. Peksen and Peterson (2016) argue that the level of target trade dependence with respect to the sender, conditioned

[7] "Iran faces global push towards more sanctions." *Financial Times*. 15 December 2009. Available https://www.ft.com/content/9ba5fd12-e9b2-11de-9f1f-00144feab49a

[8] Among the 1102 sanction episodes the TIES dataset includes for the time period we cover in this study, our measure provides data for 1017 episodes. The missing data in our measurement occurs in cases where the target was the EU (42 cases), a microstate, or a state enjoying its first year of independence. In contrast, using the *anticipated cost to the target* and *anticipated cost to the sender* variables of the TIES dataset leaves us with only 657 cases.

by the target's ability to divert this bilateral trade to alternative partners if sanctioned, proxies for a sanction's ability to hurt the target. Following convention, the authors operationalize these different types of power (i.e., sender power to hurt, and target power to withstand) using aggregate trade figures, thus overlooking differences in *quality* of the goods traded between partners.[9]

To remedy these problems, we propose a model of sanctions that defines power in terms of costs inflicted and borne. We begin by discussing and operationalizing two critically important types of bargaining power: the power to inflict costs and the power to bear or mitigate costs inflicted by others. We then show that these concepts, when applied to trade sanctions, can be disaggregated further, generating novel testable hypotheses about economic coercion.

The Components of Economic Power

Sanctions impose costs upon both the target and the sender. When the sender imposes sanctions, the target can retaliate with counter-sanctions, widening the scope of trade disruptions. In other words, the sender cannot ensure that once sanctions are initiated, disruption will be limited to those commodities that the sender includes in its sanction regime. The target can retaliate by disrupting the trade of commodities that the sender needs. Powerful targets can make it difficult for senders to maintain the sanctions that they have implemented, reducing their likelihood of success.

A state's ability to bear costs, either as a target or a sender, depends on the magnitude of its gains from trade. If a state benefits from exporting goods to another state, then sanctions hurt by reducing profits. While a state cannot completely eliminate sanction costs, the harm will be lessened significantly if its exports are highly sought-after in the global marketplace (due either to low prices or high quality). Finding new buyers is easier when the state has a large comparative advantage in the production of that commodity. On the import side, a sanctioned state must seek out alternative suppliers of a good, or to learn to do without. This state can reduce sanction

[9] Peksen and Peterson (2016) proxy for the target's trade dependence on the sender and its ability to divert trade by calculating the target's total trade with the sender as a percentage of target's total international trade and the sum of the GDP of target's allies, respectively.

costs by searching for new suppliers in the global market (external substitution) or in the domestic (internal substitution). External substitution is easier if there are other suppliers in the world who sell low-cost or high-quality versions of the relevant goods.[10]

In short, the exporter's comparative advantage affects sanction effectiveness in two ways. A high level of comparative advantage in a given good allows the exporter to find alternative buyers more easily while making it more difficult for the importer to find alternative sellers. If the sanctioner is the exporter, this makes sanctions easier to enforce. If the target is the exporter, comparative advantage gives the target more power to hurt the sanctioner back. The effect of trade on sanction success, then, depends on who is selling which commodity to whom, and on the seller's comparative advantage in that commodity. Using total trade volume as a measure of sanction costs for either the sender or the target—as has been done in prior studies—is not sufficient to reflect this process.

From our bargaining-based model of sanctions effectiveness, we can derive a number of hypotheses. First, we expect sanctions coming from sender states with greater market power to be more effective in accomplishing their goals.

Hypothesis 1. *The more easily the target can substitute for the sender's exports externally, the* ***lower*** *the likelihood of sanctions success.*

By the same logic, senders will be less sensitive to sanction costs if their dependence on the target or the target's comparative advantage is low. Under these conditions senders will find it easier to substitute for the target exports externally, allowing them to bear the cost of sanctions more easily.

Hypothesis 2. *The more easily the sender can substitute for target's exports externally, the* ***higher*** *the likelihood of sanctions success.*

[10] Global comparative advantage is not the only determinant of trade volume under free trade. Dyad-specific factors, such as distance, may also matter. Given two equally competitive producers of commodity X in the world, situated on opposite sides of the globe, substituting one producer of X for the other one will be costlier than would normally be expected.

At this point, we reemphasize that, in order to test hypotheses 1 and 2, we disaggregate total trade into imports and exports. We expect these two (weighted) components of trade to have *opposite* effects on sanction success. This is in stark contrast to previous works that measure target vulnerability using the amount or decline of total trade (McLean and Whang 2010; Whang 2010; Bapat and Kwon 2015).

Lastly, we hypothesize that diverse export portfolios reduce vulnerability for the target. We measure this in two ways: by looking at the the variety of goods the target exports (the total number of goods traded), and the concentration of those goods (the distribution of value of goods within the target's export portfolio). We base these measures on arguments about production technology, contracting costs, and enforcement ability. A diverse industrial base will allow the targeted state to transfer technology, innovate, and commit production facilities to produce the embargoed good within its economy (Hausmann and Hidalgo 2011). One of the most striking examples of such an adjustment was the apartheid government's Sasol initiative in South Africa. The regime's advanced production facilities in other areas of petrochemical production were key to (partially) offsetting the shortages induced by the international oil embargo, as these facilities were retrofitted to produce oil from coal (Kaempfer and Lowenberg 1988).[11] Moreover, when a target has a narrow export portfolio, senders can make fewer laws and obtain the support of fewer domestic interest groups at home to block the import of goods produced by the target. Finally, fewer goods mean easier monitoring and better enforcement. States that trade many goods require broader sanctions, which are inherently more difficult to maintain.[12]

Hypothesis 3. *The greater the number of commodities exported by the target state, the* ***lower*** *the*

[11]Consistent with this idea, the number of commodities exported by South Africa in 1983 was 71, more than one standard deviation above the world average that year.

[12]Our theory contends that the target may consider striking back with counter-sanctions. Following the same line of logic, we might posit that the sender's industrial setup and level of export concentration can mitigate the costs imposed by such a retaliation by the target. This, in turn, would endow the sender with further coercive capacity. These hypotheses would be the mirror images of Hypothesis 3 and Hypothesis 4, as Hypothesis 2 is to Hypothesis 1. For brevity, we omit these potential hypotheses. Additionally calculating these variables for sanctioning coalitions is problematic; various transaction costs may hinder product substitution across sender countries. Moreover, sanctions are mostly employed by economically-advanced countries. Thus, the relevant variables (sender export breadth and concentration) exhibit little variance. Nonetheless, additional tests, presented in the online appendix, show that including sender's export portfolio breadth does not change any of the substantive findings presented below.

likelihood of sanctions success.

Hypothesis 4. *The more concentrated the export portfolio of the target state, the* ***higher*** *the likelihood of sanctions success.*

Research Design

Our hypotheses concern the effects of economic power on the efficacy of sanctions. Thus, our dependent variable is the success or failure of sanctions, whether threatened or imposed. We draw the sanctions data from Morgan, Bapat and Kobayashi's (2014) Threat and Imposition of Sanctions (TIES) dataset. Our unit of analysis is the sanction episode, which includes any interaction during which one or more states imposed or threatened to impose sanctions upon another. While the TIES data range from 1945–2005, the availability of our key independent variable restricts our analysis to the years 1962–2000. We limit our set of observations to only those sanctions episodes in which *export and/or import sanctions* were threatened or imposed, as these constitute the set of relevant cases for our theory; we do not expect market power to play a role in the outcome of non-economic sanctions. Empirically, we do this by omitting sanctions episodes in which the threats fall solely within categories 7–10 in the TIES data.[13]

The dependent variable in our analysis is binary: we code episodes in which the target capitulates or a negotiated settlement is reached as successful, and we code episodes in which the sender capitulates or there is a stalemate as failures. In coding this variable, we note that some sanctions do not definitively terminate, but simply fizzle out. Thus, we are missing data on episodes that are technically still ongoing, but have effectively ended without changing target behavior. If a sanction has not explicitly terminated, but has not been mentioned in ten years or more, we assume that the sanction has failed. As the TIES dataset ends in 2013, any sanctions episode listed as *ongoing as of* 2003 or earlier is coded as a failure. We show below that our results are robust to using only those sanction episodes that definitively terminated.

[13]Categories 7–10 include, respectively: asset freezes, termination of foreign aid, travel bans, and suspension of economic agreements. Our results are robust to including category 10.

Additionally, we considered whether restricting our sample to high-politics issues changes our findings.[14] As shown in the appendix, our findings remain very similar in this smaller sample.

Measuring Cost of Sanctions

To test our hypotheses, we employ four key independent variables. The operationalization of the variables for the latter two hypotheses is relatively straightforward. The breadth of the target's export portfolio (Hypothesis 3), is simply a measure of the number of goods that a country exports in a given year. We use Feenstra et al.'s (2005) commodity trade data set, at the two-digit level (approximately one hundred commodity types), and count the number of different commodities traded by each country in each year. This value ranges from a minimum of nine export items (Cambodia in 1988 and Rwanda in 2000) to a maximum of 79 (the Netherlands in 1986 and China in 1997). We expect higher values of this variable to be related to greater target resilience.[15] The concentration variable (Hypothesis 4), calculates the *value concentration* of these commodities, regardless of the absolute number of the goods traded by the target country. We create this variable by calculating the Herfindahl-Hirschman index of the target country's trade portfolio in a given year, in terms of dollars.[16] The higher this value, the more concentrated a target's export portfolio is, and the more likely that sanctions should succeed.

Our measures of relative market power (Hypotheses 1 and 2) are more complex. We begin by calculating, in each year, for each pair of states, i and j, the market power of state i over state j. This measure is a function of market size and comparative advantage, across various different

[14] We code these based on the *Issue* variable in the TIES dataset, which lists up to three separate issues among 15 categories. Those we categorize as high-politics are categories 1-10, which are respectively "contain political influence", "contain military behavior", "destabilize regime", "release citizens, property, or material", "solve territorial dispute", "deny strategic materials", "retaliate for alliance or alignment choice", "improve human rights", "end weapons / materials proliferation", and "terminate support of non-state actors".

[15] The correlation between the number of exports and the total GDP generated from industrial endeavors (in logged dollars) for a country in a given year is 0.64. This correlation suggests more breadth in export portfolio indicates stronger industrial and technological base, which can be geared towards the production of different commodities in the targeted state.

[16] For a country trading n different commodities in a given year, the HH-index is calculated as $HH = \sum_{i=1}^{n} T_i^2$, where T_i is the value of trade in commodity i. HH will necessarily be bounded below by $\frac{1}{n}$, which indicates a diffuse trade portfolio, and above by 1, which corresponds to a concentrated portfolio.

commodities. In particular, we conceptualize i's market power over j in year t as a weighted measure of dependence:

$$D_{ijt} = \sum_m \left(\frac{X^m_{ijt}}{M_{jt}} \times CA^m_{it} \right) \tag{1}$$

where X^m_{ijt} represents the volume of i's exports of commodity m to country j in year t,[17] M_{jt} represents state j's total imports in year t, and CA^m_{it} is state i's comparative advantage in commodity m during year t. The ratio of state j's imports of commodity m from state i to its total imports provides a measure of dependence that accounts for total market size. We obtain the value of dyadic commodity exports from the Feenstra et al. data set.

We operationalize comparative advantage as a country's *relative revealed comparative advantage* (RRCA). Revealed comparative advantage (RCA), originally developed by Balassa (1965, 103), aims to measure the trade performance of individual countries in regard to manufacturing products, assuming that revealed export performance reflects an exporter's strength in production/price advantages, while accounting for non-price factors. RCA has been a popular measure in international economics, various versions of which have been employed to evaluate the degree of advantage a state has in exporting a specific good among a number of other exporters (Hillman 1980, 315). We create our RRCA measure by first calculating RCA for each commodity-country-year, using Balassa's formula. A state's RCA is effectively the ratio of a state's exports in a given commodity to its total exports, divided by the global mean. Thus, in year t, for each state, i, and each commodity m:

$$RCA^m_{it} = \left(\frac{X^m_{it}}{\sum_{n \neq m} X^n_{it}} \right) \Bigg/ \left(\frac{\sum_{j \neq i} X^m_{jt}}{\sum_{j \neq i} \sum_{n \neq m} X^n_{jt}} \right) \tag{2}$$

where X^m_{it} is the value of state i's total exports of commodity m to all other states in year t. This

[17] Our measure includes all commodities in each state's export portfolio, even though sanctioners often restrict trade only on a few items. The reason for this is that we analyze both threatened and imposed sanctions. When sanctioners first make a threat, they very rarely specify which commodities will be restricted. The target can also retaliate by restricting any export it wishes. For this reason, at the threat stage all traded commodities can be potentially restricted during sanctions. So, both sides should consider their costs and benefits from a trade disruption of all commodities. This approach is similar to the use of a country's total military and economic power during a crisis even though in very few conflicts countries employ all of their national resources in battle.

quotient provides us with a measure, $RCA^m_{it} \in \mathbb{R}_+$,[18] for each country-commodity-year. We then scale the result, to get a relative measure. We do this by finding the maximum (finite) value of RCA for each commodity-year, and dividing by that value:

$$RRCA^m_{it} = \frac{RCA^m_{it}}{\max_i RCA^m_{it}} \tag{3}$$

This returns a value, $RRCA^m_{it} \in [0,1]$, which we use to proxy for CA^m_{it} in Equation 1.

There are two possible cases in which the value of RCA^m_{it} can be infinite: if the state only exports one commodity (so that the denominator of the numerator in Equation 2 is zero), or if the state is a monopolist in a given year (in which case the denominator in Equation 2 is zero). In both cases, we simply set the value for CA^m_{it} to one, indicating maximum comparative advantage.

After calculating the values in Equation 1, we are left with a weighted aggregate dependence value for every directed-dyad-year. The raw level of dependence, $\frac{X^m_{ijt}}{M_{jt}}$, contributes to this measure completely when $CA^m_{it} = 1$, and its contribution decreases as CA^m_{it} approaches zero. Exporters with high market power in a given year are those that make up a large proportion of their partner's imports, by selling commodities for which they have a comparative advantage.

Given that 27% of sanction threats and impositions in our sample come from a coalition of states (Morgan, Bapat and Kobayashi 2014), we use the weighted aggregate dependence values for each dyad to create a measure of the total market power of the sanctioning coalition (defined below) on the target. We do this by simply aggregating the values for all coalition members. Since each state participates in the sanctions, the target state should lose the combined value of all members. Thus, an additive measure of value is appropriate. The aggregate variable ranges in value from zero (for states that do not trade commodities in a given year) to approximately 0.43 (for exports to the United States from the League of Arab States).[19] Similarly, we measure target

[18] As discussed below, some values are infinite. Within the data, the finite values of RCA range from a minimum of zero, for any case in which a state did not export a particular commodity in that year, to a maximum of 179,085.

[19] Our measure of market power enters into our model linearly. However, given its skewness and the possibility of diminishing marginal effects, we have examined several logarithmic specifications. Our general substantive findings remain unaffected.

power over a sanctioning coalition by summing the dyadic measure over each member of the sanctioning coalition.

We define a sanctioning coalition as the group of all individual sender countries listed in the TIES dataset for a given sanction episode. If sanctions are initiated through an international institution, we include all of that institution's members.[20] However, "IGOs are not all created equal" (Boehmer, Gartzke and Nordstrom 2004, 2). IGOs play a crucial role in sanction episodes by reducing incentives to free ride (Martin 1992; Drezner 2000; Peksen 2013, but see also Early and Spice 2015), but they vary in their mandates and level of institutionalization. For this reason, we conduct the following robustness checks. First, to code institutions with the relevant mandate and required capacity, we obtained an updated version of Boehmer, Gartzke and Nordstrom (2004). Based on this dataset, we include in sender coalitions only those organizations that have an economic mandate *and* a medium or high level of institutionalization. The results we obtain are similar to when we include all IGOs in sender coalitions. Secondly, we run analyses where *only* primary senders (and none of the IGOs) are included in the sender coalition. In that case all our results remain except *Target Market Power*, which becomes insignificant.[21]

Data

We begin by examining the initial relationship between our dependent variable and our variables of interest. Table 1 displays the mean levels of our four main independent variables for successful and failed sanctions. In each of these cases, the differences are significant at the $p < .10$ level and in the expected direction.[22] In general, successful sanctions are more common when target export diversity and market power are low, target exports are concentrated, and sender market power is

[20] We include sanctions initiated by the EU, but exclude sanctions where the EU is the target. The reason for this is that variables such as Target Democracy and Target's Military Capabilities are not well defined for the EU, which has supranational authority over its member states in some issues, but has not traditionally exercised it in others, including international security.

[21] This indicates that incorporating non-primary sanctioners in our analysis is valuable, because these countries' abilities to withstand counter-measures by target matter for the sanction outcome. Whether primary sanctioners' higher ability to withstand target power is due to higher resolve or enforcement is a question for future research.

[22] There are 607 complete observations for each variable in Table 1. As discussed above, non-trade related sanction episodes and those that had not terminated for our time frame are deleted from our sample.

	Target Export Variety	Target Portfolio Concentration	Target Market Power	Sender Market Power
Failed Sanctions	65	0.1	2.65	3.5
Successful Sanctions	60	0.13	3.24	1.67
Difference	-5***	0.03*	0.59**	-1.83**

* $p < .10$; ** $p < .05$; *** $p < .01$. All tests are two-tailed tests.

Table 1: Average values of our main variables by sanction outcome

high. These results are consistent with the predictions of all four hypotheses above.

The results in Table 1 are encouraging. However, it is only a first look. Our regression analysis include a number of controls, drawn from the literature.[23] Our first set of control variables accounts for characteristics of the target. Sanctions should be less likely to be effective on powerful states, as such countries are both more self-sufficient and better able deploy countermeasures against sanctions. We account for this with measures of both economic (the log of the target's total GDP and its per capita GDP (drawn from Gleditsch 2002)) and military power (the target's material capabilities, as measured by its CINC score (Singer 1988)). To account for the fact that democratic states may be more vulnerable to sanctions, we also include the target's Polity score (Marshall and Jaggers 2002). Additionally, we include the number of states involved in the sanctioning coalition. Large sanctioning coalitions should be more likely to face collective action problems, and are expected to be associated with lower levels of sanction success.

In addition to these characteristics, we consider the context in which sanctions are imposed. Most importantly, we expect different dynamics of sanction imposition and sanction-busting in the Cold War and post-Cold War periods (Jentleson 2000). In addition, we control for security-related sanctions, as target states are likely to show greater resolve in such issues and less likely to give in (Morgan and Schwebach 1997).

As a robustness check, we estimate an auxiliary model that includes three additional variables: whether sanctions were brought to bear under the aegis of an international governmental organization, whether "smart" sanctions (asset freezes, travel bans, etc.) were used or threatened, and

[23] All data come from the TIES dataset, unless otherwise indicated.

whether the U.S. was among the primary senders in the coalition.

The Challenge of Strategic Interaction and Nonparametric Estimation

The simplest way to analyze our data would be with a simple logit or probit model, which is how many previous studies have proceeded (e.g., Lam 1990; Ang and Peksen 2007; Bapat and Morgan 2009). So that it can be more easily compared with previous research, we begin our analysis with a logit model. We then extend it using a conditional logit framework, which controls for target-specific fixed effects. However, these techniques neglect two possible sources of bias: selection and strategy. Nooruddin (2002) points out that sanctions are a matter of choice, and that senders and receivers select themselves into sanctions (see also Lektzian and Souva 2007). Because the selection stage is potentially correlated with the overall outcome, failure to account for this process can result in selection bias, which is a type of specification error (Heckman 1979).

Others go a bit further, arguing that there is a *specific* structural relationship between sanction imposition and success. These authors posit that the decision to impose sanctions is based on the sender's beliefs about the target's likelihood of concession, given that sanctions are inflicted. Thus, the process is not simply one of selection, but is fully *strategic* in nature (McLean and Whang 2010; Whang 2010; Whang, McLean and Kuberski 2013). Failing to incorporate the strategic process—even when accounting for selection—will result in bias from model misspecification (Signorino 2002).

We remain skeptical of both approaches. First, a properly specified model for either the selection or the strategic process requires that the analyst have the full universe of cases on which selection or strategic interaction could occur. In this case, this means that we must have data on all of the episodes for which one state *might have threatened* or imposed sanctions, but opted not to do so. Without these data, we cannot correctly estimate either type of model. Second, while a structural statistical model that matches the true data generating process would be ideal, applying a model with an inappropriate structure would result in the very bias that we hope to avoid.

For this reason, we choose an alternative model specification. Both selection and strategic

misspecification are tantamount to omitted variable problems, which can be conceptualized as model specification problems (see Signorino and Yilmaz 2003). For situations in which it is appropriate to treat these issues as nuisances, rather than substantively interesting features in themselves, we can obtain unbiased estimates of the other coefficients, if we use methods that "allow for the estimation of functions of unknown form" (Kenkel and Signorino 2012, 2), such as fully nonparametric estimation. In this case, we are most concerned with the bias that specification error might induce with respect to our variables of interest. Thus, rather than attempt to use a structural estimator that may not be appropriate for our data, we opt for flexibility, choosing to implement local likelihood logistic regression (Fan, Heckman and Wand 1995; see also Frölich 2006; Chatagnier 2014). This is a local smoothing technique that makes no assumptions about global functional form, and as such, can model any number of processes.[24] Thus, our flexible, nonparametric estimator can account for bias from *either* selection or strategic interaction, without forcing us to apply one particular specification.[25]

Coefficients are estimated locally according to the following equation:

$$\hat{\beta}_x = \underset{\beta_x}{\arg\max} \sum_{i=1}^{n} \left[Y_i \ln\left(\frac{1}{1+e^{-X_i'\beta_x}}\right) + (1-Y_i)\ln\left(\frac{1}{1+e^{X_i'\beta_x}}\right)\right] K_H(X_i - x) \tag{4}$$

where x is a vector of covariate values, K is a symmetric, univariate kernel function, and H is a vector of bandwidth values.[26] Estimation is similar to that of parametric logit at each point within the dataset, but the contributions of other observations are "weighted," according to their distance from the current data point. The size of the smoothing window is constant across all points, and is established beforehand, using leave-one-out cross-validation. Rather than a single set of coefficients, as is returned in a parametric model, the local logit estimator returns n different sets

[24] This includes the parametric logit. As the bandwidth parameters (discussed below) increase, the smoothing window grows. When the window becomes sufficiently large to include all observations, the local logit estimates converge to the parametric estimates. Thus, the local logit actually subsumes the conventional logit estimator.

[25] The tradeoff that we must make is increased variance; our estimates will have wide confidence intervals.

[26] The vector H will be some subset of $h > 0$, $\delta \in [0,1]$, and $\lambda \in [0,1]$, applied to continuous, ordered, and unordered variables, respectively. To adjust for different scales and to ensure stability in our estimates, we standardize continuous variables (see Frölich 2006). We opt to treat number of exports (which runs between nine and 79) and number of sanctioners (which runs one and 154) as continuous, rather than discrete, given the large number of categories.

of coefficients. For this reason, we are unable to present a simple table of parameter estimates, and must instead present results graphically.

Results

Our hypotheses concern the effects of sender market power, target market power, target's export portfolio breadth, and target's export portfolio concentration on the success of economic sanctions. We expect greater levels of target market power to decrease (Hypothesis 2) and sender market power to increase (Hypothesis 1) the probability of sanctions success. Similarly, we expect a broader range of goods exported by the target to decrease the probability of sanction success (Hypothesis 3), while a target export portfolio concentrated on a smaller number of goods should increase this probability (Hypothesis 4). We begin by estimating a series of conventional logit models that examine the effects of these variables, controlling for other factors.

Logit Analysis of Sanctions Success

The results from the parametric logit models appear in Table 2. Columns 1–3 provide the results of regressions using our primary dependent variable: sanctions success for sanctions that have terminated. Column 4 uses the alternative dependent variable described above. We first look at sender and target market power variables. As expected, sender power has a positive and target power a negative impact on sanction success, suggesting that our measures capture states' coercive abilities. These findings support both hypotheses 1 and 2.

Next we look at the variety of the target state's export portfolio. Consistent with Hypothesis 3, the estimated effect is negative and significant, indicating that, all else equal, the greater the number of unique target exports, the less likely sanctions are to succeed.

Surprisingly, while we predicted target portfolio concentration to have a positive effect, the estimate is negative and statistically significant at the $p < .01$ level. To understand this estimate better we took a closer look at "deviant cases" (i.e., sanctions failures against targets with highly-

Table 2: **Logit Analysis of Sanctions Success**

	Baseline Model	Interaction	Additional Controls	Alternative DV
	(1)	(2)	(3)	(4)
Sender Market Power over Target	0.126**	0.128**	0.087**	0.113**
	(0.050)	(0.050)	(0.041)	(0.053)
Target Market Power over Sender	−0.021*	−0.020*	−0.035*	−0.021*
	(0.011)	(0.011)	(0.019)	(0.011)
Target Export Variety	−0.051***	−0.054***	−0.048**	−0.059***
	(0.018)	(0.019)	(0.020)	(0.021)
Target Portfolio Concentration	−2.057***	−0.544	−1.059	−0.856
	(0.710)	(0.772)	(0.743)	(0.878)
Target Portfolio Concentration		0.287***	0.217**	0.264**
× Target Democracy		(0.102)	(0.103)	(0.109)
Target's Total GDP	0.022	0.088	0.091	0.083
	(0.131)	(0.137)	(0.146)	(0.141)
Target's GDP per capita	0.174	0.291**	0.265*	0.253*
	(0.128)	(0.139)	(0.140)	(0.130)
CINC	2.880	1.975	1.966	1.575
	(2.628)	(2.692)	(2.959)	(2.814)
Target Democracy	−0.043**	−0.076***	−0.066***	−0.075***
	(0.018)	(0.020)	(0.021)	(0.021)
Cold War	0.040	0.050	0.046	0.071
	(0.222)	(0.225)	(0.209)	(0.248)
Security Issue	−0.301	−0.231	−0.209	−0.524**
	(0.225)	(0.240)	(0.263)	(0.244)
Coalition Size	−0.003	−0.004	−0.010	−0.003
	(0.007)	(0.007)	(0.007)	(0.007)
Smart Sanctions			0.476	
			(0.335)	
US Among Primary Senders			0.267	
			(0.246)	
IGO Involved			1.335***	
			(0.325)	
Constant	1.414	−0.695	−1.271	0.432
	(1.881)	(2.023)	(2.129)	(2.073)
Number of observations	594	594	594	539
Log-Likelihood	−387.939	−384.342	−371.961	−344.353
AIC	799.878	794.684	775.922	714.707

Robust standard errors clustered on target in parentheses.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All tests are two-tailed tests.

concentrated export portfolios). We find that almost all of those targets are full autocracies. To be sure, most countries with highly-concentrated export portfolios are autocratic, but the few democracies among them give in to sanctions.[27] Based on this observation, Model 2 includes an interaction between *Target Portfolio Concentration* and *Target Democracy*, to test whether the effect of a target's export concentration depends upon regime type. We now find that *Portfolio Concentration* increases the likelihood of sanction success, but only when the target is relatively democratic. AIC tests show that including this interaction improves model fit. We also checked whether interactions between *Target Democracy* and any other economic variables should be included, but these additional interactions did not produce significant effects, and AIC tests suggested that they did not fit the data as well.

Table 2 includes additional robustness checks. Model 3 uses three additional control variables: an indicator for IGO involvement, an indicator for smart sanctions, and an indicator for sanctions where the US is among the primary senders. Model 4 uses the alternative dependent variable, which includes only cases terminated before 2003. Our findings remain the same under these specifications. Further robustness checks related to the definition of a sender coalition and different specifications are reported in the appendix.

Figure 1 presents substantive results from Model 2 in the analysis above. We depict the results with continuous variables set to their means and discrete variables to their medians. We then vary the factor of interest. We set dichotomous variables to zero.[28] The plotted lines represent the predicted probability of sanctions success, while the shaded regions are 90% confidence intervals. The substantive results are strong. As the sender's market power increases from our empirical minimum to our empirical maximum, holding other values constant, the probability of sanction success more than doubles. Meanwhile, varying target power from its minimum to maximum value reduces the probability of success by about 90%. Portfolio size has a similarly powerful effect.

[27] For instance, there are 29 sanction target countries with a concentration higher than 0.5. Of those 29 sanctions, 16 succeeded and 13 failed. Of the 13 targets that refused to give in to sanctions, only 1 has a *Polity* score higher than 0 (Mali 1999). By contrast, 5 of the 16 targets that gave in to sanctions had scores above 0.

[28] To account for the interaction effect, we plot portfolio concentration results using Polity scores at both -8 and 8.

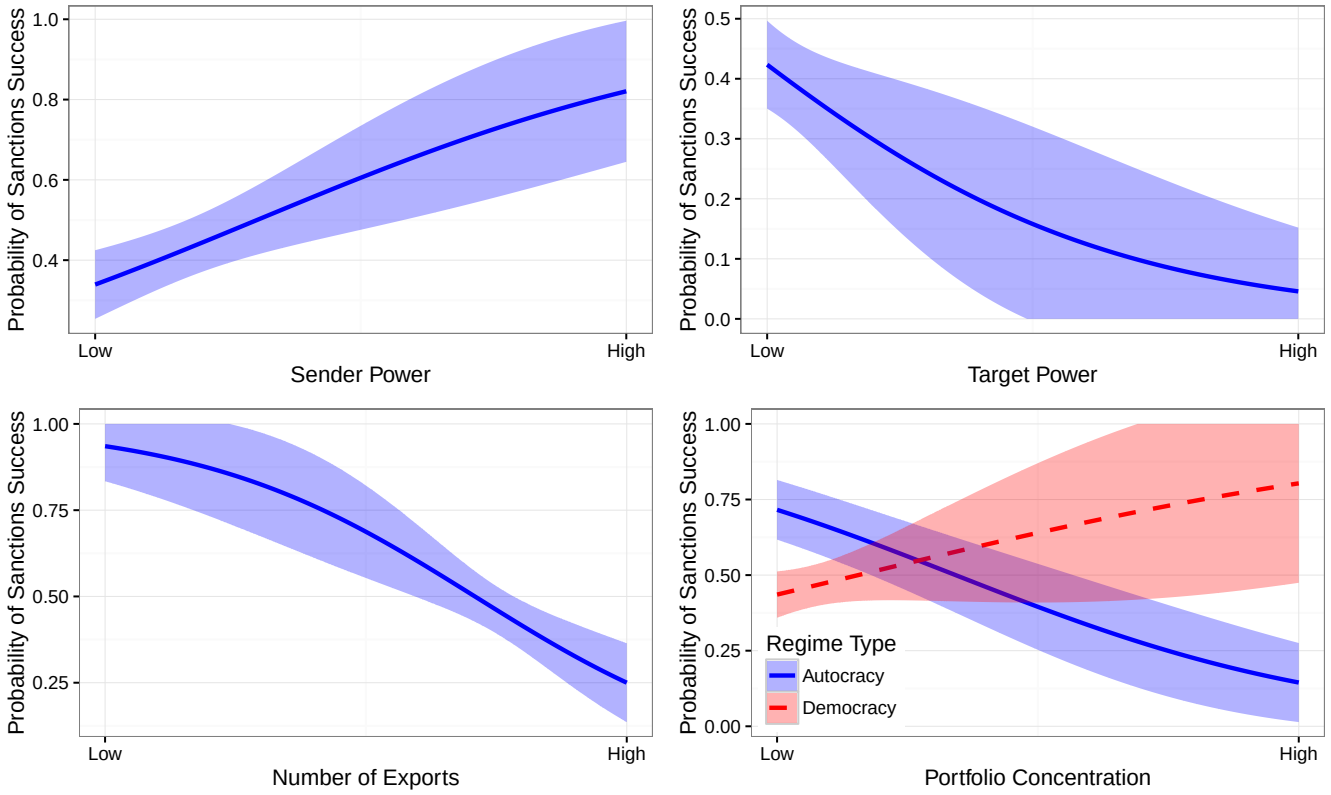

Figure 1: Logit predicted probabilities

Whereas sanctions against a state that exports only a few goods (the minimum value in our data set is nine) are virtually assured of success, sanctions against a country with an especially broad trading portfolio (the maximum in our data is 79) face about a three-in-four chance of failing. Finally, when examining the effect of portfolio concentration, we see the role of regime type. For democratic states, we obtain the expected pattern: sanctions against targets with highly concentrated trade portfolios are almost guaranteed to succeed (though the confidence interval is large at the high end), while those against targets with diverse portfolios are more likely to fail. For autocracies, the effect is reversed. Sanctions against autocratic targets with heavily-concentrated portfolios are almost certain to fail, while those against targets with diverse portfolios have a high likelihood of success. Note that this finding regarding portfolio concentration is not driven by oil exporters. The finding is robust to controlling for a target's oil exports and whether the target is an OPEC member.

As with the results in Table 1, however, these findings are tentative. While they support our expectations, they are not a wholly accurate representation of the sanctioning process. Estimation of a standard logit model carries with it the possibility of specification error, due to the strategic (or selection-based) nature of the sanctioning decision. Thus, to ensure that the estimates for our variables of interest are not an artifact of the data generating process, we turn to an analysis using the nonparametric local logit approach described above.

Local Logit Analysis of Strategic Interaction

The local logit estimator provides separate estimated effects at each profile of values for our independent variables. As mentioned above, this means that we cannot report a single table of coefficient estimates, as we did with the parametric estimator. Instead, we must select a profile of values and estimate effects locally, given a predetermined set of smoothing parameters.[29] To illustrate our results, we use the same variable profiles used in Figure 1.

Figure 2 shows the results from our nonparametric estimation. As before, we plot predicted probabilities of sanctions success as we vary each of the relevant independent variables from their minimum to maximum values, along with 90% confidence intervals. The results are encouragingly similar to those in Figure 1. As before, the results for three of our variables of interest are supportive of our hypotheses. The results for sender power are virtually unaffected, but we see greater levels of concavity for both target power and portfolio breadth. In the case of target power, the result is even nonmonotonic: at very low levels of target market power, sanctions are (slightly) *more* likely to succeed as power increases. One explanation for this may be that these states trade more, and therefore have more to lose from sanctions, while not yet having the market power to inflict any pain themselves. However, we caution against reading too much into the result, as the nonmonotonicity occurs entirely within the 90% confidence region.

The results relating to the portfolio concentration of target exports once again do not quite

[29] Leave-one-out cross-validation suggests $h = 7.0056649$, $\delta = 0.7984088$, and $\lambda = 0.5170193$ as optimal bandwidth parameters.

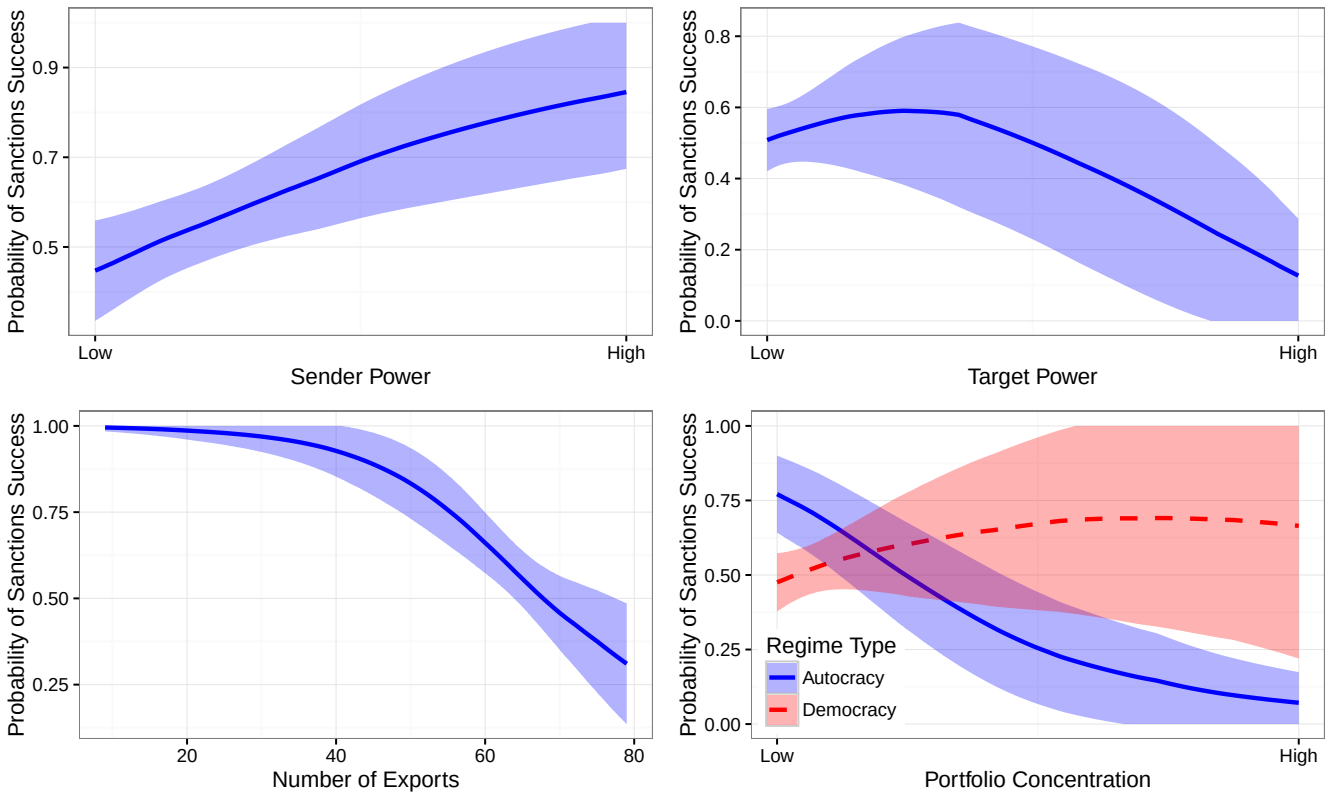

Figure 2: Local logit estimation

conform to our expectations. In this instance, the estimated effects are less linear, and in the case of democracies, non-significant. As mentioned above, there are several cases in the data in which sanctions failed against autocracies with heavily-concentrated trade portfolios (largely OPEC members). Meanwhile, there are few cases of democracies with highly concentrated portfolios. Despite the fact that we observe a substantial increase in the predicted probability of success as we vary from the lowest to highest level of portfolio concentration (from approximately 0.48 to 0.66), our confidence interval is too large to draw any firm conclusions.

The primary result that follows from both sets of analyses is that the power to hurt and to bear harm from trade disruption matters for sanction success. Sanctions are most successful when senders have more market power over targets than vice versa and when targets have relatively narrow export portfolios.

Conclusion

This paper studied the question of when trade sanctions can be effective by proposing a framework based on the Schelling maxim that the power to hurt (and to bear hurt) is a source of bargaining power. This idea implies that international crises (economic or military) are decided by each side's ability to inflict costs on the adversary and to nullify the other side's attempts to impose costs in return. Two ways of minimizing costs of trade disruptions are switching to alternative trade partners (external substitution) and adapting domestic industries to new needs (internal substitution). We operationalize the ease of external substitution using disaggregated trade data, which allows us to calculate each state's comparative advantage at the commodity-level. We then use this value to weight aggregate trade levels between the target of economic sanctions and the sender coalition. We argue that this is a superior alternative to the coarser and more commonly-used aggregated trade measure, as it incorporates not only trade, but also the ease with which the trade partner can be replaced. To capture the ease of internal substitution we calculate the variety of countries' exports and argue that states that export a greater variety of commodities have greater capacity to produce what it cannot buy from abroad. Lastly, we test whether the level of concentration of a target's export portfolio has a positive effect on sanction success, because a more concentrated portfolio means fewer goods to monitor in order to block most of a target's exports.

Our empirical results mostly bear out our theoretical expectations. In our parametric model specifications, sender market power increases sanction success, while target market power portfolio diversity are negatively related to success. Our findings on portfolio concentration prove to be conditional and, where significant, run contrary to our hypothesis. Export portfolio concentration makes autocracies more resilient to sanctions and have no effect on democracies. We believe that this warrants further study. To account for the effects of potential model specification issues (i.e., bias introduced from selection or strategic effects), we also implement a flexible, nonparametric estimator. Our results from this latter model are broadly consistent with the parametric results. The robustness of our results is encouraging, suggesting strong support for our measures of market

power as determinants of sanction success.

That the economic costs of sanctions for both sides matter for success, regardless of the target's institutional characteristics, is worth highlighting. The robustness of our findings stand in contrast to mounting evidence suggesting the relation between cost of sanctions and sanction success is primarily a function of the political setup of the target state (e.g., Allen 2005; Escriba-Folch and Wright 2010; Lektzian and Souva 2007). Whether this change in target behavior occurs due to a "societal transmission belt" (Galtung 1967) or a change in the political calculus of the elites in the target states (Cortright and Lopez 2000) is a topic for further inquiry.

Our findings carry interesting policy implications. One such implication relates to the decision of when to employ targeted smart sanctions, instead of trade sanctions. *Ceteris paribus*, employing smart sanctions may be a wiser choice against countries with advanced economies and versatile industrial bases, because these targets can more easily avert trade sanctions by finding alternative buyers for their exports and converting domestic industries to replace banned imports. Another implication of this research for sanction design is that primary sanctioners should strategically select their coalition partners to maximize their comparative advantage in the sanctioned goods. This involves looking beyond the target's *current* trade partners, and focusing on whom the target could *turn to*. Senders should try to include within their coalition countries who, in the event of a sanction, could buy the target's exports or provide imports, even if these countries are not currently trading with the target.

Lastly, utilizing disaggregated data in sanction studies paves the way for a number of novel inquiries. For instance, primary sender states may strategically choose which goods to sanction in order to maximize their global leverage over the trading of these goods. Alternatively, we may expect sanction-busters to be those who have a similar level of comparative advantage on the goods that a sender exports to the target state. Our study raises a question at the micro level as well. Do existing ties between firms from non-sanctioning sates and firms in the target state facilitate the formation of *new* trading ties to replace those between the firms in the relevant states? Finally, looking at disaggregated trade data can help us better explain varying performances

observed in post-sanctions trade recovery between sender and target states.

References

Allen, Susan Hannah. 2005. "The Determinants of Economic Sanctions Success and Failure." *International Interactions* 31(2):117–138.

Ang, Adrian U-Jin and Dursun Peksen. 2007. "When Do Economic Sanctions Work? Asymmetric Perceptions, Issue Salience, and Outcomes." *Political Research Quarterly* 60(1):135–145.

Balassa, Bela. 1965. "Trade Liberalisation and "Revealed" Comparative Advantage." *The Manchester School* 33(2):99–123.

Bapat, Navin A. and Bo Ram Kwon. 2015. "When Are Sanctions Effective? A Bargaining and Enforcement Framework." *International Organization* 69(1):131–162.

Bapat, Navin A. and T. Clifton Morgan. 2009. "Multilateral Versus Unilateral Sanctions Reconsidered: A Test Using New Data." *International Studies Quarterly* 53(4):1075–1094.

Boehmer, Charles, Erik Gartzke and Timothy Nordstrom. 2004. "Do Intergovernmental Organizations Promote Peace?" *World Politics* 57:1–38.

Cao, Xun and Aseem Prakash. 2010. "Trade Competition and Domestic Pollution: A panel study, 1980–2003." *International Organization* 64(03):481–503.

Chatagnier, J. Tyson. 2014. "Teaching the Enemy: The Empirical Implications of Bargaining Under Observation." *Journal of Conflict Resolution* 58(6):673–695.

Chatagnier, J. Tyson and Kerim Can Kavakli. 2015. "From Economic Competition to Military Combat." *Journal of Conflict Resolution* .
URL: *http://dx.doi.org/10.1177/0022002715613565*

Chikuhwa, Jacob Wilson. 2006. *Zimbabwe at the Crossroads*. Bloomington, IN: .

Cortright, David and George A. Lopez. 2000. *The Sanctions Decade: Assessing UN Strategies in the 1990s*. Boulder: iLynne Rienner.

Drezner, Daniel W. 2000. "Bargaining, enforcement, and multilateral sanctions: when is cooperation counterproductive?" *International Organization* 54(1):73–102.

Drezner, Daniel W. 2003. "The Hidden Hand of Economic Coercion." *International Organization* 57(03):643–659.

Early, Bryan R. 2009. "Sleeping With Your Friends' Enemies: An Explanation of Sanctions-Busting Trade." 53(1):49–71.

Early, Bryan R. and Robert Spice. 2015. "Economic Sanctions, International Institutions, and Sanctions Busters: When Does Institutionalized Cooperation Help Sanctioning Efforts?" *Foreign Policy Analysis* 11(3):339–360.

Escriba-Folch, Abel and Joseph Wright. 2010. "Dealing with Tyranny: International Sanctions and the Survival of Authoritarian Rulers1." *International Studies Quarterly* 54(2):335–359.

Fan, Jianqing, Nancy E. Heckman and M. P. Wand. 1995. "Local Polynomial Kernel Regression for Generalized Linear Models and Quasi-Likelihood Functions." *Journal of the American Statistical Association* 90(429):141–150.

Fearon, James D. 1995. "Rationalist Explanations for War." *International Organization* 49(3):379–414.

Feenstra, Robert C., Robert E. Lipsey, Haiyan Deng, Alyson C. Ma and Hengyong Mo. 2005. "World Trade Flows: 1962–2000." NBER Working Paper.

Frölich, Markus. 2006. "Non-Parametric Regression for Binary Dependent Variables." *Econometrics Journal* 9(3):511–540.

Galtung, Johan. 1967. "On the Effects of International Economic Sanctions, with Examples from the Case of Rhodesia." *World Politics* 19(03):378–416.

General Accounting Office. 1992. *Economic Sanctions: Effectiveness as Tools of Foreign Policy*. Washington, D.C.: U.S. General Accounting Office.

Gleditsch, Kristian Skrede. 2002. "Expanded Trade and GDP Data." *Journal of Conflict Resolution* 46(5):712–724.

Goenner, Cullen F. 2010. "From toys to warships: Interdependence and the effects of disaggregated trade on militarized disputes." *Journal of Peace Research* 47(5):547–559.

Hausmann, Ricardo and Cesar A. Hidalgo. 2011. "The network structure of economic output." *Journal of Economic Growth* 16(4):309–342.

Heckman, James J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica: Journal of the Econometric Society* pp. 153–161.

Hillman, Arye L. 1980. "Observations on the relation between "revealed comparative advantage" and comparative advantage as indicated by pre-trade relative prices." *Review of World Economics* 116(2):315–321.
URL: *http://dx.doi.org/10.1007/BF02696859*

Hovi, Jon, Robert Huseby and Detlef F. Sprinz. 2005. "When Do (Imposed) Economic Sanctions Work?" *World Politics* 57(4):479–499.

Hufbauer, Gary Clyde, Jeffrey J Schott, Kimberly Ann Elliott and Oegg Barbara. 2007. *Economic sanctions reconsidered: History and current policy, 3rd edition*. Vol. 3 Peterson Institute.

Jentleson, Bruce W. 2000. Economic Sanctions and Post-Cold War Conflicts: Challanges for Theory and Conflict. In *International Confliict Resolution After the Cold War*, ed. Paul C. Stern and Daniel Druckman. Washington, D.C.: National Academy Press pp. 123–177.

Kaempfer, William H. and Anton D. Lowenberg. 1988. "The Theory of International Economic Sanctions: A Public Choice Approach." *American Economic Review* 78(4):786–793.

Kenkel, Brenton and Curtis S. Signorino. 2012. "An Alternative Solution to the Heckman Selection Problem: Selection Bias as Functional Form Misspecification." Presented at the Annual Meeting of the Midwest Political Science Association, Chicago, IL .

Lam, San Ling. 1990. "Economic Sanctions and the Success of Foreign Policy Goals: A Critical Evaluation." *Japan and the World Economy* 2(3):239–248.

Lektzian, David and Mark Souva. 2007. "An Institutional Theory of Sanctions Onset and Success." *Journal of Conflict Resolution* 51(6):848–871.

Li, Quan and Rafael Reuveny. 2011. "Does trade prevent or promote interstate conflict initiation?" *Journal of Peace Research* 48(4):437–453.

Luft, Gal. 2009. "The New Iran Sanctions: Worse Than the Old Ones." *Foreign Policy* August, 11.

Marshall, Monty G. and Keith Jaggers. 2002. "Polity IV project: Political regime characteristics and transitions, 1800-2007." Available on line at: `http://www.systemicpeace.org/polity/polity4.htm` .

Martin, Lisa. 1992. *Coercive Cooperation: Explaining Multilateral Economic Sanctions*. Princeton Univ Press.

McLean, Elena V and Taehee Whang. 2010. "Friends or Foes? Major Trading Partners and the Success of Economic Sanctions." *International Studies Quarterly* 54(2):427–447.

Morgan, T. Clifton, Navin Bapat and Yoshi Kobayashi. 2014. "The Threat and Imposition of Economic Sanctions, 1971-2000." *Conflict Management and Peace Science* 31(5):541–558.

Morgan, T. Clifton and Valerie L. Schwebach. 1997. "Fools Suffer Gladly: The Use of Economic Sanctions in International Crises." *International Studies Quarterly* 41(1):27–50.

Nooruddin, Irfan. 2002. "Modeling Selection Bias in Studies of Sanctions Efficacy." *International Interactions* 28(1):59–75.

Paarlberg, Robert L. 1980. "Lessons of the Grain Embargo." *Foreign Affairs* 59(1):144–162.

Peksen, Dursun. 2013. The Use, Effectiveness, and Unintended Consequences of Economic Sanctions by Intergovernmental Organizations. In *Handbook of International Organizations*, ed. Reinalda. Bob. Routledge pp. 403–416.

Peksen, Dursun and Timothy M. Peterson. 2016. "Sanctions and Alternate Markets: How Trade and Alliances Affect the Onset of Economic Coercion." *Political Research Quarterly* 69(1):4–16.

Powell, Robert. 1999. *In the Shadow of Power: States and Strategies in International Politics*. Princeton,NJ: Princeton University Press.

Schelling, Thomas C. 1966. *Arms and Influence*. New Haven,CT: Yale University Press.

Signorino, Curtis S. 2002. "Strategy and selection in international relations." *International Interactions* 28(1):93–115.

Signorino, Curtis S. and Kuzey Yilmaz. 2003. "Strategic misspecification in regression models." *American Journal of Political Science* pp. 551–566.

Singer, J. David. 1988. "Reconstructing the correlates of war dataset on material capabilities of states, 1816–1985." *International Interactions* 14(2):115–132.

Slantchev, Branislav L. 2003. "The Power to Hurt: Costly Conflict with Completely Informed States." *American Political Science Review* 97(1):123–133.

Tsebelis, George. 1990. "Are Sanctions Effective? A GameTheoretic Analysis." *Journal of Conflict Resolution* 34(1):3–28.

Whang, Taehee. 2010. "Structural estimation of economic sanctions: From initiation to outcomes." *Journal of Peace Research* 47(5):561–573.

Whang, Taehee, Elena V. McLean and Douglas W. Kuberski. 2013. "Coercion, Information, and the Success of Sanction Threats." *American Journal of Political Science* 57(1):65–81.