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WINNING THE WAR: SANCTION EFFECTIVENESS AND CONSEQUENCES

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WINNING THE WAR: SANCTION EFFECTIVENESS AND CONSEQUENCES

DISSERTATION

A dissertation submitted in partial
fulfillment of the requirements for
the degree of Doctor of Philosophy
in the College of Business and
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ABSTRACT OF DISSERTATION

WINNING THE WAR: SANCTION EFFECTIVENESS AND CONSEQUENCES

Chapter 1 shows that there is a negative relationship observed between sanctions and civil liberties in the target country, which is driven by how exposed the target country's trade was to the sanctioning countries. Using a fixed effect panel regression covering 160 countries from 1972-2005, it is found that import exposure to the sanctioning countries drives this negative relationship, with every percentage point of import exposure reducing the inverted FHI freedom score by 0.165 points. This implies that restricting imports to a country that promotes an oppressive response by the targeted government.

Chapter 2 examines whether countries change their trade patterns in response to economic sanction threats in addition to imposed sanctions. Using a bilateral gravity panel dataset covering 180 countries from 1950-2005 I find that imposed sanctions cause a very significant 55.43% increase in purchases from third party suppliers or a smaller 49.78% increase in sales to third party buyers during sanction events. Sanction threats cause a 42.05% increase in purchases from third party suppliers, and a 42.76% increase in sales to third party buyers, all significant at the 1% level. I conclude that both imposed sanctions and sanction threats lead to a significant increase in trade with third party countries, preempting and subverting sanction regimes.

Chapter 3 studies whether there is evidence of cheating during sanction events by examining the difference in reporting for exports in the selling country versus imports in the buying country. A systematic change in reporting behavior is detected, with the log difference of reported exports minus reported imports increasing 7.46% in the case of exporter imposed sanctions, and decreasing 9.86% in the case importer imposed sanctions. This is consistent with the theory that firms in the sanctioning country face harsher penalties for being caught compared to the targeted countries.

KEYWORDS: Economic Sanctions, Freedom, Political Rights, Sanction Cheating, Trade Diversion

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1.1 Introduction

Economic sanctions have been a staple of "soft power" from the end of World War II to today as a way to induce behavioral changes from the targeted government without engaging in direct warfare.(Hufbauer et al., 2007) A modern example are the ongoing sanction regimes against Iran and North Korea over their nuclear programs. These two cases also illustrate the importance of how exposed a target country's trade is to those who are attempting to sanction it. The United States and the United Nations Security Council began sanctioning North Korea after its first nuclear test in 2006, targeting vital industries and eventually expanding to cover 90% of North Korea's bilateral trade flows. However the UN and US administrations have stressed the importance that China, which also accounts for 90% of North Korea's trade flows, must comply with these sanctions for them to have any effect.(Griffiths et al., 2009; Klein, 2018; Staff and Agencies, 2017) In effect, North Korea's trade is not exposed to the world, but only to China and so they are the arbiters of success or failure in terms of economic sanctions.

The nuclear sanctions against Iran also began in 2006, and eventually lead to the 2015 Joint Comprehensive Plan of Action, or the Iran Nuclear Deal, and required the combined efforts of China, France, Russia, the United Kingdom, the United States and the European Union to put pressure on the Iranian economy. The unilateral withdrawal of the United States from the agreement is causing short term disruptions, but without the cooperation of Europe and other major Iranian trading partners it is unclear how effective the new sanction regime under Trump will be.(Gambrell, 2018; Herszenhorn, 2018) Since Iran's trade is only exposed to the United States through the international oil trade, there is a limited impact that the United States can have on its own.

This chapter investigates the relationship between sanctions and their potential for trade disruption and civil liberties in the target country. The potential disruption caused by a sanction will be measured here by trade exposure, which is defined as imports or exports between the targeted country and the sanctioning country in the years leading up to the sanction, as a percent of the target country's GDP. I then include this measure in a regression analysis that allows me to differentiate whether it is the imposition of a sanction or the prior trade relationship between the sanctioning country and target state that matters for freedoms and civil liberty outcomes in the targeted state. It contributes to the literature by developing a numeric estimate of the potential damage of a sanction, whereas previous studies have only examined sanctions as dummy variables with intensities based on the type of sanction being imposed, not the actual damage it might cause. This will allow me to differentiate between the signal sent by the type of sanction being imposed versus the signal sent by the potential disruption caused by the sanction event and evaluate which one is more significant.

Section 2 of the chapter gives an overview of other chapters that have studied the impact of economic sanctions on liberties in the targeted countries. Section 3 of the chapter describes the data used to analyze the relationship between civil liberties and economic sanctions and briefly explains how these things are measured.

Section 4 uses a panel-gravity approach to estimate the average impact of sanction events on the imports/exports between the targeted country and the sanctioning countries, and I find that sanctions do negatively influence trade flows. Section 5 builds off of this insight, estimating a dynamic panel model of freedom against sanctions and trade exposure. I find that sanctions affect civil liberties only through the potential economic disruption they cause, with import disruptions being the primary driver of this result. During a sanction, an increase in trade exposure of 1 percentage point of the target country's GDP is associated with a decrease in that country's Freedom House Index Freedom score of 0.0625 points, while a 1 percentage point increase in import exposure as a percent of the target country's GDP leads to a 0.165 point decrease in the Freedom score for that country. This effect is significant at the 1% level, and indicates that there is a strong negative impact of civil liberties when countries cease the flow of goods to a target nation, in comparison to ceasing purchases from that nation. This result is robust to the disaggregation of sanctions into multiple categories, which is discussed in section 6 of this chapter.

Section 7 analyzes the impact of sanction threats on civil liberties, but finds that the inclusion of sanction threats does not significantly alter the analysis. Section 8 concludes the chapter with conclusions and discussion, with the primary result being that sanctions which disrupt imports to the target nation lead to worse outcomes in terms of civil liberties for those nations. Section 9 contain an appendix of additional information and robustness checks.

1.2 Literature: Sanctions and Civil Liberties

There has always been a concern that the collateral damage caused by sanctions might outweigh their usefulness as political tools.(Drezner, 2003) In addition to the direct hardship that cutting trade to a country will impose upon its citizens, there is also a concern that the targeted government might react harshly and crack down on its own population to maintain control rather than acquiesce to the sanctioning countries demands. Wood (2008) finds that both US and UN imposed sanctions are associated with an increase in government violence toward citizens, with harsher sanctions leading to more extreme repression. Soest and Wahman (2013) examine whether sanctions intended force authoritarians to adopt greater democratic institutions and find that sanctions in general seem to make things worse, while sanctions intended to improve democratic institutions do achieve that goal. Peksen (2009) and Peksen and Drury (2010) find that more intense sanctions are associated with increased political violence and reduced freedoms/human rights in the target countries.

There are several theoretical reasons for this relationship. The first explanation is a simple survival story, where a regime targeted by sanctions use violence to preempt or prevent a revolution or other form of regime change. Hardships caused by the sanctions are intended to incite the population against the government and its

behaviors, and some governments attempt to confront this effect directly with terror tactics and fear.(Wood, 2008)

A second reason why governments might increase repression or coercive behavior when confronted with sanctions is that the sanction itself provides opportunities to consolidate power.(Batmanghelidj, 2018; Reiss, 2017; Rowe, 2001) When the flow of goods and funds to a country is restricted, it creates winners and losers in that country's industries. The government can therefor increase its relative power by taking over those winning industries, giving them greater control over the flow of goods and funds than they had before the sanctions began.(Kaempfer and Lowenberg, 1999), By awarding these companies or resources to powerful political allies, and restricting access to these things to opposition groups, the sanction event can create a situation where the government is more powerful relative to opposition groups, even if the overall size of the economy was diminished.(Peksen and Drury, 2010) An example of this would be the Iranian Revolutionary Guard increasing the share of the economy directly under their command during the anti-proliferation sanctions targeting Iran's nuclear program.

A third reason is that sanctions can be seen as signals of international support to opposition groups, both by those opposition groups and by the targeted government. In this case it may not be that the government fears losing control so much as they are using the sanctions as an excuse to target their political rivals. A "rally around the flag" effect where citizens largely come to support the government against foreign aggression is sometimes observed as a result of sanctions, and governments can use this to cover crack downs against the opposition which are scapegoated as supporters of the sanction event.(Olson, 1979; Peksen, 2009; Peksen and Drury, 2010; Wood, 2008) An example of this would be the current sanctions imposed against Venezuela, which its leadership have dubbed an "Imperialist Economic War" and accused the opposition parties of being collaborators with the United States.

In all of these cases there is strong reason to suspect that the strength of the repressive response by the target government would be related to the damage being caused by the sanction, which is not necessarily captured by dummy variables. In the first case, a sanction which causes more damage will result in a more disgruntled population and a greater loss of control by the target government. The government has reason to suppress its population even more, in an attempt to prevent a popular uprising against it. In the second case, a sanction which is more disruptive to a market gives even greater opportunity for the government to choose winners and consolidate control over the remaining resources, leaving it even more powerful than when the sanction began. In the third case, a sanction which is actually causing harm can lead to greater nationalist fervor as the population seeks to resist the foreign influence, giving an even greater opportunity for the regime to target its opponents.

Another potential cause for the observed negative relationship between sanctions and civil liberties could be reverse causality, where it is not the sanctions that lead to repression but it is repression that leads to the sanctions.(Kreutz, 2015; Peksen et al., 2014) In that case we are observing the fact that governments which enact harsh measures against their population face higher probability of sanctions, and that more oppressive regimes would be targeted by more intense sanctions. However this result

is less consistent with the results observed because if the reverse causality story was true, then sanction threats should also have a similar coefficient to imposed sanctions. An oppressive regime should be more likely to be targeted by sanction threats, but there is no clear relationship between sanction threats and freedom in the data. In addition, if it was a case of reverse causality then trade exposure would be predicted to be less significant, because an increasingly oppressive regime would be more likely to be sanctioned by its small trading partners as well as its larger ones. Together these make it less likely that reverse causality is a concern in this case.[1]

The previous literature studying the relationship between sanctions and liberties relied on dummy variables for different types of sanctions to capture the strength or severity of a sanction event.(Carneiro, 2013; Escriba-Folch and Wright, 2010; Marinov, 2005; Peksen, 2009; Peksen and Drury, 2010; Wood, 2008) The presence of a type of sanction is only part of the story though, and might not accurately describe the economic damage being inflicted. A sanctioning country issuing an embargo against a target that they have no trade relations with would be captured as imposing a very harsh sanction type, but in real terms the sanction may not be causing much damage. Conversely an import restriction might cut off critical materials or goods which causes major economic disruption, even though it is coded as a less severe sanction. The previous literature included bilateral trade as a control variable but did not interact it with the sanction event. The use of bilateral trade also misses potentially differences between sanctions that disrupt imports to sanctions that disrupt exports.

I contribute to the literature in two ways. First I construct a measure of of how much damage an economic sanction could cause, rather than relying only on dummy variables to capture the strength of a sanction event. To do this I create a trade exposure term, which is how much the targeted country trades with the sanctioning countries before the sanction event begins, as a percent of the target country's GDP. By interacting this term with the sanction dummy I have a measure of the maximum disruption that a sanction could cause, as a proxy for how much economic disruption the sanction will cause.

Second I analyze the impact of imports and exports rather than examining aggregate bilateral trade flows. This will allow me to examine any potential differences in terms of outcomes for sanctions that disrupt exports versus sanctions that disrupt imports. Restricting exports might cripple the economy and cause a great deal of economic disruption, while restricting imports might increase prices for certain goods but otherwise have little effect. The alternative might also be true, if the target country relies on certain key imports for its economy or society while its exports can be sold to third-party countries with relatively little loss. Aggregating imports and exports together therefor might miss the real disruption being caused by the sanction, or it might lead to incorrect conclusions about what sort of sanctions should be used.

[1]In addition to this I also attempt to control for reverse causality using the Arellano-Bond method, which uses lags of the dependent and independent variables to try and control for endogenous variables. I find further evidence supporting the result that import exposure is driving the negative relationship between sanctions and civil liberties. This is discussed further in section 2 of the appendix.

1.3 Data

The primary data used in this analysis is an unbalanced panel with 4,633 country-year observations covering 160 countries from 1972-2005. The variable of interest is the inverted Freedom score from the Freedom House Index, which measures political and civil liberties in every independent nation and some disputed territories in the world over the data period.[2] The Freedom score is an aggregate measure of civil liberties formed into a 2-14 point scale. The inverted form of this index is used so that higher scores indicate a freer society.

I combine this with sanction and threat data from the Threat and Imposition of Sanctions (TIES) Dataset, which provides data on sanction episodes from 1945 to 2005.[3] The TIES dataset was constructed by first running a keyword search of legal documents on the *Lexis-Nexus* website and other sources for keywords such as sanctions, embargoes, reduction in foreign aid and other related terms.[4] Potential sanction cases were then examined by coders which determined whether a sanction event occurred, what type of sanction or threat was involved, the duration and other relevant information.(Morgan et al., 2014) This is done in an attempt to discover as many sanction cases as possible for any country-pair. There are 9 categories of sanctions for both imposed and threatened sanctions, which are summarized in Table 1.1. In order to avoid as much endogeniety as possible, sanction events that have a stated goal having to do with trade disputes or trade flows are excluded from the analysis. Summary statistics for the freedom index, sanctions and sanction threats are reported in Table 1.2

Trade data comes from the Correlates of War (COW) Trade Dataset.[5] The primary reason that this dataset is preferred is because it distinguishes between data which is missing from the dataset and data where two countries report zero or insignificant trade flows. Because the focus of this analysis is trade sanctions, it is expected that in at least some cases trade between the sanctioner and target country should go completely to zero, which is why this dataset is preferred.

Country characteristics data are drawn from the CEPII gravity dataset, a square panel of all country-pairs from 1948 to 2005.[6] This data includes GDP, population

[2]The Freedom House Index is reported by Freedom House, a US based NGO that has compiled annual reports on democracy and civil liberties in all countries and territories since 1972. The data can be accessed at https://freedomhouse.org/report-types/freedom-world

[3]The Threat and Imposition of Sanctions dataset was created by Cliff Morgan, Navin Bapat, Valentin Krustev and Yoshiharu Kobayashi and is hosted by the University of North Carolina. Version 4 of the dataset is used in this analysis and can be found at http://www.unc.edu/ bapat/TIES.htm

[4]The most important sources are *Lexis-Nexus*, *Facts on File*, *Keesing's Record of Contemporary Events*, the *New York Times* and the *London Times*.

[5]The Correlates of War Trade dataset was created by Katherine Barbieri and Omar Keshk, and is based primarily on the IMF's Direction of Trade Statistics data. It is hosted by the University of South Carolina and Ohio State University. Version 4 of this dataset is used, and can be accessed along with documentation at http://www.correlatesofwar.org/data-sets/bilateral-trade

[6]The CEPII gravity dataset is hosted by the French Centre d'Etudes Prospectives et d'Informations Internationales, and is maintained by Thierry Mayer. It is accessible at http://www.cepii.fr/cepii/en/bdd_modele/presentation.asp?id=8

and international organization membership which are used as country controls in my analysis.

Finally I use the Major Episodes of Political Violence (MEPV) dataset to incorporate information on both the presence and intensity of international and civil wars that take place over the sample period. The MEPV dataset covers all states over the period 1946-2016, with episodes coded on a 0-10 scale based on the intensity of the conflict and the magnitude of its impact on the society.[7] with separate scores for war between countries and civil wars/disorder within a country. Table 1.3 reports summary information for each of these datasets and the combined dataset used in this chapter.

1.4 Effect of Sanctions on Trade

The first step of the analysis is to measure the impact of sanctions on the trade with the targeted country. To do this I first estimate how disruptive a given sanction type is on bilateral trade flows between the imposing and target country using a gravity model of exports ($E_{i,j,t}$) from the exporting country (i) to the importing country (j) in year (t). Data on trade comes from the COW Trade Database and sanction data comes from the TIES dataset. I capture all trade flows in the form of exports in current dollars, the log of which forms my dependent variable. Reported zeroes in the trade data are replaced with 1$ so that they are not dropped from the dataset when taking the natural log and to differentiate them from missing data.

This analysis uses the same sanction definitions as Caruso (2005) and Hufbauer and Oegg (2003), but where Hufbaur & Oegg used a cross-sectional analysis comparing two years of data I follow Caruso who used a gravity panel to analyze the impact of sanctions between the U.S. and its trading partners.[8]

I differ in that my gravity panel captures bilateral trade flows in terms of exports, so that I have exports from country A to country B and also exports from country B to country A. This allows me to retrieve import and export information for any given country year. I also utilize time-varying country fixed effects as recommended by Head and Mayer (2013).

$$lnE_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + \beta_1 S^X_{i,j,t} + \beta_2 S^M_{i,j,t} + \epsilon_{i,j,t} \tag{1.1}$$

where $E_{i,j,t}$ is the logged current value of exports in dollars and $\alpha_{i,j}$ are country-pair fixed effects which control for distance, borders, shared language/history and

[7]The MEPV dataset was created by Monty Marshall and is hosted by the the Center for Systemic Peace. The dataset was created by researching all reported instances of major political violence which lead to 500 or more deaths over the course of the incident. It can be accessed from http://www.systemicpeace.org/inscrdata.html

[8]Caruso (2005) uses a panel of the United States and its trading partners to examine the impact of extensive and non-extensive sanctions on trade. Hufbauer and Oegg (2003) uses a multiple time series analysis of countries during three separate years to calculate the impact of sanctions on trade flows.

other variables describing the relationship between the countries. Country characteristics such as GDP, population and whether the country is at war which vary in each country by year are controlled by $\alpha_{i,t}$ and $\alpha_{j,t}$, country-year fixed effects for the exporter/importer. These also control for multilateral resistance as described in Anderson and van Wincoop (2003). The error term for a given country-pair year is given by $\epsilon_{i,j,t}$.

Economic sanctions are added to the model by including two vectors of dummy variables, $S^X_{i,j,t}$ and $S^M_{i,j,t}$, which capture both the type and the direction of the sanction. $S^X_{i,j,t}$ is a vector dummy variables which take the value of 1 if country i, the exporter in the country pair is the target country of a sanction from the importing country j in year t. $S^M_{i,j,t}$ is a vector dummy variables which take the value of 1 if country j, the importer of the country pair is the target country for that type of sanction from the exporting country i in year t.

Three definitions of $S^X_{i,j,t}$ and $S^M_{i,j,t}$ are used to examine the impact of sanctions on trade. First is a simple binary measure of whether there are any sanctions imposed during a given year. Second is a model of sanctions that divides them into intense (blockades and embargoes) and non-intense sanctions following Peksen and Drury (2010) as a way to compare results. Third is a model that divides sanctions into three tiers, intense (blockades and embargoes), moderate (partial embargoes, import restrictions and export restrictions) and light (travel bans, asset freezes, suspension of economic agreement and termination of foreign aid) following Caruso (2005); Hufbauer and Oegg (2003). By using the same measures of severity as used in prior literature, I will be able to determine if prior results in the literature could be explained by how exposed the target country is to the sanctioning countries.

The impact of sanctions in general on logged exports is reported in Table 1.5. The results are in line with the expectation that it is easier and less costly to cut sales coming from a target country compared to attempting to stop businesses from selling to the target country. Direct interpretation of these coefficients is difficult however, and so they are transformed into percent reductions for analysis.[9] A sanction is expected to reduce exports from the targeted country by 46.53%, which is statistically significant at the 1% level. By comparison the target country's imports are only reduced by 29.6%, significant at the 10% level.

1.5 Effect of Sanctions on Civil Liberties

My results for the effect of sanctions on trade are consistent, if smaller in magnitude to Caruso (2005) and Hufbauer and Oegg (2003), indicating that my data and analysis are consistent with what has done before. I then extend the analysis to civil liberties, because damage from sanctions can come with costs beyond the direct impact of declining trade on GDP. The sanctions might pick winners and losers in the targeted country's markets, providing opportunities for governments and powerful actors to

[9]The coefficients of sanctions are transformed into a percentage reduction using $\%Reduction = 100 * e^{(\beta-1)}$, where the β's are coefficients on the dummy variables of interest. By plugging in -0.626 for β we find that a sanction reduces a target country's exports by approximately 46.53%. I will convert coefficients from these panel regressions to percent reductions to correctly interpret them.

increase their power relative to the people. Sanctions are hostile acts that might provide a catalyst for purges or crackdowns on dissidents who can be seen as allies of the sanctioning country. However if a sanction has no economic impact on a target country, then none of these things should occur, or at least there should be a greater reaction if the real economic damage being caused is large relative to the size of the target country's economy.

To study this I will first use a simple fixed effects model with a sanction dummy, then I will develop a "trade exposure" term which will show how vulnerable the target country was to the sanctioner's action. The dependent variable of this analysis will be the FHI Freedom score, a measure of the political and civil liberties. This will be regressed against a lag of the Freedom score, population, GDP, WTO membership and measures of international and civil conflict a well as country and year fixed effects, following the general model setup of previous literature to try and replicate their results.(Peksen, 2009; Peksen and Drury, 2010; Soest and Wahman, 2013) The variable of interest is a sanction dummy which takes the value of 1 if country i is under any sort of sanction in year t. The estimation equation for this analysis is given by:

$$Free_{i,t} = \alpha_0 Free_{i,t-1} + \alpha_t + \alpha_i + c_{i,t} + \beta_1 S_{i,t} + \epsilon_{i,t} \tag{1.2}$$

Where $Free_{i,t}$ is the inverted Freedom score, α_t and α_i are time and country fixed effects and $c_{i,t}$ is a set of country controls: population, GDP, a measure of international conflict intensity in a given year, a measure of internal civil conflict intensity in a given year, and a dummy variable for if that country has GATT/WTO membership. $S_{i,t}$ is a dummy variable for whether any given country i is under any sort of economic sanction during year t. The literature includes a lag of the Freedom because although the Freedom House Index does not exhibit a unit root, it does show evidence of being strongly autoregressive process due to institutional inertia.(Peksen and Drury, 2010) Government institutions tend not to change quickly, and the recent past is important for the state of institutions in the present. .

If β_1 is negative, that would mean that sanctions in general are associated with a reduction in civil liberties and political rights, giving support to the theory that governments increase repression as a response to sanctions. A positive β_1 would be associated with the opposite, indicating that sanctions promote civil and political liberties in the targeted country.

The impact of this first regression is found in Table 1.6, Column 1, where the coefficient associated with the sanction dummy variable is found to be -0.174 and statistically significant at the 1% significance level. This coefficient is equal to 9.2% of the average within-country standard deviation of the freedom score.

This result is comparable in sign and magnitude to the results found by Peksen and Drury (2010) analyzing the impact of sanctions on democracy, as well as the results found by Wood (2008) which examined the relationship between sanctions and government violence. This indicates that the presence of sanctions in general has a small, but statistically significant impact on freedoms as measured by the FHI that

is within the same range as found by Peksen and Drury (2010), the closest analysis to the one that I perform here. As this is aggregating all sanctions from blockades to travel bans, the relatively small coefficient is unsurprising.

Calculating Trade Exposure

Previous literature has examined the impact of sanctions on civil and physical liberties in the targeted country.(Carneiro, 2013; Escriba-Folch and Wright, 2010; Marinov, 2005; Peksen, 2009; Peksen and Drury, 2010; Wood, 2008) However this literature only examines the type of sanction being imposed, controlling for severity with the inclusion of dummy variables for different types or categories of sanctions. I contribute to the literature by creating an "exposure term." Trade exposure is defined here as the amount of trade as a percent of GDP that exists between a target country and countries that are imposing sanctions upon it. The more a country trades with its sanctioners, the more exposed it is to the potential damage and disruption caused by those sanctions.

To do this I exploit the existing trade relationship between the countries prior to the sanction to gain a measure of how important trade with the sanctioning countries are compared to the rest of the target countries economy. The equation for the basic export exposure term is given by equation 1.4:

$$R_{i,t}^{\%Exp} = \beta^{X\%} \sum_{j=1}^{n} \frac{Export_{i,j,lag}^{Avg} \times S_{i,j,t}}{GDP_{i,lag}^{Avg}} \tag{1.3}$$

where $R_{i,t}^{\%Exp}$ is how much of country i's exports are directed toward countries sanctioning it as a percent of country i's GDP. $Export_{i,j,lag}^{Avg}$ is the average exports from i to its partners j in the five years prior to the sanction, $GDP_{i,lag}^{Avg}$ is the average GDP in country i in the five years prior to the sanction and $S_{i,j,t}$ is a dummy variable for if country i is under any sort of sanction from a partner country j during period t. By design sanctions should impact exports and GDP in the target country simultaneously, so the lagged averages are used to avoid contemporaneous interactions between exports, GDP and the sanction event.

By summing over all of country i's trading partners in period t, I find the total exposure of a target country' exports to countries sanctioning them that year. For ease of interpretation I will scale this term by $\beta^{X\%}$, the coefficient associated with export sanctions from equation 1.1 transformed into a percent reduction. Using this term will give an estimate of the potential disruption caused by a sanction given how exposed the target country was to that sanction.

An equivalent process is done for imports to country i as well, giving an equivalent exposure term for imports:

$$R_{i,t}^{\%Imp} = \beta^{M\%} \sum_{j=1}^{n} \frac{Import_{i,j,lag}^{Avg} \times S_{i,j,t}}{GDP_{i,lag}^{Avg}} \tag{1.4}$$

where the variables are the same as in equation 1.3, except that $Import^{Avg}_{i,j,lag}$ is the average imports of country i from its countries j for the five years prior to the sanction and the term is scaled by $\beta^{M\%}$, the sanction coefficient associated with import sanctions from equation 1.1 transformed into a percent reduction.

Potential bilateral disruption is found by summing the import and export exposure terms together:

$$R^{\%Trade}_{i,t} = R^{\%Exp}_{i,t} + R^{\%Imp}_{i,t} \tag{1.5}$$

where $R^{\%Exp}_{i,t}$ and $R^{\%Imp}_{i,t}$ are defined by equations 1.3 and 1.4, respectively. Summary statistics of these variables, conditional on the presence of a sanction, are given in Table 1.4. The mean trade exposure for a country under any sort of sanction is 4.3% of GDP for the targeted country, while the mean export exposure is 2.6% of GDP and the mean import exposure is 1.7% of GDP. In general, countries which are sanctioned tend to be more exposed in terms of exports than imports, both on average and in terms of the maximum results.

Trade Exposure and Civil Liberties

Now that I have measures of how exposed a country is to sanctions I will include them in my regression from equation 1.2, to determine whether it is the act of imposing a sanction or the potential damage it can cause which has a larger impact on civil liberties. This will allow me to differentiate whether it is the simple signal of sanction imposition that causes target governments to crack down on liberties or whether it is more related to the potential trade disruption caused by that sanction. I will first analyze total bilateral trade exposure using the following equation:

$$Free_{i,t} = \alpha_0 Free_{i,t-1} + \alpha_t + \alpha_i + c_{i,t} + \beta_1 S_{i,t} + \beta_2 R^{\%Trade}_{i,t} + \epsilon_{i,t} \tag{1.6}$$

where the variables are the same as equation 1.2, however $R^{\%Trade}_{i,t}$ is the total exposure of bilateral trade caused by the sanction as a percentage of GDP.

The results of this regression can be found in Table 1.6, Column 2. Once trade exposure is included the sanction dummy becomes statistically insignificant, indicating that the negative relationship found in the previous regression was due primarily to the potential disruption that the sanction caused.

The coefficient associated with trade exposure is -0.0625 and significant at the 1% level. Interpreting this coefficient, a 1 percentage point increase in trade exposure during a sanction event results in a decline in the target state's freedom score approximately equivalent to a 1 point increase in the civil war measure.[10] Looking at Table 1.4, the mean trade exposure as a percentage of GDP caused is approximately 4.3%. Multiplying the trade exposure coefficient by this value gives an estimated

[10]This is equivalent to a country going from no political violence to "sporadic political violence," the primary example of which is the United States' political instability during the 1960's.

mean reduction in the freedom score of 0.2696 points, equivalent to 14.4% of the average within-country standard deviation. Repeating the calculation for the maximum trade exposure of 23.6% results in a maximum predicted reduction in the freedom score equal to 1.47 points, a significant reduction equivalent to 3/4 of the average within-country freedom score standard deviation. This result is robust when replicated using an Arellano-Bond methodology, which indicates that the result is not being driven by endogeneity. This is discussed further in section 2 of the appendix.

This suggests that the signal of imposing some sort of sanction seems to have little bearing on institutional changes and freedoms in the targeted country, but instead is related actual damage the sanction event causes that leads to reductions in rights and freedoms. Sanctions against countries with greater amounts of trade exposure are associated with serious, negative impacts on democracy, rights and freedoms in the targeted country.

Import vs Export Exposure and Civil Liberties

The next question is whether total trade exposure is important, or whether potential disruptions of imports are more important than potential disruptions in exports, or vice-versa. Cutting imports of food, medicine or vital equipment to the targeted country could backfire, turning the public against the outside forces and allowing the government/other actors even greater power in the targeted country, while restricting exports such as oil might make it very difficult for the targeted country to subjugate their citizens because of a lack of resources.

To examine this question trade exposure is split into export exposure and import exposure, resulting in the following equation:

$$Free_{i,t} = \alpha_0 Free_{i,t-1} + \alpha_t + \alpha_i + c_{i,t} + \beta_1 S_{i,t} \tag{1.7}$$

$$+\beta_2 R_{i,t}^{\%Exp} + \beta_3 R_{i,t}^{\%Imp} + \epsilon_{i,t}$$

where $R_{i,t}^{\%Exp}$ and $R_{i,t}^{\%Imp}$ are how much exports/imports are reduced on average by the presence of some sort of sanction, respectively. Results of this regression are reported in Table 1.6, Column 3. The coefficient on the sanction dummy remains statistically insignificant, but the important result is the differential impact of export exposure versus import exposure.

It seems that export exposure is much less significant compared to import exposure, despite countries under sanctions typically being more exposed in terms of exports to the sanctioning countries. The mean and maximum value for export exposure from Table 1.4 are larger compared to potential import exposure, 2.6% vs 1.7% for the means conditional on being sanctioned and 21.1% vs 9.8% for the maximum values. Despite this, export exposure does not have any economically or statistically significant impact on freedoms and institutions. Instead it is exposure to import disruption that is the primary driver of the negative relationship between sanctions and rights and institutions in the targeted government.

The point estimate for the import exposure coefficient is -0.165, which is significant at the 1% level, approximately equivalent to a three point increase in the civil war measure.[11] This indicates that for every 1% of import exposure a country has to a sanctioning nation, freedom is expected to fall by an average of 0.165 points. Taking the mean import exposure of 1.4 found in Table 1.4, the mean predicted reduction in the freedom score for an average country 0.281 points. This reduction is nearly equivalent to the predicted freedom reduction of 0.2696 points from trade exposure in general from Section 5.2, giving additional evidence that import exposure is the primary driver of the previous results examining trade exposure. This is also in line with the predicted signs and magnitude for the effect of sanctions on rights and liberties found by Peksen (2009), Peksen and Drury (2010) andWood (2008). Taking the most extreme value of import exposure, 9.8% and conducting the same multiplication gives a predicted reduction in the freedom score of 1.62, approximately 85% of the average within-country standard deviation of the Freedom Index and very similar to the 1.47 point decrease predicted for the maximum trade exposure, giving further evidence that it is imports that are driving the results even when analyzing trade exposure in general.

There are a number of reasons this might be occurring. It might be an indication that imports tend to be more essential to the target country's economy, such as food or medicine as discussed by Garfield et al. (2010) and Akunjee and Ali (2002). Alternatively it could be that countries under sanction have an easier time finding new buyers for their products compared to new suppliers for imports. Perhaps disrupting imports causes a greater amount of discontent among the population compared to stockpiling unsold exports, or that restricting imports makes it easier for the government to choose a scapegoat to blame. Whatever the reason, import exposure is associated with a strongly negative response from the target government in terms of civil liberties. This seems to argue against the idea that this is being driven by endogeneity between sanctions and civil liberties however, because although it could be that trade exposure and sanctions suffer from reverse causality there is not a clear reason why it would be specifically with imports to the target country.

1.6 Heterogeneous Sanctions

The next step will be to expand the sanction term to examine three different tiers of sanctions rather than a simple sanction dummy, to better capture the full range of sanction types and different signals that might be sent. For example it could be that intense sanctions such as blockades and embargoes cause an extremely harsh reaction from the target government, no matter what how exposed the target is to the sanctioner's trade. If that is the case then the analysis in the previous section

[11] A 1% increase in import exposure being equivalent to a 3 point increase in the civil war measure implies that a country under sanctions where 1% of its imports, as a percent of GDP, were exposed to the sanctioning countries is equivalent to those countries going from no political violence to "Serious Political Violence," which is characterized by localized but intense operations against militants, opposition members and leadership, the primary example of which is the crackdown on dissidents in Pinochet's Chile after the military coup of 1973.

might be underestimating the importance of the presence of sanctions by diluting the impact of strong sanctions with the impact of weaker, more targeted sanctions.

To analyze this question I use the same setup from Section 5, but rather than a single reduction term for each country i in time t, there will be vectors of reduction terms from the different sanction types imposed during time t.

Heterogeneous Sanctions and Trade

The TIES database divides sanctions into nine categories, which vary in intensity from complete economic embargoes to targeted travel bans and asset freezes that attempt to limit wider economic damage. It may be possible that the sanction dummy used in Section 4 did not capture the true disruptive potential of sanctions, because it averaged the impact of economic blockades with reductions in foreign aid.

The first disaggregation of the sanction dummy used here is to divide sanctions into Intense (blockades and embargoes) and Non-Intense (all other sanction types) as used by Caruso (2005), which also gives me a basis of comparison for my results. The regression equation for this is the same as the baseline trade regression replacing the sanction dummy with a vector of intense / non-intense sanction dummies:

$$lnE_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + \beta_1 S_{i,j,t}^{X(N,I)} + \beta_2 S_{i,j,t}^{M(N,I)} + \epsilon_{i,j,t} \tag{1.8}$$

where all the variables are the same as equation 1.1, except that $S_{i,j,t}^{X(N,I)}$ is a vector of two dummy variables that take the value of 1 if the exporting country i is under an intense or non-intense sanction and $S_{i,j,t}^{M(N,I)}$ is a vector of two dummy variables that take the value of 1 if the importing country j is under an intense or non-intense sanction.

Table 1.7, Column 1 gives the results for dividing sanction into intense and non-intense categories. The coefficient for intense import sanctions is -0.836, which translates to a reduction in imports to a target country j of 56.66%, while the coefficient for intense export sanctions is -0.952, translating to a reduction in exports from a target country i of 61.4% on average, but neither of these are statistically significant. Non-intense sanctions also lack statistical significance, with coefficients that translate to a reduction in exports from a target country i of 11.49% and a reduction in imports to a target country j of 39.88%, on average. The coefficients for intense sanctions on bilateral trade found by Caruso (2005) is -0.87, between the coefficient for import and export sanctions that I find. The coefficient for non-intense sanctions, -0.15, is also comparable to my coefficient estimates for non-intense sanctions. However in my data there is not enough information to differentiate between the effect of intense and non-intense sanctions, because of the inclusion of country-pair clustered standard errors.

The next step in this analysis is to further break down sanctions into three categories, Intense (blockades and embargoes), Moderate (export restrictions, import restrictions and partial embargoes) and Light (asset freezes, reduction of foreign aid, suspension of economic agreements, travel bans). These three categories were used in

Hufbauer and Oegg (2003) and are commonly used in sanctions literature.(Caruso, 2005; Peksen and Drury, 2010; Wood, 2008) The regression equation used here is mostly unchanged:

$$lnE_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + \beta_1 S_{i,j,t}^{X(L,M,I)} + \beta_2 S_{i,j,t}^{M(L,M,I)} + \epsilon_{i,j,t} \tag{1.9}$$

where all the variables are the same as equation 1.1, except that $S_{i,j,t}^{X(L,M,I)}$ is a vector of three dummy variables that take the value of 1 if the exporting country i is under a light, moderate or intense sanction and $S_{i,j,t}^{M(L,M,I}$ is a vector of three dummy variables that take the value of 1 if the importing country j is under a light, moderate or intense sanction.

Table 1.7, Column 2 shows the results for this regression. The pattern of intense sanctions generally having larger coefficients is maintained, but again prior analysis shows a much stronger and statistically significant relationship. Of the three sanction tiers only moderate export sanctions are statistically significant, with an estimated percent reduction of 46.05%, significant at the 5% level. This is not seen as evidence that only moderate sanctions matter, but rather that the data cannot precisely estimate the other sanction impacts in the presence of country-pair clustered standard errors.

In comparison, Hufbauer and Oegg (2003) find that intense sanctions almost completely stop bilateral trade with very high significance. However their results match mine in that light sanctions do not seem to statistically impact trade. This comparison is not as straightforward, because their chapter utilized a cross-sectional analysis to examine the impact of sanctions, but in general my findings are in line with theirs as far as the coefficient pattern is concerned.

Heterogeneous Sanctions and Civil Liberties

Although there is generally low statistical significance for the different levels of sanctions in my estimations, the coefficient pattern observed in Table 1.7 and findings from prior literature do seem to suggest that stronger types of sanctions are more effective at reducing trade.(Caruso, 2005; Hufbauer and Oegg, 2003; Neuenkircha and Neumeief, 2015; Yang et al., 2004, 2009) In that case how exposed a target country's trade is to the sanctioning countries will matter more if those countries impose harsher types of sanctions such as an embargo versus lighter sanctions like an asset freeze. On the other hand, the target government may instead react more to the implicit signal of a harsher sanction type, regardless of the potential trade disruption that results from it. To analyze this question first freedom is regressed against the three tiers of sanction dummies defined in the previous section:

$$Free_{i,t} = \alpha_0 Free_{i,t-1} + \alpha_t + \alpha_i + c_{i,t} + \beta_1 S_{i,t}^{L,M,I} + \epsilon_{i,t} \tag{1.10}$$

where $S_{i,t}^{L,M,I}$ is a vector of dummy variables that take the value 1 if country i is targeted by a light, moderate or intense sanction, respectively. The remaining variables

are defined in equation 1.2, giving a baseline relationship between heterogeneous sanctions and the freedom index. The same interpretation remains on β_1 where a negative coefficient indicates a lower FHI Freedom Index score and a less free/well run society on average.

Results for the tiered sanctions examining the response of the FHI Freedom Index can be found in Table 1.9, Column 1. By splitting sanctions into three categories, it becomes clear that the same issue of differentiating different categories of sanctions continues from Table 6. The only sanction type which is statistically significant is the moderate sanction, matching the result from Table 1.7, with a coefficient of -0.136, significant at the 10% level. Again this is not seen to be an indication that only moderate sanctions are especially important for freedom outcomes, but rather a limitation in the data to precisely estimate the impact of these different types of sanctions.

The general pattern of the coefficients follows the hypothesis however, with larger negative coefficients associated with intense sanctions compared to moderate and light sanctions. This does not seem to indicate that sanctions don't matter, instead it seems that the data cannot differentiate the impact of intense, moderate and light sanctions from one another in a statistically significant way. This was an examination of the presence of a type of sanction though, it may be the case that even though the data can't differentiate between the presence of the different types of sanctions it might be able to differentiate between different levels of trade exposure that are then affected by different types of sanctions.

Heterogeneous Trade Exposure

To analyze the relationship between freedom, heterogeneous sanctions and the trade exposures associated with those levels of sanctions, the first step is to create a new measure of trade exposure. Instead of a single trade exposure measure, trade exposure will be calculated in terms of what type of sanctions the target country is being targeted by. Heterogeneous export exposure is given by the following equation:

$$R_{i,t}^{\%Exp(L,M,I)} = \beta^{X\%(L,M,I)} \sum_{j=1}^{n} \frac{Export_{i,j,lag}^{Avg} \times S_{i,j,t}^{L,M,I}}{GDP_{i,lag}^{Avg}} \tag{1.11}$$

where these variables are defined the same as they were in equation 1.3, except that $\beta^{X\%(L,M,I)}$ is a vector of percent-reduction transformed beta coefficients for if the exporting country i is under a light, medium or intense sanction and $S_{i,j,t}^{L,M,I}$ is a vector of dummy variables for if the exporting country i is under a light, medium or intense sanctions. Instead of a single export exposure term then, $R_{i,t}^{\%Exp(L,M,I)}$ is a vector of three export exposure terms for how exposed the target country i's exports are against light, medium and intense sanctions.

An equivalent process is done for import exposure and total trade exposure. Summary statistics for these new exposure terms are given in Table 1.8. I use these disaggregated exposure terms to augment equation 1.10, giving a regression of civil liberties on heterogeneous sanctions and trade exposures:

$$Free_{i,t} = \alpha_0 Free_{i,t-1} + \alpha_t + \alpha_i + c_{i,t} + \beta_1 S_{i,t}^{L,M,I} \tag{1.12}$$

$$+\beta_2 R_{i,t}^{\%Trade(L,M,I)} + \epsilon_{i,t}$$

where $R_{i,t}^{\%Trade(L,M,I)}$ are the total heterogeneous trade exposure terms, and the other variables are the same as defined in equation 1.10. The results of this regression are given in Table 1.9, Column 2. After adding in trade reduction terms for each of the light, medium and intense sanction cases, the coefficient for moderate sanctions becomes statistically insignificant while the coefficients for intense and light sanctions are small enough to be essentially zero.

The light, moderate and intense trade exposure terms are all statistically significant with coefficients ranging from -0.0431 to -0.0478, and all of the coefficients are within a standard error of one another.[12] Since there is no reason to believe that 1% of trade as a percent of GDP being disrupted by a light sanction versus 1% of trade as a percent of GDP being disrupted by an intense sanction should have different impacts, this serves as a sort of robustness check. The coefficients are also very similar to the -0.0625 coefficient estimated for trade exposure in the aggregate case shown in Table 1.8. The mean predicted decrease in the freedom score is between 0.0478 points for light exposure and 0.129 points for intense sanctions, which is smaller than the decreases predicted in the aggregate sanction case but are generally comparable. The estimate for intense sanctions is 6.83% of the average within-country standard deviation of the freedom score, lower than estimated in the aggregate case. The maximum freedom score reduction comes from intense sanctions as well, with an estimated reduction of 1.38 points which is again lower than seen in the aggregate case, but is still around 3/4 of the average within-country standard deviation of the freedom score.

However there is still value in examining the difference between import exposure for different types of sanctions and export exposure for those types of sanctions. Intense sanctions in particular attempt to cut all imports and exports between the sanctioner and target, so that coefficient in particular will be of interest as a check to make sure the results from the aggregate sanction case were being driven by differences in import versus export sanctions. If there is a difference between the impact of import exposure and export exposure on civil liberties during an intense sanction, then this cannot be because of a systematic preference for sanctions that restrict imports to the target over sanctions that restrict exports from the target. To analyze this question I use the following equation:

$$Free_{i,t} = \alpha_0 Free_{i,t-1} + \alpha_t + \alpha_i + c_{i,t} + \beta_1 S_{i,t}^{L,M,I} \tag{1.13}$$

$$+\beta_2 R_{i,t}^{\%Exp(L,M,I)} + \beta_3 R_{i,t}^{\%Exp(L,M,I)} + \epsilon_{i,t}$$

[12]Light exposure is statistically significant at the 10% level, moderate exposure at the 1% level and intense exposure at the 5% level.

where these variables are the same as equation 1.12, except with the total trade exposure vector being replaced by the export and import exposure vectors $R_{i,t}^{\%Exp(L,M,I)}$ and $R_{i,t}^{\%Imp(L,M,I)}$. The results of this regression is given in Table 1.9, Column 3. The coefficient for the sanction dummies all remain small and statistically insignificant, while the light exposure terms become highly insignificant.[13] while there is an observed differential impact on export and import exposure. Export exposure for the different tiers of sanction are statistically insignificant and extremely close to zero, indicating that restricting the ability of a country to sell its goods abroad does not illicit a strong response from the target government in terms of restricting rights, democracy or eroding other institutions.

Import reductions by contrast have a negative impact on the FHI index, with intense and moderate import exposure being significant at the 5% level. The intense import exposure coefficient of -0.105 is smaller than the moderate import exposure coefficient of -0.206. However these estimates have overlapping standard errors, so this difference isn't seen as economically significant. Also of interest is that the import exposure coefficient in the aggregate sanction case was estimated to be -0.165, nearly directly in the middle of the moderate and intense coefficients. Instead the important result is that despite intense sanctions applying equally to imports and exports, export exposure does not appear to have any impact on civil liberties while import exposure for those intense sanctions does. This gives even stronger evidence that there is something about imports that directly relates to the target government's reactions, whether it is because import goods are more necessary for target countries or it is harder for countries to find new sources for importing goods.

The next sections will continue to examine these questions from different perspectives, giving additional robustness to my results and potentially finding avenues for further research in the future.

1.7 Sanction Threats

The next analysis will examine the relationship between sanction threats and trade, then the relationship between sanction threats and civil liberties. If sanctions can be interpreted as a signal which provokes action from a targeted government, then the threat of a sanction should serve a similar, if generally weaker purpose. Threats of sanctions can cause businesses to preemptively begin stockpiling or shifting business plans to account for the potential disruption of a future sanction, and if that is the case then there could be a relationship between threats and civil liberties as well.

Sanction threats are gathered from the same dataset as imposed sanctions, the TIES database. In addition to finding government legislation imposing sanctions between countries, their keyword search is also able to detect when a government is threatening a sanction. In some cases this takes the form of the preemptive legislation from the sanctioning country that promises sanctions if the target country does not change its behavior. Other times the TIES dataset detects threats through news

[13] The coefficient on light import exposure is very large, but this is driven by the fact that there are almost no cases of import exposure for light sanctions resulting in an incredibly imprecise estimate.

stories, where heads of state give speeches that threaten economic hardship against foreign rivals before any legislation is passed at all. This data is then coded into the same categories as imposed sanctions based on the type of sanction threatened, to allow an analysis between threats and my variables of interest.

Sanction Threats and Trade

The first variable of interest will be trade and how sanction threats affect it relative to imposed sanctions. To examine the impact of sanction threats on trade equation 1.1 is modified with the inclusion of dummy variables to capture sanction threats, using the same format as the dummy variables for the sanction dummies:

$$lnE_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + \beta_1 S^X_{i,j,t} + \beta_2 S^M_{i,j,t} \tag{1.14}$$

$$+\beta_3 T^X_{i,j,t} + \beta_4 T^M_{i,j,t} + \epsilon_{i,j,t}$$

where $T^X_{i,j,t}$ is a variable that takes the value 1 if the exporting country i is threatened with a sanction in period t and $T^M_{i,j,t}$ is a dummy variable that takes the value 1 if the importing country j is threatened with a sanction in period t. The remaining variables are defined the same as in equation 1.1.

The results of this regression are shown in Table 1.10. When accounting for sanction threats, threats to exports are not statistically significant but threats do tend to lead to an increase in imports to the threatened country, which is statistically significant a the at the 1% level. In particular, when a country is threatened with sanctions it tends to increase imports from the threatening country by 42.47%, suggesting a strong stock-piling response to threats and confirms that there is a relationship between sanction threats and trade. The direct effect of export sanctions is mostly unchanged from Table 1.5, while import sanctions have a smaller coefficient and no statistical significance.

The primary result from this is that sanction threats, at least in terms of imports, do have a significant impact on trade. Interestingly, the effect is to increase trade in terms of imports to the target country, the reverse of what imposed sanctions caused in the prior analysis. This provides the opportunity to test if it is truly the potential *disruption* or if it is *reduction* in trade flows that is driving the relationship observed in previous sections.

Sanction Threats Effects on Civil Liberties

The first step will be to examine the impact a sanction threat has on civil liberties. Even if the actual impact of the threat is to increase imports from the threatening country, a sanction threat is still a signal sent to the target government to enact some action or face the imposition of a sanction. The target government might then react to this signal with repression or other ways to strengthen its position against the sanctions. To test this equation 1.3 is augmented with the addition of a threat dummy indicating the presence of sanction threats:

$$Free_{i,t} = \alpha_0 Free_{i,t-1} + \alpha_t + \alpha_i + c_{i,t} + \beta_1 S_{i,t} + \beta_2 T_{i,t} + \epsilon_{i,t} \tag{1.15}$$

where the variables are defined the same as equation 1.2, except that $T_{i,t}$ is a dummy variable indicating that country i was under some threat of sanctions during year t. The results for this equation are given in Table 1.12, Column 1. The primary result of this regression is that sanction threats on their own don't appear to have any relationship to civil liberties at all, with a coefficient near zero and no statistical significance. So even though there was an impact on trade as a result of sanction threats, there is no direct effect of threats on civil liberties.

The next step is still to examine the threat exposure, because even though the simple presence of a threat does not seem to affect civil liberties, there could be a relationship between how exposed the target is to those threats and the civil liberties in the target country.

Threat Exposure and Civil Liberties

To analyze the relationship between threat exposure and civil liberties another set of trade exposure terms are needed. Rather than measuring how exposed a country was in the period before the sanction was imposed, these exposure terms measure how exposed the target country was before the threats began.

The threat exposure in terms of exports is given by the following equation:

$$TR_{i,t}^{\%Exp} = \beta^{TX\%} \sum_{j=1}^{n} \frac{Export_{i,j,lag}^{Avg} \times T_{i,j,t}}{GDP_{i,lag}^{Avg}} \tag{1.16}$$

where these variables are defined the same as they were in equation 1.3, with the primary difference being the five year average for exports and GDP is calculated for the five years prior to the start of the sanction threat. Other major differences are $\beta^{TX\%}$ is the percent-transformed beta coefficient for if the exporting country i is under a sanction threat found in Table 1.10 and $T_{i,j,t}$ is a vector of dummy variables for if country i is under a sanction threat from its partner country j in year t. The final difference is rather than being a percent reduction transformation as in previous sections, the $\beta^{TX\%}$ is a percent *increase* term, since trade threats are associated with an increase in trade flows.

An equivalent process is then done for import and total threat exposure. With these terms I analyze the relationship between how exposed a country is before threats begin and how the target government reacts in terms of civil liberties. Summary statistics for countries the threat exposure conditional on being threatened are provided in Table 1.11. I continue the analysis rerunning the regression of the freedom score and sanction threats with the addition of trade exposure and trade threat exposure:

$$Free_{i,t} = \alpha_0 Free_{i,t-1} + \alpha_t + \alpha_i + c_{i,t} + \beta_1 S_{i,t} + \beta_2 T_{i,t} \tag{1.17}$$

$$+\beta_3 R_{i,t}^{\%Trade} + \beta_4 TR_{i,t}^{\%Trade} + \epsilon_{i,t}$$

where the variables defined are identical to equation 1.6, with the addition of a threat dummy $T_{i,t}$ and the measure of threat exposure $TR_{i,t}^{\%Trade}$. The results from this regression can be found in Table 1.12, Column 2. The sanction dummy loses significance compared to the baseline threat regression, as expected, and the trade exposure term is essentially statistically unchanged from the aggregate sanction case shown in Table 1.6. Of interest is that the sanction threat term actually becomes statistically significant at the 10% level, with a coefficient estimate of *positive* 0.096. This indicates that when you account for threat exposure, the presence of a sanction threat has a tendency to increase the freedom score of the threatened country by 5.1% of the average within-country standard deviation.

This might be because governments which can be influenced by economic coercion would acquiesce to foreign demands at the threat stage, meaning that threats are effective at improving civil liberties in the target country or otherwise prevent bad behavior. Conversely countries that actually suffer the imposition of sanctions were always going to be resistant to foreign pressure, and so the impact for the imposition of sanctions is negative. However the threat exposure coefficient is much larger and negative, which could potentially counter this effect. Importantly the trade impact of sanction threats was seen in terms of imports to the target country, not exports and therefor it might be the case that splitting threat exposure into imports and exports will counter this result.

The next regression is therefor to split threat exposure and trade exposure into imports and exports:

$$Free_{i,t} = \alpha_0 Free_{i,t-1} + \alpha_t + \alpha_i + c_{i,t} + \beta_1 S_{i,t} + \beta_2 T_{i,t} + \beta_3 R_{i,t}^{\%Exp} \tag{1.18}$$

$$+\beta_4 R_{i,t}^{\%Imp} + \beta_5 TR_{i,t}^{\%Exp} + \beta_6 TR_{i,t}^{\%Imp} + \epsilon_{i,t}$$

where the variables defined are identical to equation 1.17, with the addition import and export exposure terms $R_{i,t}^{\%Exp}$ and $R_{i,t}^{\%Imp}$ as well as import and export threat exposure terms and the measure of threat exposure $TR_{i,t}^{\%Exp}$ and $TR_{i,t}^{\%Imp}$. The results from this regression can be found in Table 1.12, Column 3.

The most interesting result is that export exposure term is now -0.0273 and statistically significant at the 5% level. However this impact is very small compared to import exposure coefficient of -0.103, which is significant at the 1% level. This supports the idea that the primary contributor to the negative relationship between sanctions and civil liberties is the import exposure term, even though the export exposure time might matter more than was observed in previous regressions.

The positive and statistically significant coefficient on the sanction threat term is not robust to the inclusion of import/export exposure and threat exposure terms. However a closer observation of the standard errors and p-values does show something interesting. The coefficient on the sanction threat term is positive, with a p-value of 0.124, very close to the 10% significance level. The import threat exposure term is

negative, with a p-value of 0.131 which is also close to the 10% cut off level. An F-test of joint significance rejects the null that both coefficients are zero at the 10% level. This indicates that the signal sent by a sanction threat and the potential disruption caused by the sanction threat could be having the opposite effect, even though the disruption of a sanction threat is to increase imports to the threatened country rather than limiting trade. However I cannot comment further on the magnitude of these effects, because of the imprecise nature of the coefficient estimates.

1.8 Conclusion

In this chapter I analyze the relationship between sanctions and civil liberties, to investigate whether sanctions might lead to additional oppression as a reaction by the targeted government. I use a fixed effects panel regression covering 160 countries from 1972-2005 to study the impact of sanctions on civil liberties as measured by the Freedom Index. I find that the presence of a sanction reduces the freedom score by 0.174 points, a result statistically significant at the 1% level. This result is comparable to the results found by Peksen and Drury (2010) and Wood (2008). I then generate a novel trade exposure variable using the trade relationship that existed before the sanction event occurred and included it in my regressions. I find that the presence of the sanction doesn't affect the freedom score, but rather trade exposure was the primary driver of the negative relationship between sanctions and civil liberties. A 1% increase in trade exposure leads to an expected decrease in freedom of 0.0625 points, leading to an estimated mean decrease in the freedom score of 0.2696 points, equivalent to 14.3% of the average within-country standard deviation.

I then split trade exposure into import and export exposure, and find that the primary reason that the sanction dummies were negative related to the freedom score was because of import exposure, with a coefficient of -0.165 leading to a mean decrease in the freedom score of 0.281 points, slightly larger than observed in the trade exposure case. This result was robust to disaggregating sanctions into multiple tiers as well as the inclusion of sanction threats, with the only interesting development being that export exposure is also significant when accounting for import and export threat exposure, with a coefficient estimate of -0.0273 which is significant at the 5% level.

I contribute to the literature in two primary ways. By developing my trade exposure terms and interacting it with the sanction and threat dummies I develop a measure for how potentially damaging a sanction is independent of the type of sanction dummy used. I also examine the impact of both potential import disruption and potential export disruption, rather than using bilateral trade as a control variable. Together with these I show that sanction dummy variables are not directly related to freedom outcomes in the target countries, but rather it is how potentially disruptive the sanction is that matters, as measured by trade exposure. I also show that in particular it is import exposure that matters most, with export exposure being mostly statistically insignificant in my analysis.

This result has potentially important implications for policymakers in terms of what sort of sanctions should be implemented to avoid inciting a government crackdown in the target country. I now plan to utilize this term in analyzing the success

or failure of a sanction regime. It is also important to investigate what is driving the importance of import exposure relative to export exposure, which has theoretical explanation but no definitive reason.

The general result of this chapter is that it is not the imposition of the sanction that matters for civil liberties in the target country, but how exposed that country's trade was to the sanctioning countries and in particular how exposed the target country's imports were to those sanctioning countries. Import exposure is strongly and statistically significantly associated with a decrease in civil liberties in the target country during the sanction event.

1.9 Appendix and Robustness Checks

Measuring Freedom

The Freedom House Index is an annual index produced by Freedom House, a US-based NGO that studies trends in political rights, civil liberties and democracy as part of a broader effort to advocate for those rights and liberties. The index attempts to capture the actual level of civil liberties and political rights in the country experienced by citizens, not a measure of the theoretical legal guarantees given by governments.

The index is created based on research by a group of around 100 in-house researchers, external analysts and human rights experts. These experts use news articles, NGO reports, academic research and their own personal contact networks to score countries based on events and observations. These scores are then proposed and reviewed at annual meetings until consensus is reached. This process of independent research, proposal and review is intended to reduce subjectivity and the impact of individual bias on the rating process.

Each country is scored based on 10 political rights indicators and 15 civil liberties indicators. These scores range from 0 to 4 points, with zero being least free and 4 being most free. The political rights indicators are grouped into three basic categories: the integrity of the electoral process, political pluralism and participation and the functioning of government. The civil liberties indicators are grouped into four basic categories: freedom of expression and belief, free association and organizational rights, rule of law and personal autonomy/individual rights.

These scores are totaled and then transformed into a 1-7 scale for civil liberties and political rights, with 1 being the most free and 7 being the least free. For political rights, a score of 1 indicate countries with free and fair elections, competitive political parties and strong protections for opposition groups and minorities. A score of 7 indicate countries where there is little to no political freedom, due to the presence of severe government oppression or the presence of civil war.

For civil liberties a score of 1 indicates that the country has a wide range of individual freedoms including freedom of expression, association and religion. It also indicates the presence of an independent, impartial judiciary and equal opportunities in general for the population. A civil liberties score of 7 indicate an extremely repressive society, where economic and political activity is tightly controlled and dissident behavior is met with violence, imprisonment or both.

The Freedom index is the combination of these two scores, forming an index that ranges from 2 to 14, with lower numbers indicating greater freedom. This chapter uses an inverted form of this index for ease of interpretation. Examples of countries scoring "most free" are the United States, Canada and the United Kingdom. Example of countries scoring "least free" are Libya, Myanmar and Syria.

Robustness: Dealing with Endogeneity

There is a logical argument that the observed negative relationship between sanctions and civil liberties is not because governments and populations are responding to the sanctions but that the sanctions are being imposed because of a deterioration in civil rights. To deal with this potential endogeneity I rerun the regressions from section 5 using an Arellano-Bond model. The Arellano-Bond estimator is a GMM estimator used to estimate dynamic panel models in the presence of endogeneity. It instruments for lagged variables using further lagged differences of the dependent and independent variables.

First I re-run equation 1.2, using two lags of the freedom index and three lags of the independent variables to see if the negative relationship between sanctions and the freedom score is the result of reverse causality. The results of this regression are reported in Column 1 of Table 1.13.

The presence of a sanction is associated with a 0.195 point reduction in the freedom score, significant at the 10% level. This is nearly identical to the 0.174 point reduction originally estimated, the primary difference being a reduced level of significance. The three year lag of the sanction variable is also significant at that 10% level, indicating that the freedom score is 0.135 points higher three years prior to a sanction being imposed. This indicates that there is some deterioration of freedoms in the years leading up to the sanction event, but even controlling for that the coefficient estimate of the contemporaneous sanction event estimated previously is robust.

Next I re-estimate equation 1.6 using the Arellano-Bond method to see if the relationship between sanctions and civil liberties is driven primarily by trade exposure. The results are presented in column 2 of Table 1.13. Just as before, the sanction variables lose all statistical and economic significance when controlling for trade exposure. The coefficient estimate for trade exposure is -0.0788 and significant at the 5% level, which is very similar to the -0.0625 and significant at the 1% level estimated in the normal regression. The primary difference is a slight reduction in statistical significance. I take this as further evidence that my results are robust to the inclusion of this deeper lag structure.

Finally I re-estimate equation 1.7 using the Arellano-Bond method to see if the pattern of import exposure being the primary reason for the negative relationship between sanctions and freedom is maintained. Results are reported in column 3 of Table 1.13. The coefficient estimate for import exposure is very similar, with the Arellano-Bond estimator result of -0.206 being very comparable to the coefficient -0.165 estimated in the normal regression. However the p-value associated with import exposure in the Arellano-Bond estimator indicates it would be significant at the 14.8% level, so the statistical significance of the result has declined.

However a joint test of significance for import exposure and its lags are jointly significant at the 5% level, while the joint significance for the sanction dummy and export exposure are not significant at any level. Thus although there is a reduced level of statistical significance, the coefficient estimate and the joint test of significance provides evidence that import exposure is still the driving force for the negative relationship between sanctions and civil liberties, and so my results are mostly robust to the inclusion of the deeper lag structure.

An additional robustness check is also conducted by controlling for the presence of sanctions specifically related to human rights. The results of these regressions are reported in Table 1.14. The coefficient estimates and levels of significance are essentially unchanged, so I conclude that my results are robust to controlling for the presence of sanctions specifically targeted toward human rights. The only alteration is that export exposure during human rights sanctions is negatively associated with freedom. A 1 percentage point increase in export exposure during a human rights related sanction leads to a decrease in civil liberties of 0.0661 points. This result is not true for import exposure, and export exposure in general is not significantly related to civil liberties or political rights. Import exposure is still the more significant factor in statistical significance and economic importance terms.

Robustness: Human Rights Oriented Sanctions

A potential source of bias in these results is that I do not distinguish between sanctions relating to military or political goals and those sanctions which are explicitly targeting human rights issues. This is similar to a regression performed by Wood (2008), looking at physical rights integrity and government sponsored violence. It is also similar to Soest and Wahman (2015). Both of these find that sanctions in general are harmful for democratization and physical rights, but that democratic sanctions and sanctions over human rights abuses are helpful in improving both of those. There is some debate over this though, as Peksen (2009) examines the impact of sanctions on physical rights and finds that even sanctions attempting to help human rights issues are harmful, with extensive and multilateral sanctions being even more harmful.

To examine this question I modify equation 1.7 by splitting off human rights related sanctions from normal sanctions and interacting those with the exposure terms:

$$Free_{i,t} = \alpha_0 Free_{i,t-1} + \alpha_t + \alpha_i + c_{i,t} + \beta_1 S_{i,t} + \beta_2 HRS_{i,t} \tag{1.19}$$

$$+\beta_3 R_{i,t}^{\%Exp} + \beta_4 R_{i,t}^{\%Imp} + \beta_5 R_{i,t}^{\%Exp} * HRS_{i,t} + \beta_6 R_{i,t}^{\%Imp} * HRS_{i,t} + \epsilon_{i,t}$$

where all the variables are the same as equation 1.7, but now $HRS_{i,t}$ is a dummy variable taking the value 1 if country i is under a human rights related sanction during time t. This is interacted with the exposure terms, giving a combined total of how human rights related sanctions react differently to trade exposure compared to regular sanctions.

Results are reported in Table 1.14. In column 1 where it is just sanctions and human rights sanctions, I have results that support Peksen (2009), where it seems that human rights related sanctions are associated with a larger drop in rights and freedoms, with a coefficient of -0.235 which is double the magnitude of normal sanctions and significant at the 1% significance level. In column 2 when exposure is added, the sanction variables themselves are small and insignificant, but notably the human rights sanction coefficient is still negative. The exposure terms are very closely related. For every 1% a country's trade is exposed to it sanctioners as a percent of its GDP, it would expect a drop in its freedom score of -0.0453 for regular sanctions and -0.0462 for human rights sanctions, significant at the 1% and 10% level respectively. This is also fairly consistent with the coefficient estimate of -0.0625 found in Table 1.6.

Finally when looking at import and export exposure separately something interesting happens. As before import exposure is driving the results for normal sanctions, with its coefficient of -0.179 being basically unchanged from Table 1.6 and significant at the 1% level. However, for Human Rights sanctions, import exposure doesn't matter. It is export exposure that is driving the results, with a coefficient of -0.0661, significant at the 5% level. Approximately a third of the magnitude, but negative, significant and the opposite direction. This is also an indication that perhaps this is not being driven by reverse causality. There is no pressing reason to think that human rights sanctions only target exports from the target nation. On the whole this is a very interesting result that will be explored further, but for now the core results of the paper are robust to separating and treating human rights related sanctions on their own, and I find that human rights related sanctions are associated with reductions in freedom in my data and analysis.

Robustness: Polity Score

In order to test if there is just something about the data construction method or the Freedom House Index score itself, I re-run my analysis using the Polity Score index which measure authoritarianism, with -10 being the most authoritarian government and +10 being the most democratic or representative. To do this I take equation 1.7 and rerun it with a new dependent variable:

$$Polity_{i,t} = \alpha_0 Polity_{i,t-1} + \alpha_t + \alpha_i + c_{i,t} + \beta_1 S_{i,t} \tag{1.20}$$

$$+\beta_2 R_{i,t}^{\%Exp} + \beta_3 R_{i,t}^{\%Imp} + \epsilon_{i,t}$$

where the variables are the same as equation 1.7, except for the new index measuring how authoritarian the government is. Although not a perfect match for rights and freedoms, it does deal with political rights and self expression so there is some overlap in its measurement.

The results are given in Table 1.15. Despite the change in index, I find that the results are very close, with sign, significance and magnitude being almost unchanged

from Table 1.6, the baseline freedom regressions. In column 1 sanctions are negatively associated with the Polity score, meaning sanctions tend to make governments more authoritarian with a coefficient of -0.171, significant at the 10% level. By comparison the same score in column 1 of Table 1.6 was -0.174, significant at the 1% level. The only major deviation is the magnitude of the import exposure coefficient in column 3 of Table 1.15, which is -0.217 and significant at the 1% level. By comparison, the same coefficient in column 3 of Table 1.6 was -0.165, significant at the 5% level. This can be explained by the fact that the Polity index has a wider range than the Freedom House Index, but the signs and magnitudes are almost identical.

Therefor I conclude that my results are robust to the use of different measures of freedoms, rights and authoritarian tendencies in governance.

Tables and Figures

Table 1.1: Sanction Descriptions

Sanction Type	Description	Imposed Cases
Blockade	Imposer attempts to prevent all countries from economic interactions with target country.	37
Embargo	Imposer cuts all economic activity between itself and the target.	51
Partial Embargo	Imposer cuts economic activity in certain sectors with the target country.	118
Import Restriction	Imposer restricts imports from the target country.	447
Export Restriction	Imposer restricts exports to the target country.	58
Withdrawal from EA.	Imposer withdraws from previously negotiated economic arrangements.	55
Asset Freeze	Imposer seizes all or part of the target state's assets in the imposing country's jurisdiction.	34
Reduction in Foreign Aid	Imposer reduces or terminates foreign aid to the target country.	191
Travel Ban	Imposer bans travel to and from the target country, either in general or for specific individuals.	55

This table is based on the Threat and Imposition of Sanctions categories. The number of imposed sanction events are reported in the third column.

Table 1.2: Freedom and Sanction Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Freedom Index	7.978	4.003	2	14
-Within Std. Dev.	-	1.897	-	-
Sanction	0.199	0.399	0	1
Light San.	0.051	0.233	0	1
Moderate San.	0.100	0.299	0	1
Intense San.	0.041	0.199	0	1
Threat	0.065	0.247	0	1

These statistics are based on the 4,633 observations of the combined dataset. The mean of the sanctions and threat are the percentage of country-year observations featuring a sanction or threat.

Table 1.3: Summary of Component Datasets

Datasets	Description	Countries	Years
FHI Freedom Index	Political Rights and Civil Liberties	204	1972-2015
TIES Sanctions	Threat/Imposition of 9 sanction types	165	1945-2005
COW Trade Database	Bilateral Trade Flows (Current Dollars)	205	1948-2014
CEPII Gravity Dataset	Country/Territory Pair Characteristics	225	1948-2015
MEPV	Major Episodes of Civil War/International Conflict	165	1946-2017
Combined Dataset	Summary of combined overlap (N = 4,633)	160	1972-2005

This table reports the number of countries and period covered by the component datasets used in this analysis as well as a summary of the final combined dataset utilizing all of them.

Table 1.4: Conditional Trade Exposure Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Trade Exposure	4.3	5.3	$1.18 * 10^{-8}$	23.6
Exp. Exposure	2.6	3.8	$7.09 * 10^{-9}$	21.1
Imp. Exposure	1.7	2	$4.68 * 10^{-9}$	9.8

This table reports summary statistics for trade exposure, conditional on a sanction being in place. Variables are the mean level of exposure a target country's trade, exports or imports are to countries sanctioning it, the minimum level of exposure observed and the max level of exposure observed as a percentage of the target country's GDP. Results are reported in percentage points.

Table 1.5: Effect of Sanctions on Log Exports

Ln(Exports)	(1)
Import Sanctions	-0.351*
	(0.212)
Export Sanctions	-0.626***
	(0.225)
Observations	975,210
R-squared	0.770

Includes controls for Country-Year and Country-Pair fixed effects. Country-Pair Clustered standard errors are reported in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 1.6: Freedom Baseline Sanctions

Freedom Index	(1)	(2)	(3)
Sanction	-0.174***	-0.00254	0.0313
	(0.0583)	(0.0576)	(0.0650)
Trade Exposure		-0.0625***	
		(0.0168)	
Import Exposure			-0.165**
			(0.0640)
Export Exposure			-0.0170
			(0.0192)
Lag Freedom	0.852***	0.848***	0.848***
	(0.0143)	(0.0146)	(0.0144)
Pop	-0.000800	-0.000674	-0.000812
	(0.000631)	(0.000593)	(0.000627)
GDP	-0.0709**	-0.0727**	-0.0723**
	(0.0288)	(0.0303)	(0.0310)
WTO Member	-0.103	-0.0800	-0.0849
	(0.0671)	(0.0659)	(0.0656)
International War	0.00243	0.00416	0.0121
	(0.0265)	(0.0257)	(0.0248)
Civil War	-0.0685***	-0.0684***	-0.0679***
	(0.0155)	(0.0164)	(0.0161)
Observations	4,633	4,633	4,633
R-squared	0.951	0.952	0.952

Robust standard errors adjusted for country clustering are reported in parentheses. All regressions also include country and year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 1.7: Heterogeneous Sanctions and Log Exports

Ln(Exports)	(1)	(2)
Intense Import San.	-0.836	-0.838
	(0.576)	(0.572)
Non-Intense Import San.	-0.122	
	(0.221)	
Intense Export San.	-0.952	-1.013
	(0.656)	(0.639)
Non-Intense Export San.	-0.355	
	(0.225)	
Moderate Import San.		-0.168
		(0.282)
Moderate Export San.		-0.617**
		(0.289)
Light Import San.		-0.00191
		(0.263)
Light Export San.		0.159
		(0.288)
Observations	975,210	975,210
R-squared	0.770	0.770

Includes controls for Country-Year and Country-Pair fixed effects. Country-Pair Clustered standard errors are reported in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 1.8: Conditional Heterogeneous Trade Exposure Summary Statistics

Variable	Mean	Std. Dev.	Max
Light Exposure	1	3.4	28.4
Moderate Exposure	2.8	3.8	22.1
Intense Exposure	3	7.9	31.9
Light Export Exposure	1	3.4	28.4
Light Import Exposure	0	0	0.6
Moderate Export Exposure	1.1	2.3	20.9
Moderate Import Exposure	0.3	0.6	3.8
Intense Export Exposure	1.7	4.9	18.2
Intense Import Exposure	1.3	3.3	14.2

This table reports summary statistics for trade exposure, conditional on a sanction being in place. Variables are the mean level of exposure a target country's trade, exports or imports are to countries sanctioning it, the minimum level of exposure observed and the max level of exposure observed as a percentage of the target country's GDP. Results are reported in percentage points.

Table 1.9: Heterogeneous Sanctions and Freedom

Freedom Index	(1)	(2)	(3)
Intense	-0.213	0.0170	0.0503
	(0.131)	(0.174)	(0.184)
Moderate	-0.228***	-0.115	-0.0854
	(0.0675)	(0.0703)	(0.0760)
Light	-0.0809	0.0511	0.181
	(0.0770)	(0.0733)	(0.111)
Intense Exposure		-0.0431**	
		(0.0210)	
Moderate Exposure		-0.0461***	
		(0.0124)	
Light Exposure		-0.0478*	
		(0.0252)	
Import Intense Exposure			-0.105**
			(0.0438)
Export Intense Exposure			-0.00229
			(0.0255)
Import Moderate Exposure			-0.206**
			(0.0980)
Export Moderate Exposure			-0.0187
			(0.0210)
Import Light Exposure			-34.82
			(21.30)
Export Light Exposure			-0.0102
			(0.0167)
Lag Freedom	0.851***	0.847***	0.847***
	(0.0143)	(0.0145)	(0.0145)
Pop	-0.000765	-0.000592	-0.000688
	(0.000634)	(0.000638)	(0.000652)
GDP	-0.0692**	-0.0731**	-0.0723**
	(0.0268)	(0.0287)	(0.0289)
WTO Member	-0.109	-0.0855	-0.0925
	(0.0673)	(0.0660)	(0.0661)
International War	0.00338	0.00512	0.0136
	(0.0265)	(0.0257)	(0.0248)
Civil War	-0.0690***	-0.0688***	-0.0693***
	(0.0155)	(0.0160)	(0.0159)
Observations	4,633	4,633	4,633
R-squared	0.951	0.952	0.952

Robust standard errors adjusted for country clustering are reported in parentheses. All regressions also include country and year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 1.10: Sanction Threats and Log Exports

Ln(Exports)	(1)
Import Sanctions	-0.138
	(0.160)
Export Sanctions	-0.721***
	(0.181)
Import Threats	0.359***
	(0.119)
Export Threats	0.134
	(0.145)
EIA	0.00262***
	(0.000475)
Observations	852,469
R-squared	0.757

Includes controls for Country-Year and Country-Pair fixed effects. Country-Pair Clustered standard errors are reported in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 1.11: Conditional Threat Exposure Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Trade Threat Exposure	8.5	9.7	$3.05 * 10^{-10}$	56.1
Exp. Threat Exposure	4.3	5.6	$1.53 * 10^{-10}$	28.6
Imp. Threat Exposure	4.2	5.1	$1.52 * 10^{-10}$	32.1

This table reports summary statistics for threat exposure, conditional on a threat being in place. Variables are the mean level of exposure a target country's trade, exports or imports are to countries threatening it, the minimum level of exposure observed and the max level of exposure observed as a percentage of the target country's GDP.
Results are reported in percentage points.

Table 1.12: Sanction Threats and Freedom

Freedom Index	(1)	(2)	(3)
Sanction	-0.174***	0.00483	0.0257
	(0.0582)	(0.0591)	(0.0616)
Threat	0.0821	0.0960*	0.0874
	(0.0574)	(0.0581)	(0.0565)
Trade Exposure		-0.0498***	
		(0.0101)	
Trade Threat Exposure		-1.511	
		(1.119)	
Import Exposure			-0.103***
			(0.0377)
Export Exposure			-0.0273**
			(0.0125)
Import Threat Exposure			-6.029
			(3.970)
Export Threat Exposure			2.335
			(2.342)
Lag Freedom	0.852***	0.849***	0.849***
	(0.0143)	(0.0143)	(0.0142)
Pop	-0.000869	-0.000722	-0.000842
	(0.000632)	(0.000597)	(0.000628)
GDP	-0.0708**	-0.0719**	-0.0730**
	(0.0291)	(0.0303)	(0.0317)
WTO Member	-0.103	-0.0777	-0.0840
	(0.0671)	(0.0662)	(0.0658)
International War	0.00132	0.00283	0.00817
	(0.0261)	(0.0252)	(0.0243)
Civil War	-0.0690***	-0.0681***	-0.0686***
	(0.0155)	(0.0162)	(0.0160)
Observations	4,633	4,633	4,633
R-squared	0.951	0.952	0.952

Robust standard errors adjusted for country clustering are reported in parentheses. All regressions also include country and year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 1.13: Arellano-Bond Sanction Estimation

Freedom Index	(1)	(2)	(3)
Lag Freedom	0.858***	0.854***	0.855***
	(0.0370)	(0.0367)	(0.0370)
Lag2 Freedom	-0.0442*	-0.0443*	-0.0428*
	(0.0263)	(0.0253)	(0.0254)
Sanction	-0.195*	-0.0347	-0.00604
	(0.105)	(0.0925)	(0.0950)
Lag Sanction	0.111	0.00921	0.00400
	(0.0896)	(0.0937)	(0.0938)
Lag2 Sanction	0.00563	-0.0353	-0.0492
	(0.0780)	(0.0795)	(0.0841)
Lag3 Sanction	0.135*	0.0529	0.0463
	(0.0788)	(0.0854)	(0.0852)
Trade Exposure		-0.0788**	
		(0.0330)	
Lag Trade Exposure		0.0241	
		(0.0320)	
Lag2 Trade Exposure		0.00254	
		(0.0196)	
Lag3 Trade Exposure		0.0270	
		(0.0245)	
Import Exposure			-0.206
			(0.148)
Lag Import Exposure			0.0348
			(0.132)
Lag2 Import Exposure			0.0335
			(0.0719)
Lag3 Import Exposure			0.0541
			(0.0915)
Export Exposure			-0.0189
			(0.0525)
Lag Export Exposure			0.0140
			(0.0511)
Lag2 Export Exposure			-0.0107
			(0.0335)
Lag3 Export Exposure			0.0167
			(0.0362)
Constant	1.561***	1.838***	1.579***
	(0.216)	(0.222)	(0.226)
Observations	3,975	3,975	3,975
Number of Countries	159	159	159

Robust standard errors are reported in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 1.14: Human Rights Related Sanctions

Freedom Index	(1)	(2)	(3)
Sanction	-0.118*	0.0203	0.0547
	(0.0599)	(0.0633)	(0.0694)
Human Rights San	-0.235***	-0.102	-0.0890
	(0.0795)	(0.0780)	(0.0845)
Trade Exposure		-0.0453***	
		(0.0146)	
Trade*Rights San.		-0.0462*	
		(0.0242)	
Import Exposure			-0.179***
			(0.0604)
Export Exposure			0.0132
			(0.0218)
Import*Rights San.			-0.00174
			(0.0755)
Export*Rights San.			-0.0661**
			(0.0318)
Lag Freedom	0.850***	0.847***	0.848***
	(0.0152)	(0.0153)	(0.0152)
Pop	-0.000417	-0.000386	-0.000528
	(0.000474)	(0.000507)	(0.000555)
GDP	-0.0729**	-0.0755**	-0.0752**
	(0.0293)	(0.0309)	(0.0316)
WTO Member	-0.0841	-0.0650	-0.0691
	(0.0671)	(0.0664)	(0.0662)
International War	0.00317	0.00828	0.0136
	(0.0270)	(0.0267)	(0.0258)
Civil War	-0.0681***	-0.0701***	-0.0696***
	(0.0150)	(0.0159)	(0.0158)
Observations	4,464	4,464	4,464
R-squared	0.953	0.954	0.954

Includes controls for Country-Year and Country-Pair fixed effects. Country-Pair Clustered standard errors are reported in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 1.15: Polity Index Robustness Check

Polity Score	(1)	(2)	(3)
Sanction	-0.171*	0.0303	0.0803
	(0.0890)	(0.102)	(0.104)
Exposure		-0.0693***	
		(0.0175)	
Import Exposure			-0.217***
			(0.0617)
Export Exposure			-0.00510
			(0.0311)
Lag Polity	0.867***	0.865***	0.866***
	(0.00743)	(0.00743)	(0.00743)
Pop	-0.000246	-6.26e-05	-0.000246
	(0.00147)	(0.00147)	(0.00147)
GDP	-0.183**	-0.188**	-0.187**
	(0.0795)	(0.0793)	(0.0793)
WTO Membership	0.109	0.136	0.129
	(0.112)	(0.112)	(0.112)
International War	0.0467	0.0478	0.0541
	(0.0610)	(0.0609)	(0.0609)
Civil War	-0.0384	-0.0376	-0.0360
	(0.0262)	(0.0261)	(0.0261)
Observations	4,416	4,416	4,416
R-squared	0.952	0.952	0.952

Includes controls for Country-Year and Country-Pair fixed effects. Country-Pair Clustered standard errors are reported in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Chapter 2 Sanctions, Threats and Trade Diversion

2.1 Introduction

Economic Sanctions have become a major foreign policy tool in recent years, particularly for the United States. Determining the effectiveness of sanctions at inflicting economic damage is critical for designing sanctions which will achieve their stated goals. For example, sanctions placed on Iran were successful in that the regime there agreed to negotiations and later restrictions on their nuclear program because the sanctions were effective at stifling economic growth.

A critical component of this was that the restrictions on trade could not be outmaneuvered by diverting trade to third party countries not involved in the sanction regime. As demonstrated in Chapter 1, sanctions do have definite negative impacts on trade between the sanctioner and the target nation. However, even before sanctions begin they can alter behavior in the target nations.(Lee and Lee, 2018) When sanctions are threatened nations can attempt to divert their trade behavior, to lessen the shock of an imposed sanction as the Sandinistas did in the 1980's.(Rodman, 2001) Other examples of this can be found in the response of Libya and Iran to sanction threats in the 1990s and early 2000s.(O'Sullivan, 2003) Accounting for this effect is therefor important for sanction regime design.

This chapter advances the literature by studying the impact of trade diversion from both imposed sanctions and sanction threats, which will allow an analysis of how target country behavior changes in response to sanction threats both directly in terms of trade between itself and the sanctioning country and trade with third party countries. Secondly I will measure trade diversion in terms of trade toward the target nation's top trade partners not involved in the sanctions, which will allow for a general analysis of trade diversion and the use of country-pair and country-year fixed effects. The use of fixed effects will help solve the selection problem, because the decision to impose a sanction is not exogenous to trade relations.

In section 2.2 I examine the previous literature looking at the impact of sanctions on trade and trade diversion. In section 2.3 I explain the data used in this analysis and give a brief overview of how the dataset was constructed. In section 2.4 I run a regression of imposed sanctions and sanction threats to measure the direct impact on trade between the sanctioner-target pair by replicating the analysis from Allen (2019). The results of this analysis are given in Table 2.3. I find that importer imposed sanctions reduce trade into the sanctioning country by 51.37%, significant at the 1% level.[1] However exporter imposed sanctions do not have a significant impact on trade between the sanctioning and target pair. The opposite is true for threats, where sanction threats issued by the exporting country results in an increase in sales

[1]This is found by taking the coefficient of the Importer Imposed Sanction dummy variable and converting it into a percent change using $100 * (e^{\beta} - 1)$. Other coefficients are also reported in percent changes using this same conversion method.

to the target country of 43.19%. Conversely sanction threats issued by the importing country do not significantly affect trade.

In section 2.5 I expand that analysis with the inclusion of trade diversion and threat diversion variables to analyze the impact of these events on the wider trade network of the target country. Strong evidence of trade diversion is found for both imposed sanctions and during sanction threats. Imports from third party suppliers during a sanction event increases by an average of 55.43%, significant at the 1% significance level. Sales to third party buyers also increase, going up by 49.78%, significant at the 1% level. Imports from third parties during sanction threats increases by 42.05%, significant at the 1% level while sales to third parties during sanction threats increases 42.76% during sanction events, significant at the 1% level. This indicates that controlling with country-year and country-pair fixed effects that countries do divert trade to alternate markets before and during sanction events.

Section 2.6 breaks the sanction and diversion variables in multiple heterogeneous variables, which are analyzed for any differential effect that different intensities of sanctions might have. Final conclusions and discussion are found in section 2.7.

2.2 Literature: Sanctions and Trade Diversion

There is a great deal of interest in the idea of sanction busting in the literature. Kakutani (2017) examines how the proliferation of multinational companies will lead to increased sanction busting so long as the rents created by the sanction exceed the potential cost. A theoretical example is Drezner (2000), who develops the bargaining game that exists between the sanctioner and target, and the sanctioner and third parties. He finds that empirically sanctions backed by an international organization such as the UN are more effective than multilateral sanction regimes developed between nations, because the UN provides an enforcement mechanism and additional incentive to maintain the sanctions. Kopp (2005) shows how UN sanction design policies can actually encourage sanction busting if there is not an enforcement procedure. Many papers which are interested in determining the success of sanctions take interest in sanction busting, as the ability to subvert a sanction makes it much easier for countries to resist sanctions.

The primary inspiration for this chapter is Caruso (2005), which uses a panel gravity framework for bilateral trade between the United States and 49 partner countries over the period 1960-2000. Logged bilateral trade flows are regressed against the GDP of the two trading partners, the population of the two countries, distance between the countries and dummy variables indicating whether or not the reporter country was involved in war/civil war. However it does not include standard country fixed effects to account for multilateral resistance.

Caruso then augments their gravity model with dummy variables for "extensive" sanctions, blockades and embargoes as defined by Hufbauer and Oegg (2003), and "moderate" sanctions which covers everything else. He finds that limited/moderate sanctions have a positive but not statistically significant impact on bilateral trade flows, which he attributes to the low intensity of the sanction measures which may have negligible aggregate impact. However he does find that extensive sanctions,

especially those undertaken by multiple countries alongside the United States, are extremely effective in disrupting bilateral trade, reducing it by nearly 90%. This result is consistent with the earlier work by Hufbauer and Oegg (2003).

He then tests for trade diversion, where trade is redirected to third party countries to make up for lost trade with the sanctioning country. This is done by building a new panel of data using the same 49 partner countries, but instead of trade between the partner countries and the United States this second panel has trade with between "the other G-7 countries" and countries sanctioned by the United States. He finds that extensive sanctions are effective at reducing trade generally, but that there is evidence of sanction busting for moderate sanction events.

Another paper that takes a similar approach is Yang et al. (2009), which uses a gravity panel approach examining logged bilateral trade between the European Union and 166 partner countries over the time period from 1980 to 2003. They include a dummy variable taking the value of 1 for if a country is being sanctioned by the US, another for if the country is being sanctioned by the EU and finally interaction terms between them. They find that the presence of US sanctions against a country tends to reduce trade between the targeted nation and the EU, but that the longer a sanction goes on the more likely it is countries divert their trade to the EU.

Early (2009) also approaches the question of trade diversion and sanction busting, but from the perspective that when the US imposes sanctions on a target, it is allies of the United States that tend to step in to increase trade with the target nation more than unrelated third party countries. He develops a dummy variable for 'sanction buster' by examining the percent change in trade between third party countries and the target nation before and after the sanction, then uses that as the dependent variable in a logit regression. He finds for US imposed sanctions it is allies of the US who are most likely to 'bust' the sanction by increasing trade with the target nation.

I will make two main contributions to this field. The first is that I will use trade diversion to the top 10 trade partners of the target country that are not involved with the sanction regime as part of a bilateral gravity panel. This will capture trade diversion between a targeted nation and its major trade partners, rather than restricting the detection of trade diversion to specific groups such as G7 or the EU.

Also, by restricting trade diversion to the top 10 trade partners and using smaller trade partners as a comparison group I will be able to use country-year fixed effects. In addition to controlling for population, GDP and other standard country characteristics the inclusion of fixed effects will at least partially control for the inherent selection problem that exists when studying the impact of sanctions on trade. The decision to impose a sanction is not exogenous to the trade relationship between two countries, but country-year fixed effects will capture any political shocks within the target country that would both increase the likelihood of the target to be targeted by economic sanctions and affect trade flows between the target and its trade partners.

This use of fixed effects here is similar to their use in the trade agreement literature, where the decision to enter into a trade agreement is not exogenous to the existing trade relationship between the two countries.(Baier and Bergstrand, 2007; Baier et al., 2014; Baldwin and Taglioni, 2007; Regolo, 2013; Soete and Hove, 2017) Using country-pair and country-year fixed effects to capture the observable factors

that affect both the decision to enter into a trade agreement and the level of trade in general, I will partially control for the endogeniety of the decision to sanction and the level of trade between the nations.

The second contribution is that I will account for trade diversion during the threat stage of a sanction as well as trade diversion caused by imposed sanctions. If a country is faced by a serious threat of sanctions it might preemptively adjust trade to lessen the shock if/when the sanction is actually imposed. If this hedging behavior is prevalent then coefficient estimates of the impact of sanctions on trade flows could be biased, indicating that sanctions might have greater impact on trade flows than otherwise indicated.

2.3 Data

The dataset used in this chapter is an imbalanced panel created by combining the Threat and Imposition of Economic Sanctions dataset, the Correlates of War Trade Dataset and the CEPII gravity dataset. The combined dataset contains information on 180 countries over the period 1950-2005, with a total of 15,335 country pairs. The total combined sample size of 852,469 country-pair-years, with the variable of interest for this chapter will be the log of exports, which are recorded for both countries in a pair.

Trade data comes from version 4 of the Correlates of War Trade Dataset, which is based on the IMF's Direction of Trade Statistics and has bilateral trade flows for 205 countries over the period 1945 to 2005. This data is used because the COW trade data distinguishes between reported zeroes and dates where there is missing data/no trade reports in a given year. Because this analysis is concerned with trade sanctions it is expected that at least some of the time trade should be reduced to zero, and so the distinction between zero reported trade and no reported trade is important.

Trade diversion is also measured from this trade data, by the creation of dummy variables for countries that were the top 10 buyers/suppliers of a target nation the year prior to a sanction that also did not get involved in the sanction regime. In order to give an idea of how important increases in trade to these third party countries are, total imports/exports to these countries during sanction events are summed and then divided by the target nation's GDP. Summary statistics for this are given in Table 2.2.

Data on sanctions comes from version 4.0 of the Threat and Imposition of Economic Sanctions (TIES) dataset, which scans legislation, government documents and proceedings and news articles to capture as many sanction threats and events as possible which began between 1945 and 2005. The dataset includes data as recent as 2013, however new sanctions stop being added after 2005 and so I use that as the end date for my data. In order to further remove as much endogeniety as possible I exclude all sanction events that are explicitly stated to concern trade disputes. More information about the coding and construction of the TIES dataset used here can be found in the Data Appendix.

Due to some of the categories of sanction being rare and to be more in line with previous literature the primary analysis will aggregate the 9 sanction categories into 3.

These are intense sanctions (blockades and embargoes), moderate sanctions (partial embargoes, import restrictions and export restrictions) and light sanctions (travel bans, suspension of economic agreements, removal of foreign aid and asset freezes).

Finally, data on economic integration is taken from the National Science Foundation-Kellog Institute Database on Economic Integration Agreements. Covering 195 countries from 1950-2012, the higher a country-pair's EIA score the more integrated the two economies are, with 0 being no trade agreement, 3 being a free trade agreement and 6 being a full economic union with a single monetary, fiscal and immigration policy.

2.4 Direct Impact of Sanctions and Threats

I will begin by setting up a gravity model of exports ($E_{i,j,t}$) from the exporting country (i) to the importing country (j) in year (t). I capture all trade flows by including country pairs (exports from country A to B) and the reverse (exports from country B to country A), which forms my variable Exports. The log of exports is my dependent variable for this analysis. In order to keep the observed zeroes in the trade data when taking the natural log, any zero is converted to 1$.

The first regression will be the baseline model, looking at the effect of imposed sanctions and sanction threats on trade between the sanctioner-target pair. The model itself will be a bilateral panel gravity equation using logged exports as the dependent variable, indicator variables for the presence of sanctions or sanction threats, and country-year and country-pair fixed effects. These fixed effects will capture country characteristics, multilateral resistance as described by Anderson and van Wincoop (2003) and as discussed previously will help account for government policy shocks in the trade partners. The model to be estimated is given by:

$$lnE_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + EIA_{i,j,t} + \beta_1 S^X_{i,j,t} + \beta_2 S^M_{i,j,t} \tag{2.1}$$

$$+\beta_3 T^X_{i,j,t} + \beta_4 T^M_{i,j,t} + \epsilon_{i,j,t}$$

where $E_{i,j,t}$ is the logged real value of exports and $\alpha_{i,j}$ are country-pair fixed effects and $\alpha_{i,t}$ / $\alpha_{j,t}$ are country-year fixed effects for the exporter i / importer j, respectively. EIA is a variable measuring the level of economic integration and trade freedoms between the two countries. The error term for a given country-pair year is given by $\epsilon_{i,j,t}$.

The variable $S^X_{i,j,t}$ is an indicator variable which takes the value of 1 if the exporting country i is imposing some type of economic sanction against the importing country j during a given year t. A negative coefficient on $S^X_{i,j,t}$ (β_1) indicates that a country's exports to a country it is targeting decreases as a result of the sanctions, and therefor sanctions are generally successful. A positive β_1 would indicate that a country exports more to a country it is targeting with economic sanctions, which goes against intuition.

The inverse of this situation is $M_{i,j,t}$, an indicator variable which takes the value of 1 if the importing country j is imposing an economic sanction against the exporting country i. A negative coefficient on $S^M_{i,j,t}$ (β_2) indicates a reduction in imports from a country being sanctioned to the country imposing the sanctions, indicating that sanctions are generally effective at reducing imports from targeted nations. A positive β_2 would indicate that sanctions generally increase imports from a country under sanctions, the opposite of the intended policy goal.

In addition to variables for imposed sanctions, $T^X_{i,j,t}$ is an indicator variable which take the value of 1 if the exporting country i is threatening to impose economic sanctions on the importing country j in year t. The coefficient on $T^X_{i,j,t}$ (β_3) measures how exports from the threatening country to the target country change as a result of an economic sanction threat. A positive coefficient on β_3 would indicate that exports from the threatening country increases during a threat period, supporting the theory that the targeted country will attempt to stockpile goods from the threatening nation. A negative coefficient on β_3 would indicate the opposite, that a targeted country will preemptively stop purchasing goods from a country that is threatening it.

The inverse of this is $T^M_{i,j,t}$, and indicator variable which take the value of 1 if the importing country j is threatening economic sanctions against the exporting country i. The coefficient on $T^M_{i,j,t}$ (β_4) measures how imports into the threatening country change as a result of the economic sanction threat. A positive coefficient on β_4 indicates firms and citizens in the threatening country try to stockpile goods from the target country before potential sanctions go into effect. A negative coefficient on β_4 indicates that firms and citizens in the threatening country tend to preemptively comply with potential future sanctions, or that firms in the target country stop selling to the threatening country before sanctions are in place.

The results of this regression are given in Table 2.3. I find that exporter imposed sanctions have no statistically significant impact on exports to the target country, indicating that the sanctioning country either does not significantly restrict sales to the target country or is unsuccessful in enforcing the sanction. Importer imposed sanctions by comparison have a significant impact, reducing imports from the target country i to the sanctioning country j by 51.37% on average, significant at the 1% level. Taken together this indicates that countries are more stringent or more successful at restricting goods coming into their country compared to restricting goods leaving their country. The sign and magnitude of the coefficient for importer imposed sanctions, -0.721, is comparable in sign and magnitude to the disruption in bilateral trade flows found by Caruso (2005), the prior analysis closest to my methodology, who found that intense sanctions reduced trade between the United States and its sanction target by a coefficient of -0.89.

The pattern is reversed for sanction threats, where importer threats are not statistically significant, while exporter threats are. When the exporting country threatens sanctions, it leads to a 43.19% increase in sales to the threatened country, significant at the 1% level. An importer threatening to restrict goods coming into their country is not taken as seriously by firms and consumers compared to an exporter threatening to restrict sales. This gives evidence for stockpiling behavior when the exporter is threatening sanctions, with firms and consumers increasing purchases in expectation

that the market may be closed in the near future.

This only examines the direct impact that sanctions and threats have on the sanctioner-target pair however. Target countries can react to a sanction or threat by increasing trade with third party countries, which would lessen the impact of the actual sanction. Failing to account for this will lead to an inflated measure of the damage sanctions cause.

2.5 Sanctions and Trade Diversion

In order to capture the effect of exporters under a sanction attempting to find new customers and the effect of importers under sanction looking for new sources of goods, two indicator variables are created. These indicator variables track the third party countries not involved in the sanction regime that were the target nation's largest trading partners before the sanction regime began.

The key assumption that I make in this process is that the majority of trade diversion will be directed to the target country's largest trade partners. I assume that measuring how trade with these large third party trade partners change during sanction events will give an accurate assessment of the amount of trade diversion occurring overall. This is because there are network effects that tie the target nation to larger trade partners compared to less important trade partners. Large trade partners are more likely to have trade infrastructure available for use, and there would be firm and individual relationships that would make ramping up trade easier compared to "creating" a new major trade relationship. This means that the implicit control group for this analysis are smaller third party trade partners, whose trade flows should not react as strongly to the presence of a sanction.

The threat of trade diversion is a primary reason that countries try to build multilateral sanction regimes. The more third party countries agree to the sanction regime, the less flexibility targets have to react to sanctions and the more damaging those sanctions will be. Similarly, a country that is being threatened with sanctions can preemptively react to those threats by diverting trade to third party countries. Accounting for this preemptive action is important to determining the true amount of trade diversion, which might be understated if you don't include prior actions.

To analyze this the baseline regression is modified with buyer/supplier diversion variables for imposed sanctions and threatened sanctions:

$$lnE_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + \beta_1 S^X_{i,j,t} + \beta_2 S^M_{i,j,t} + \beta_3 T^X_{i,j,t} + \beta_4 T^M_{i,j,t} \tag{2.2}$$

$$+\beta_5 SD_{i,t} + \beta_6 BD_{i,j,t} + \beta_7 TSD_{i,j,t} + \beta_8 TBD_{i,j,t} + \epsilon_{i,j,t}$$

Where the variables remain the same as equation 2.1, with the addition of four diversion variables. Supplier diversion, or the tendency for countries under an exporter imposed sanction to seek new sources for importers, is given by $SD_{i,j,t}$. This is an indicator variable that takes the value of 1 during the sanction event for the top 10 exporters (i) to the target country (j) in the year prior to the start of the sanction

event that also did not participate in the sanction regime. In effect this tracks how trade behaves for the largest trade partners going into the sanction event that did not participate, the countries most likely to engage in sanction busting behavior. The coefficient on this variable β_5 is therefor a measure of how well the target country can divert its import needs to its largest available suppliers. A positive result indicates that imports from important third party trade partners increases during sanction events, giving evidence of trade diversion.

The same is true for buyer diversion, the tendency for countries under an importer imposed sanction to seek new markets for its goods to make up for the lost customers in the sanctioning country. This is explained by $SD_{i,j,t}$, which takes the value of 1 during the sanction event for the top 10 importers (j) from the target country (i) in the year prior to the sanction event beginning that did not participate in the sanction regime. A positive coefficient on this variable would indicate a country is successful in diverting its goods to open markets after sanctions are imposed.

Two equivalent variables are created for threat cases. Supplier diversion caused by sanction threats is given by $TSD_{i,j,t}$ and buyer diversion caused by sanction threats is given by $TBD_{i,j,t}$. Positive coefficients on these variables would indicate that countries preemptively seek new sources of goods/new markets for their goods when a sanction is threatened. Accounting for this preemptive action is important both because of its implications for sanction success and also to find the true level of sanction diversion during a sanction event.

The results are reported in Table 2.4. I find that the results from the first regression are robust to the inclusion of these diversion variables, with only small changes in magnitude being observed.

The coefficient on supplier sanction diversion indicates that imports from the 10 largest suppliers to a country not involved with the sanction event increases by 55.43%, significant at the 1% significance level. Similarly, the coefficient on buyer sanction diversion indicates that sales to the 10 largest markets not involved with the sanction event increases by 49.78%, significant at the 1% level. To provide context, I have added together the trade flows of the top 10 third party trade partners, and divided this sum by the GDP in the target nation. Summary information can be found on this statistic in 2.2. Taken together with the coefficient estimates, the average target country will increase sales to its largest third party customers by an amount equivalent to 6.7% of the target state's GDP. Imports from the average target nation's largest suppliers increases by a similar amount, equivalent to 7.98% of the target country's GDP.

These increases in trade flows to the largest trade partners that did not participate in the sanction regime indicate that countries are successful at replacing at least part of their normal imports and exports by finding new buyers and suppliers.

The coefficient on supplier threat diversion is also statistically significant, indicating that imports from a country's largest third party suppliers increases by 42.05% during a sanction threat, significant at the 1% level. The coefficient on buyer threat diversion indicates an increase in sales to third party markets of 42.76% during sanction events, significant at the 1% level.

Finally, the coefficient estimates of the direct impact of sanctions and sanction

threats are not significantly affected by the inclusion of trade diversion variables. There is no indication that the coefficient estimates were being biased by not accounting for this trade diversion phenomenon.

On the whole this gives strong evidence that not only does trade diversion exist, but it is generally prevalent and also occurs before sanctions are actually imposed. During sanction threats, trade with other countries not involved with the sanction events increases both for importer imposed sanctions and exporter imposed sanctions. The pattern in the increases indicates that based on the magnitude, countries begin diversifying their markets in response to threats, and that this continues on if the sanction is actually imposed. The size of this market shift is equivalent to 6-8% of the target nation's GDP for both imports and exports.

2.6 Heterogeneous Sanctions and Trade Diversion

The final step in this analysis is to examine whether or not these results are being driven by a particular category/severity of sanctions. Theoretically a more intense sanction would result in a greater direct disruption in trade flows, but also an increase in trade diversion as there is a greater market distortion for third parties to take advantage of. On the other hand there might be political pressure during intense sanctions that will make third party countries hesitate from trading with the target. This pressure would logically not be there during lighter sanctions which are not pursued with the same commitment as intense sanctions.

To analyze this question, I use a modified version of equation 2.2:

$$lnE_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + \beta_1 S_{i,j,t}^{X(L,M,I)} + \beta_2 S_{i,j,t}^{M(L,M,I)} + \beta_3 T_{i,j,t}^{X(L,M,I)} + \beta_4 T_{i,j,t}^{M(L,M,I)} \tag{2.3}$$

$$+\beta_5 SD_{i,t}^{L,M,I} + \beta_6 BD_{i,j,t}^{L,M,I} + \beta_7 TSD_{i,j,t}^{L,M,I} + \beta_8 TBD_{i,j,t}^{L,M,I} + \epsilon_{i,j,t}$$

where the variables are the same as in equation 2.2, but instead of single variables each is a vector of variables depending on whether the sanction being imposed/threatened is a light, moderate or intense sanction. For each variable there will be three coefficients, one for each case. It is expected that intense sanctions and threats should have a more negative impact on trade between the sanctioner and target country, while moderate and light sanctions should have progressively smaller effects. A similar pattern is expected for diversion and threat diversion. Trade should be diverted to third party countries in greater amounts for intense sanctions and threats, while light sanctions may not greatly affect trade flows at all.

Results are given in Table 2.5. Of note, the two columns of the table both relate to the same regression estimate. The first column gives the coefficient results for an imposed sanction of the given intensity or trade diversion as a result of those sanctions. The second column does the same for sanction threats.

When dividing the threat division variable into intense, moderate and light the coefficients lose individual significance. So it seems that sanction threats do change

trade flows, but I cannot distinguish the individual impact of intense, moderate and light threats. The trade disruption caused by imposed sanctions is easier to see. The coefficient on intense buyer diversion is 2.432, corresponding to an increase of 1038.16%. However this is only significant at the 10% significance level, and the distribution indicates that it is positive, but imprecisely estimated. In terms of supplier diversion, it is moderate supplier diversion which is statistically significant at the 10% level, corresponding to a 69.72% increase. However this is not interpreted as moderate sanctions causing more supplier diversion, but rather that it is difficult to differentiate individual coefficients from one another. The pattern is maintained with the largest magnitudes generally going to intense sanctions and threats, while lighter sanctions have impacts that are statistically zero and economically small.

In terms of threatened sanctions it is exporter sanctions that are statistically significant. Both intense exporter sanctions and intense importer sanctions are associated with large, positive relationships that are significant at the 5% level. Intense exporter sanctions have a coefficient of 1.63, while intense importer sanctions have a coefficient of 2.635. For threatened sanctions it is much more clear cut that intense sanctions threats cause a preemptive movement from the target nation, while moderate and light sanctions do not. This gives evidence that the results for sanction threats before were primarily caused by nations attempting to preempt intense sanctions.

2.7 Conclusion

The major policy question that this chapter analyzes is whether it is important to form multilateral coalitions, in order to avoid situations where target states can avoid some or most of the pain of economic sanctions by diverting their trade to alternate markets. This result is confirmed, as there is strong evidence that sanctions do cause trade to be diverted to third party countries. This is in line with Allen (2019), which examined how targeted governments reacted in terms of civil rights during a sanction event. I found there that the greater the sanctioning nations trade was as a percent of the target nation's GDP, the more disruption those sanctions caused and the more oppressive the regimes became in response.

This chapter explains that result clearly, because if you do not actually get a large percentage of a nation's trade partners on board with the sanction, those nations will maintain their economic position through the use of third party trade. Moreover the trade diversion found in this paper is both economically and statistically significant, equivalent to approximately 6-8% of the target nation's GDP on average.

I also examine how these results change when examined in terms of heterogeneous sanctions. I find that generally importer sanctions are more significant and relevant, in line with the aggregated case. The intense buyer diversion for imposed sanctions and moderate supplier diversion both give additional credence that there is real trade diversion from imposed sanctions. In addition it is confirmed that it is intense sanction threats, both in terms of importer imposed and exporter imposed, that cause people to react directly. However there is no strong evidence of third party trade diversion

from threats, despite the strong result earlier. This seems to indicate that again we cannot differentiate these coefficients from one another.

I contribute to the literature in two ways. First I use the top 10 trade partners going into a sanction as a proxy for trade diversion more generally. This first allows me to study trade diversion no matter if the major trade partners are part of some kind of special group like the EU or not. More importantly though using a subset of the major trade partners allows for the use of country-year and country-pair fixed effects, which control for country characteristics as well policy shocks and government actions in the target nation. This allows me to at least partially control for the selection problem inherent in studying trade and sanctions, where the decision to impose an economic sanction is not exogenous to trade. Based on this I conclude that I have detected trade diversion, both because of imposed sanctions but also that threats of intense sanctions can cause target nations to begin adjusting their trade patterns to try and avoid a hard shock when or if a sanction is actually imposed.

2.8 Tables and Figures

Table 2.1: Sanction Descriptions

Sanction Type	Description	Imposed Cases
Blockade	Imposer attempts to prevent all countries from economic interactions with target country.	37
Embargo	Imposer cuts all economic activity between itself and the target.	51
Partial Embargo	Imposer cuts economic activity in certain sectors with the target country.	118
Import Restriction	Imposer restricts imports from the target country.	447
Export Restriction	Imposer restricts exports to the target country.	58
Withdrawal from EA.	Imposer withdraws from previously negotiated economic arrangements.	55
Asset Freeze	Imposer seizes all or part of the target state's assets in the imposing country's jurisdiction.	34
Reduction in Foreign Aid	Imposer reduces or terminates foreign aid to the target country.	191
Travel Ban	Imposer bans travel to and from the target country, either in general or for specific individuals.	55

This table is based on the Threat and Imposition of Sanctions categories. The number of imposed sanction events are reported in the third column.

Table 2.2: Trade with Top 10 Partners as % of GDP

Variable	Mean	Std. Dev.	Min	Max
Sales to Third Party (% GDP)	12.23%	11.65	0.001%	89.12%
Purchases from Third Party (% GDP)	16.05%	50.52	0.08%	915.12%

This table reports summary statistics for trade diversion to the top 10 trade partners not involved in a sanction during a given year. By adding up total sales to / purchases from those third parties and dividing by the target nation's GDP a percent measure of how important with those alternate trading partners is to the target country. The largest examples for sales are major export economies such as Congo, Ireland and Malaysia.
The largest example for purchases is Liberia in the 2000-2003 which suffered a civil war, collapsing the domestic economy.
Results are reported as a percent of GDP.

Table 2.3: Threatened and Imposed Sanctions

Ln(Exports)	(1)
Exporter Imposed San.	-0.138
	(0.160)
Importer Imposed San.	-0.721***
	(0.181)
Exporter Threatened San.	0.359***
	(0.119)
Importer Threatened San.	0.134
	(0.145)
Economic Integration	0.00262***
	(0.000475)
Observations	852,469
R-squared	0.757

Regression includes country-pair and country-year fixed effects.
Country Pair Clustered Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2.4: Trade Diversion from Sanctions and Threats

Ln(Exports)	(1)
Exporter Imposed San.	-0.205
	(0.161)
Importer Imposed San.	-0.773***
	(0.179)
Exporter Threatened San.	0.235*
	(0.122)
Importer Threatened San.	0.014
	(0.145)
Supplier San. Diversion	0.441***
	(0.079)
Buyer San. Diversion	0.404***
	(0.081)
Supplier Threat Diversion	0.356***
	(0.063)
Buyer Threat Diversion	0.352***
	(0.066)
Economic Integration	0.00262***
	(0.000475)
Observations	852,469
R-squared	0.748

Regression includes country-pair and country-year fixed effects.
Country Pair Clustered Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2.5: Heterogeneous Threat Diversion

	Imposed Sanctions	Threatened Sanctions
Intense Exporter San.	-1.040	1.630**
	(0.867)	(0.740)
Moderate Exporter San.	-0.105	0.248
	(0.224)	(0.178)
Light Exporter San.	-0.0590	0.491
	(0.325)	(0.305)
Intense Importer San.	-1.978**	2.635**
	(0.905)	(1.038)
Moderate Importer San.	-0.741***	-0.110
	(0.236)	(0.199)
Light Importer San.	-0.0277	0.141
	(0.337)	(0.314)
Intense Buyer Div.	2.432*	-1.565
	(1.449)	(1.749)
Moderate Buyer Div.	0.428	0.230
	(0.385)	(0.257)
Light Buyer Div.	-0.293	-0.0801
	(0.396)	(0.355)
Intense Supplier Div.	1.616	-1.270
	(1.053)	(1.167)
Moderate Supplier Div.	0.529*	-0.135
	(0.310)	(0.240)
Light Supplier Div.	-0.201	-0.352
	(0.346)	(0.313)
Economic Integration	0.00262***	
	(0.000475)	
Observations	852,469	
R-squared	0.757	

This table presents the results of a single regression, with coefficients corresponding to imposed sanctions or trade diversion presented in the first column, and coefficients corresponding to threatened sanctions or threat diversion are presented in the second column.
Regression includes country-pair and country-year fixed effects.
Country Pair Clustered Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

2.9 Data Appendix

The TIES dataset divides imposed and threatened sanctions into 10 categories, of which I make use of 9. These sanctions are summarized in Table 2.1. The tenth category which I exclude here is a generic "other" category for cases which don't fit into any of the other designations. Because of the unusual nature of these events, and because there are only five such events in the dataset they are dropped from the analysis. Sanction threats have an additional "unspecified" threat category which is not analyzed here. Data is reported in terms of "sanction cases," defined as all of the sanctions imposed or threatened by a country or group of countries on a target over a specific issue, which are transformed into a set of panel dummy variables for each type of threatened or imposed sanction

A limitation this imposes is that the data does not report data on the timeline of when specific sanctions or threats are made. Instead the dataset reports when a *sanctioncase* begins and ends. If a sanction regime starts as a travel ban, leads to import restrictions and later becomes an embargo the sanction case would begin at the imposition of the travel ban and end when the embargo is lifted. Dummy variables for travel ban, import restrictions and embargoes associated with that sanction case and would all be coded 1 for the entire sanction case duration.

For a modern example, we can examine the recent sanctions against Iran. The United States and others have instituted numerous sanctions against Iran because of its nuclear weapon program over a period of years. All of those sanctions relating to Iran's nuclear program would be counted as a single sanction case. The United States also have sanctions against Iran for other actions in the region, such as its support for rebels, terrorist organizations and other groups. These foreign policy sanctions are unrelated to the issue of nuclear weapons, and thus would constitute a separate sanction case.

In order to avoid potential problems of endogeneity, sanctions which are threatened or imposed due to trade or factors relating to trade are removed from the dataset for a total of 671 sanction cases. Of these 503 involved threats of sanctions while 398 cases resulted in sanctions actually being imposed. There are 273 sanction cases which end at the threat stage with no sanction being imposed and there are 168 cases of sanctions being imposed with little or no threat or warning before it.

The average duration of a sanction case is 4.2 years while sanction cases that lead to sanctions being imposed are slightly longer, averaging 4.6 years, with maximum duration varying drastically. Some sanction cases last only a few months, while other cases like the United State's embargo of Cuba span nearly the entire dataset, with a maximum duration of 46 years.

Chapter 3 Detecting Cheating During Economic Sanctions

3.1 Introduction

Economic sanctions are foreign policy tools meant to inflict economic harm against a country or governments in order to affect their foreign or domestic policies. In order to be effective it is necessary for the sanctions to be adhered to, as even relatively small actions that undercut a sanction regime can give enough relief to change the marginal decision from giving in to the sanctioner's demands to resisting the sanction. Blatant sanction dodging can also communicate a lack of commitment to the sanctions, making them ineffective even if there is significant damage being caused to the target economy.

North Korea is a modern example where sanction regimes are theoretically very restrictive, but there are allegations that China does not actually enforce the economic sanctions it has imposed on North Korea. Since China is overwhelmingly North Korea's largest trading partner, if there is sanction dodging between China and North Korea the entire international sanction regime is ultimately ineffective.(Klein, 2018) Another example include firms and countries going around their own sanctions against Iran over its nuclear program, in particular purchasing Iranian oil in violation of UN sanctions.(Gladstone, 2014)

Being able to detect this sort of cheating is therefor important for countries who wish to maintain pressure on targeted countries to ensure the sanction is actually achieving its stated goals. This chapter contributes to the literature by using taking advantage of the different incentives for actors in the sanctioning country compared to the target country to detect the presence of sanction dodging or some alteration in reporting behavior. A firm in the country imposing the sanctions faces far more scrutiny and penalties for dodging the sanction and being caught, as they are more directly under the jurisdiction of the sanctioner. Conversely, firms and individuals in the target country have much less need to hide their activities from the perspective that being caught is much less likely to lead to penalties, and might lead to an improvement in reputation as heroes attempting to subvert hostile actions from foreign governments.

This difference in reporting incentives could lead to changes in reporting behavior based on whether the reporter is in the country imposing the sanction versus the country being targeted by a sanction. A firm in the sanctioning country will attempt to hide its trade with the target country, to avoid penalties from the government. A systematic change in difference between what one country reports as exports and its trade partner reports as imports during a sanction event could be evidence of firms cheating during the sanctions.

There is a natural difference between what one country reports as exports, which are typically measured "Free on Board" (FOB) versus imports which are reported "Cost, Insurance and Freight" (CIF). Free on board measures of trade include the value of the item being transported and the cost of moving the goods onto the trans-

port. In contrast CIF trade measures include the value of the item being transported, the cost of moving the goods onto the transport and also the cost of transporting the goods to the destination country. This includes shipping costs and insurance fees. Over time the difference between FOB exports and CIF imports should be relatively constant between countries, as distance between countries and general cost of insuring don't change. This means that a statistically significant increase or decrease in the difference between one country's exports and the others reported imports during a sanction event is evidence that there is either sanction cheating or at least a change in reporting behavior.

Section 2 gives an overview of other chapters that have studied the topic of sanction busting and cheating in the literature. Section 3 of the chapter describes the data used to analyze the difference between exports and reported imports during sanction events and how these things are measured.

Section 4 uses a panel-gravity approach to estimate the average impact on the difference between exports and reported imports as a result of imposed sanction events. I find that during an importer imposed sanction event, the gap between logged imports and reported exports decreases by an average of 9.39%, significant at the 5% level. During exporter imposed sanction events the sign is reversed, with the gap growing 7.75%, significant at the 5% level. Both of these are consistent with sanction cheating based on the different incentives and penalties faced by firms depending on whether they are in the country imposing the sanction or not.

Also in Section 4 is an analysis of how reporting behavior changed based on heterogeneous sanction types being imposed. I find that based on the coefficient estimates, the more intense the sanction the greater the change in reporting behavior. The signs of the coefficients are all consistent with the same sanction cheating behavior when using aggregated sanction dummies. The coefficients for importer imposed sanctions are not individually significant, but are jointly significant. Intense exporter sanctions are associated with an average 28.02% increase in the gap between reported log imports and log exports, significant at the 5% level. In general this is additional support for the observed change in reporting behavior consistent with sanction cheating.

Section 5 and Section 6 analyze whether there is a change in reporting behavior during sanction threats or with third-party countries not directly involved in the sanction. Since there is no change in reporting behavior detected during sanction threats or with third party nations, there is stronger evidence that the results of the previous section are because of a change in reporting behavior related to the legality of trade between the sanctioner-target pair and not some unrelated third factor.

Section 7 uses the procedure developed to examine how firms in the United States behave during sanction events in particular. I find that when the United States imposes sanctions on another country, there is no evidence of cheating by firms exporting to the targeted nation. However there is a change in the reporting behavior of firms importing from the targeted nation that indicates that there is cheating by American firms.

Section 8 is conclusion and discussion of the results. Finally, Section 9 contains the tables of results.

3.2 Literature: Sanction Busting and Cheating

Sanction cheating is explored in several chapters in the literature, but typically in terms of third party countries coming in to take up the slack caused by sanction events. Drezner (2000) studies the issue of multilateral sanctions as a cooperation problem, and finds that third party countries are likely to engage in sanction busting when there is not a strong enforcement mechanism to force compliance with the sanction regime. A similar result is found by Early (2009), which examines whether a sanctioning country's allies step in to take advantage of the disruption caused be a sanction by increasing their trade. They find that the United State's allies are most likely to bust a sanction regime by trading with the targeted country, likely using the alliance as a cover for commercial gain.

The question of sanction busting by firms and individuals was studied in the context of the Chinese sanction against Norwegian salmon is studied by Chen and Garcia (2016). The chapter finds that this sanction did cause market distortions, but found evidence that individuals evaded the sanctions by rerouting, smuggling and other activities related to black market trading. Another example of a chapter that studies whether firms in the sanctioning country or countries engage in sanction busting behavior is Vigna and Ferrara (2010), which studies arms embargo violations using stock prices. By studying random shocks in conflict intensity, such as major victories by the rebels or regime forces, they find that shocks that indicated an increase in conflict intensity led to increased stock prices for certain arms companies, indicating that there might have been insider knowledge about those companies subverting the embargo.

To study the question of sanction cheating more broadly I will follow Kellenberg and Levinson (2016), which used systematic differences between Country A's reported exports and Country B's reported imports to find evidence of cheating during changes to tariff regimes. Because sanctions are essentially extreme forms of tariffs it is consistent to use this methodology to examine whether there is similar cheating during sanction events.

In effect what I wish to see is the behavior of firms during sanction events, to see how common it is for there to be cheating during sanction events. Since that is not possible to observe directly, I will use the difference in reported trade flows to act as an indicator for it. As in Kellenberg and Levinson (2016) I will have a gravity equation that accounts for the primary determinants of reporting, with a treatment variable in the form of a sanction dummy. By comparing the sign and magnitude of the coefficient on sanction dummy to which direction the sanction is going, I will be able to say that there is a change in reporting behavior consistent with sanction cheating.

3.3 Data

The dataset used in this chapter is an imbalanced panel based on the IMF's Direction of Trade Statistics (DOTS). This is combined with sanctions data defined by the Threat and Imposition of Economic Sanctions dataset. The combined dataset con-

tains information on 175 countries over the period 1950-2005, with a total of 16,180 country pairs. The total combined sample size of 282,625 country-pair-years

The dependent variable in this dataset comes from the IMF's Direction of Trade Statistics (DOTS). The Direction of Trade Statistics dataset is a bilateral panel dataset covers 236 countries and territories over the period from 1948 to 2016. It includes data on what each country reports as exports and what their trade partners report as imports, and the reverse. The primary dependent variable from this is the difference between the natural log of what country A reported as their imports and the natural log of what country B reported as their exports. Summary statistics for this data can be found in Table 3.3.

Data on sanctions comes from version 4 of the Threat and Imposition of Economic Sanctions database. This dataset covers sanctions beginning during the period from 1945 to 2005 by examining government documents, legal documents and news reports. It covers sanctions imposed by any country on any other country, to generate as complete a dataset as possible.

The categories of sanctions are described in Table 3.1. I omit miscellaneous "other" sanction events that don't fit into any of the other 9 sanction categories because there are only 5 such events and there is little connection between them. In order to avoid as much endogeneity as possible I also exclude those sanctions which are directly related to trade disputes or trade wars.

Because some categories are small, when examining the impact of heterogeneous sanctions these categories are aggregated into intense (blockades and embargoes), moderate (partial embargoes, import restrictions and export restrictions) and light (travel bans, asset freezes, suspension of economic agreement and termination of foreign aid). Summary statistics for the number of sanction observations can be found in Table 3.2.

All sanctions threatened and imposed on a country over a specific geopolitical issue are grouped together into a "sanction case," which is how the TIES dataset is reported. However this does impose a limit on accuracy because if a sanction case begins with a travel ban and ends with an embargo, it is counted as if the travel ban and embargo were imposed concurrently for the entire duration. [1] However there is clear information that differentiates the threat stage of a sanction event from the imposed stage.

On average a sanction case lasts 4.2 years, while including those cases which did not go past the threat stage. Counting only sanction cases where sanctions were imposed, the average duration is slightly larger at 4.6 years. The shortest sanction cases last less than a year, but certain sanctions where both sides reach a political stalemate can last decades, such as the American embargo against Cuba. The longest duration measured for a sanction is 46 years.

Data on the level of economic integration between two countries, including free trade agreements, customs unions and common markets are given by the National

[1] For an example of what this means, all of the sanctions that the United States and the United Nations imposed against Iran over their nuclear program are counted as a single sanction case, meaning that the dates for when the asset freezes, oil embargoes and other sanctions were imposed is not found in the dataset.

Science Foundation-Kellog Institute Database on Economic Integration Agreements. This dataset covers 195 countries from 1950-2012, and measures the level of economic integration between country pairs during a given year on a 0-6 scale, with 0 indicating no trade agreement and 6 indicating a full economic union with unified monetary, fiscal and immigration systems. Free trade agreements are ranked at 3, in the center of the scale.

3.4 Detecting Sanction Cheating

To detect the presence of cheating, I follow Kellenberg and Levinson (2016) by using the difference between one country's imports and the partner country's exports. This difference should be positive on average, because typically the reported value of imports is higher than the corresponding reported value of exports. This is because imports are reported in Cost, Insurance and Freight (CIF), which include the value of the goods being transported in addition to the cost of loading the goods onto a transport, the cost of shipping and any insurance or fees paid to get the goods to the target country. Exports are typically reported Free on Board (FOB) which only include the value of the goods being transported and the cost of moving those goods onto a transport. Both of these are "Incoterms" defined by the International Chamber of Commerce as approved rules of trade, which defines CIF trade as a situation where the seller is responsible for costs of delivering goods to the transport as well as the costs of bringing the goods to the destination country, along with insurance fees to cover the risk of loss or damage during transportation. All of these additional costs added to the value of reported imports explain why they are typically higher than reported exports.

This difference should be relatively stable over time, as transport costs depend heavily on distance traveled and loading costs which are determined by infrastructure. Insurance costs are aimed at covering damage during transport which primarily occur because of weather or shipboard operations, both of which should not change dramatically for a given transport route.

During a sanction event there are different penalties for being caught depending on which country a firm is located in that could lead to the difference between reported imports and exports to change. In the country imposing the sanction, being caught breaking the sanction will be harshly punished, because it is breaking a law set by the government and providing aid to a geopolitical rival. Even in terms of public perception, being caught purchasing Iranian oil in the United States would have major repercussions for the public image of the firm. Thus there is incentive to stop trading with the target of the sanction, or at least to stop reporting imports from the target.

Conversely, being caught breaking the sanction in the targeted country will likely be met with little punishment or even positive support. The sanction is something being imposed on the target, not a domestic policy. Because of this, being caught trading with the sanctioning country is much less likely to be punished, and might even be supported by the targeted government as a form of resisting the foreign influence. Therefore there is less need to hide trade flows in the target nation, because

those firms do not face personal risk of prosecution or negative public perception in their own country.

The first regression examines the difference between country i's reported log exports and country j's reported log imports, with the variables of interest being the presence of an exporter or importer imposed sanction.

$$ln(M)_{i,j,t} - ln(X)_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + \beta_1 S^X_{i,j,t} + \beta_2 S^M_{i,j,t} + \beta_3 EIA_{i,j,t} + \epsilon_{i,j,t} \quad (3.1)$$

where $ln(M)_{i,j,t}$ is natural log of country i's reported imports from country j and $ln(X)_{i,j,t}$ is the natural log of country j's reported exports to country i during time period t. To control for distance and other fixed trade costs between countries I include time invariant country pair fixed effects, $\alpha_{i,j}$. This also captures the general importance of trade between two given countries and a measure of how important their long-term geopolitical relationship is. I use country-year fixed effects $\alpha_{j,t}$ and $\alpha_{i,t}$ that will capture increases in transport fees and insurance costs caused by policy shocks or government actions. This will at least partially control for those policies and shocks that increases tension between countries and adds uncertainty to the international market. To capture an important time-varying trade policy between countries I use the NSF-Kellogg Institute level of Economic Integration Agreement, $EIA_{i,j,t}$. Sanctions are captured by $S^X_{i,j,t}$, a dummy variable which takes the value of 1 when country i is imposing some kind of sanction on country j. Importer imposed sanctions are captured by $S^M_{i,j,t}$, which takes the value of 1 when country j is imposing some kind of sanction on country i.

Sanction cheating, or at least changes in reporting behavior will be represented by a statistically significant coefficient on the sanction variables of the regression. As discussed previously, firms in the sanctioning country have greater incentive to hide their true trade flows to avoid prosecution and penalties, while firms in the target country have much less direct risk from being caught subverting the sanction regime. Taking that difference in risk into account, if the sanction is being imposed by the importing country, the coefficient is expected to be negative. Because reported imports are expected to decrease more than the reported exports, the difference between imports and exports will shrink. Conversely, if the exporting country is imposing the sanction the coefficient is expected to be positive. The natural difference between imports and reported imports will grow larger, as firms in the exporting country hide or misreport their trade flows while firms in the importing country do not face as much direct consequence for being caught.

The results are found in Column 1 of Table 3.4, which supports the hypothesis that reporting behavior changes based on the origin of the sanction policy. If there is an importer imposed sanction, the coefficient of -0.0986 indicates the difference between exports and reported imports decreases by approximately 9.86%, significant at the 5% level. For comparison in Kellenberg and Levinson (2016) they study the change in reporting behavior because of increases in importer tariffs. Looking at their model with country-year fixed effects which is the closest to the model used here, they found

that importer tariffs had a coefficient of -1.22. Although much larger, their variable of interest is a weighted level of tariffs rather than a dummy variable. Given the standard deviation of their tariff variable is 0.04, the presence of any kind of sanction results in the same change in reporting behavior as a two standard deviation increase in tariffs. For a country pair with the mean difference between log imports and log exports of 0.174, the presence of an importer imposed sanction would decrease the gap by more than half. This provides strong evidence that there is a major change in reporting behavior in line with the theory that firms in the sanctioning country hide their true trade flows more than firms in the target country.

Similarly, exporter imposed sanctions has a coefficient of 0.0746 indicating that difference in that country's exports and the targeted country's imports increases by approximately 7.46%, which is significant at the 5% level. This is again in line with the previous theory that firm location matters for reporting behavior. In this case the firms in the exporting country have greater incentive to hide their true trade flows. This results in the difference between reported imports and exports increasing, matching the prediction made previously.

Thus there is strong support that there is sanction cheating, or at least changes in reporting behavior that would indicate cheating, in line with the different reporting incentives described. Both of these results are robust to the exclusion of the top 1% and bottom 1% of log difference results, indicating that this is not being driven by outliers in the data.

Cheating during Heterogeneous Sanctions

As an additional confirmation the same tests are done, but with sanctions split into three tiers for intense, moderate and light sanctions. In theory the more intense a sanction event is, the more incentive there is to cheat and take advantage of the market distortion. But there is also greater danger in subverting intense sanctions such as embargoes, which typically have greater penalties compared to a travel ban or import restriction. Because we have evidence that sanctions in general do change reporting behavior, looking at different tiers of sanctions could also yield interesting information. To analyze this equation 3.1 is modified with the inclusion of new dummy variables that take the value of 1 in the presence of a certain tier of sanction. For the difference in reported imports and exports this is given by:

$$ln(M)_{i,j,t} - ln(X)_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + \beta_1 S_{i,j,t}^{X(L,M,I)} + \beta_2 S_{i,j,t}^{M(L,M,I)} \tag{3.2}$$

$$+\beta_3 EIA_{i,j,t} + \epsilon_{i,j,t}$$

where the variables are the same as equation 3.1 but $S_{i,j,t}^{X}(L,M,I)$ is a vector of three dummy variables taking the value of 1 if the exporting country i is imposing an intense, moderate or light sanction on country j, respectively. The reverse is true for $S_{i,j,t}^{M}(L,M,I)$, a vector of three dummy variables taking the value of 1 if the importing country j is imposing an intense, moderate or light sanction on country i.

The results of this are given in column 1 of Table 3.5. The signs are the same as Table 3.4, where exporter imposed sanctions are associated with positive coefficients and importer sanctions are associated with negative coefficients. Intense sanctions are associated with larger changes in the difference between exports and reported imports. Intense exporter sanctions are associated with an approximately 24.7% increase in the difference between exports and reported imports, significant at the 5% level. Again comparing this result to Kellenberg and Levinson (2016), an intense exporter sanction results in the a change in reporting behavior similar in magnitude to the largest tariff observed in that chapter's dataset. This indicates that much of the negative relationship found in the previous section is being driven by intense sanctions.

Importer Intense and Importer Moderate sanctions are not individually significant, but are jointly significant at the 10% level, with coefficients indicating a 14.9% increase in the difference between exports and reported imports and a 7.39% increase, respectively. Overall this gives support to the theory that more intense sanctions leads to greater changes in reporting behavior based on the location of the reporting firm.

From here it is clear that even accounting for different types of sanctions there is evidence of cheating, or at least altered reporting behaviors as a result of imposed economic sanctions.

3.5 Misreporting Behavior During Sanction Threats

One possible cause of the previous results is that rather than a change in reporting behavior caused by sanction cheating, it might rather be a result of the sanction regime changing the costs for transporting goods between the sanctioner/target country pair in a systematic way. A sanction regime indicates an increase in tensions between the countries and are often the result of policy choices of the target country. Although the country-year fixed effects $\alpha_{j,t}$ and $\alpha_{i,t}$ can partially control for this in terms of policies specific to country j or country i, there are potential bilateral policies that could lead to an increase in insurance costs and fees that might be driving the previous results rather than it being evidence of cheating.

However if the previous results are being driven by changes in transport and insurance costs caused by policies and increased uncertainty not picked up by the country year fixed effects, these should also be present when sanctions are being threatened. If there are sanctions being threatened, then there is a risk of sanctions being imposed suddenly and relevant in-transit shipping might be caught out, increasing insurance costs and required fees. On the other hand, if the results are being driven by firms subverting the sanctions then there would be no significant effect during the sanction threat period. Before the sanction is imposed, trade between the countries is legal and there is no incentive to change reporting behavior.

I will therefore run the previous regression again but include exporter threats and importer threats in addition to imposed sanctions to test whether the prior results are driven by systematic changes to insurance and transport costs or whether it is driven by firms changing reporting behavior which might indicate cheating.

$$ln(M)_{i,j,t} - ln(X)_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + \beta_1 S^X_{i,j,t} + \beta_2 S^M_{i,j,t} \tag{3.3}$$

$$+\beta_3 T^X_{i,j,t} + \beta_4 T^M_{i,j,t} + \beta_5 EIA_{i,j,t} + \epsilon_{i,j,t}$$

Where the variables are the same as equation 3.1 but where $T^X_{i,j,t}$ represent exporter threats, taking the value of 1 if country i is threatening country j with sanctions during period t. The reverse is importer threats $T^M_{i,j,t}$, which takes the value of 1 if country j is threatening country i with sanctions during period t.

If the coefficients on the threat variables are similar to the coefficients for the imposed sanctions, that indicates that the results are caused by shocks to trade costs and insurance fees as a result of the sanction events. However if the threat coefficients are insignificant, that indicates that the results from the previous sections are being driven by a change in reporting behavior that indicates cheating behavior.

The results of this analysis are given in column 1 of Table 3.6. The the coefficients on the threat variables are statistically insignificant, indicating that there is no significant change in the difference between reported imports and exports during a sanction threat. In addition, the coefficients for imposed sanctions are not significantly changed from 3.4, with both importer and exporter imposed sanctions maintaining their sign, significance and are of similar magnitude. Taken together this means that the inclusion of the threat variables does not affect the results from the prior regressions in any significant way.

This indicates that the results are being driven by reporting behavior changes during the sanction event, meaning it is related to the legality of trade between the two nations. I also conclude that these results are not being driven by systematic changes to insurance costs or transport fees, because if it were then a similar changes in the difference between reported imports and exports would be found during sanction threats.

3.6 Third Party Misreporting

As an additional test I examine whether third party countries that are not involved in the sanction regime change their reporting behavior with targeted countries during the sanction event. If the previous results are being driven by something other than reporting behavior changes because of the legal penalties of breaking a sanction, then it should also be observed for the targeted nations other trade partners. If there was a general change in reporting behavior for example that was not focused on the sanction-target pair, but was instead a general result of policy this could explain the previous observations and provide evidence against sanction cheating being the primary driver of my results. It is not illegal for third parties to trade during a sanction event, and so if this change in the difference in reported imports and exports changes with third party nations as well then we can conclude sanction cheating is not the primary cause.

To study this question I modify equation 3.1 with measures of 3rd party purchases and 3rd party sales to the target nation during sanction events.

$$ln(M)_{i,j,t} - ln(X)_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + \beta_1 S^X_{i,j,t} + \beta_2 S^M_{i,j,t} \tag{3.4}$$

$$+\beta_3 D^X_{i,j,t} + \beta_4 D^M_{i,j,t} + \beta_5 EIA_{i,j,t} + \epsilon_{i,j,t}$$

Where everything is identical to equation 3.1, with the addition of third party sales given by $D^X_{i,t}$, which takes the value of 1 for country j's top 10 suppliers not involved in the sanction during a sanction imposed on it during period t. If there is some other effect unrelated to the legality of trade during the sanction that is driving the previous observed changes in reporting behavior, then the coefficient on this term should be negative and similar to the coefficient for importer imposed sanctions. The reverse for third party purchases is given by $D^M_{i,t}$, which takes the value of 1 for country i's top 10 customer nations not involved during sanction events where country i has a sanction imposed on it. Again if there is some factor not related to sanction cheating driving prior results then the coefficient on this variable should be positive and similar to the coefficient for exporter imposed sanctions.

The results of this regression are given in column 1 of Table 3.7. The coefficients for 3rd party sales and 3rd party purchases are both close to zero and highly insignificant, indicating that there is no change in the difference between reported imports and reported exports with those third parties and the target nations during sanction events. The coefficients on importer imposed and exporter imposed also remain consistent in sign and magnitude to previous regressions, indicating that accounting for these third parties does not alter the original observations.

Based on this I conclude that there is not some general factor affecting reporting behavior by the target of a sanction event and all of its trade partners, but it is specifically associated with the sanctioner-target country pair. In addition the change in reporting behavior is consistent with the different incentives and penalties associated with whether a firm is located in the country imposing the sanction or the target of that sanction. I find this to be strong evidence of sanction cheating, or at least changes in reporting behavior that would be consistent with sanction cheating. There might be an argument that during intense sanctions the sanctioning country might use its maximum political influence that would incite third party countries to change their reporting behavior, but I don't find significant evidence for this either.

3.7 Specific Country Behavior

By using the difference between CIF Imports and FOB Exports as the dependent variable in a panel gravity model I have gathered evidence that in general there is cheating during sanction events, or at least changes in reporting behavior that would indicate the presence of sanctions cheating. However this same process can also be used as a tool to study behavior of specific countries. I will examine the USA's

sanction events as an example of what this procedure could be used for, by augmenting equation 3.1 with new dummy variables interacting the sanctions dummies with interaction terms for the country.

$$ln(M)_{i,j,t} - ln(X)_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \alpha_{j,t} + \beta_1 S^X_{i,j,t} + \beta_2 USA^{San/Ex}_{i,j,t} \tag{3.5}$$

$$+\beta_3 USA^{Tar/Imp}_{i,j,t} + \beta_4 S^M_{i,j,t} + \beta_2 USA^{San/Imp}_{i,j,t} + \beta_3 USA^{Tar/Ex}_{i,j,t} + \beta_5 EIA_{i,j,t} + \epsilon_{i,j,t}$$

Where the variables are the same as equation 3.1, but augmented with interaction terms for the potential cases of the USA's involvement, whether they are the exporting country i (Ex), the importing country j (Imp), imposing a sanction (Imp) or being targeted by a sanction (Tar). This means that $USA^{San/Ex}_{i,j,t}$ is a dummy variable that takes the value 1 if the exporting country i is the United States and imposing a sanction on country j in time period t. $USA^{Tar/Imp}_{i,j,t}$ is a dummy variable that takes the value 1 if the importing country j is the United States and is being targeted by a sanction from country j in time period t. $USA^{San/Imp}_{i,j,t}$ is a dummy variable that takes the value 1 if the importing country j is the United States and imposing a sanction on country i in time period t. Finally $USA^{Tar/Ex}_{i,j,t}$ is a dummy variable that takes the value 1 if the exporting country i is the United States and is being targeted by a sanction from country j in time period t.

Results of this regression are found in 3.9, sorted so that the country interaction term is with the standard sanction dummy for easier comparison. I focus here on the behavior of American firms when the US is imposing sanctions on a target country. To find the effect when the USA is the exporter imposing a sanction on some target country, I add the coefficient for Exporter Sanction to the USA Sanctioner / Exporter coefficient. Thus the total impact is 0.142 - 0.145 = -0.003, or negative and close to zero. Both variables are significant, at the 1% and 5% level respectively. This means that there is no shift in the gap between imports and reported exports when the USA is imposing sanctions as an exporter, meaning that for the USA in this case there is no evidence of cheating or changes in reporting behavior.

When the USA is the importer targeting another country with a sanction, then the total effect is adding to together the importer sanction coefficient and the coefficient for the USA Sanctioner / Importer variable. Although neither coefficient is statistically significant at the usual levels, jointly they are significant at the 5% level. Adding their coefficients together -0.036 - 0.129 = -0.165, or the gap between imports and reported exports shrinks. This indicates that imports are falling faster than exports, meaning that American firms are hiding their imports relative to what firms in the exporting country are reporting. Thus it seems that American firms change their reporting behavior in such a way that is consistent with sanction cheating when the US tries to prevent goods coming into the country.

In summary, it appears that American firms obey sanction restrictions in terms of sales to the target country. However, American firms do exhibit changes in reporting behavior consistent with cheating when they are importing goods from countries targeted by US sanctions.

Another country used for this is Russia, with the results given by 3.10. By contrast to the United States, where firms tended to respect government restrictions stating not to sell to foreign governments, in Russia there seems to be strong evidence of sanction cheating on the part of exporters. There is a 0.0733 coefficient for exporter imposed sanctions, significant at the 5% significance level. In addition, Russia imposing sanctions as an exporter causes the gap between reported log imports and reported log exports to increase by a further 0.667, significant at the 1% level. Even when the central government restricts sales of goods, firms continue to sell at a rate above other countries.

There is also evidence that Russian firms continue to import when their government is trying to restrict imports at a rate consistent with other countries. The coefficient on importer imposed sanctions in this regression is -0.099, significant at the 1% level. The coefficient for Russia specifically imposing sanctions as an importing country is positive, but very imprecisely measured and not statistically significant.

Combined this gives an indication that Russian firms do not follow directives from the government. US firms do not sell to countries that are being sanctioned by the US government, but Russian firms will sell to countries being sanctioned by the Russian government. Firms in both countries will continue to buy from firms under sanction, or at least reporting behavior in both countries change in a way consistent with cheating the sanctions.

3.8 Conclusion

This chapter examined whether or not there is sanction cheating during economic sanctions by firms in the sanctioning country subverting the sanction regime. I did this by examining the difference in what one country reported as imports and what a partner country reported as exports to see if there was a change in reporting behavior during sanction events. Theoretically this difference should change depending on where the sanctions originate, in the exporting country or the importing country, based on the incentives and penalties for being caught breaking the sanction. Firms in the country where the sanction originates face far higher costs and penalties for being caught subverting the sanction, which is breaking the law, versus firms in the country being targeted. In the target countries subverting the sanction might even be encouraged as a form of resistance against foreign influence.

I ran regressions using the difference between the natural log of one country's reported imports and the corresponding trade partner's logged reported exports. This difference should be positive generally, as imports include the value of transporting the goods, insurance and other fees. I find that during a sanction imposed by the importing country, the difference between reported logged imports and logged exports falls by a coefficient of -0.0986, which is significant at the 5% level. This is equivalent to cutting the average gap between reported imports and exports in half, and corresponds to a reporting behavior change equivalent to the change found after a two standard deviation increase in tariffs as found by Kellenberg and Levinson (2016). It is also in line with the theoretical prediction, where firms in the importing country face prosecution for being found out subverting the sanctions and so reported

trade falls greatly. However, firms in the exporting country do not face those same threats of prosecution and so do not hide their existing trade as thoroughly. This is reversed for the exporter imposed sanction, where the gap between reported imports and exports increased by a coefficient of 0.746, also significant at the 5% level. This is again a major change in reporting behavior comparable to the change in reporting behavior observed by Kellenberg and Levinson (2016) for a major increase in tariffs, that matches the predicted result based on the incentives for firms in the different countries.

These results do not appear to be driven by shocks to insurance costs or transportation fees as a result of uncertainty during the economic sanction, as this uncertainty would also exist during the period of time where sanctions are being threatened and could be imposed at any time. No change in reporting behavior is found during sanction threats. Similarly there is not some general policy change that occurs during sanctions to change reporting behavior by the target nation and its trade partners generally, the change in reporting behavior is only observed between the sanctioner-target pair. These results are also not driven by large outliers in the data, as removing them does not substantively change the coefficients or significance of the results.

Based on this I conclude that I have detected cheating during sanction events, or at least changes in reporting behavior that strongly suggest cheating. Trade flows reported by the sanctioning country fall more relative to trade flows reported by the target country, consistent with firms in the country imposing the sanction being careful to avoid being caught subverting the sanction. Meanwhile firms in the target face much less pressure to hide their true trade flows, so their reported trade flows do not fall as much relative to trade flows reported by the sanctioning country. Therefore it seems that firms do in fact cheat during sanctions in a general way that be observed in aggregate data examining a wide variety of sanctions over many decades, or at least change their reporting behaviors in ways that imitate what would be occurring if there were cheating.

3.9 Tables and Figures

Table 3.1: Sanction Descriptions

Sanction Type	Description	Imposed Cases
Blockade	Imposer attempts to prevent all countries from economic interactions with target country.	37
Embargo	Imposer cuts all economic activity between itself and the target.	51
Partial Embargo	Imposer cuts economic activity in certain sectors with the target country.	118
Import Restriction	Imposer restricts imports from the target country.	447
Export Restriction	Imposer restricts exports to the target country.	58
Withdrawal from EA.	Imposer withdraws from previously negotiated economic arrangements.	55
Asset Freeze	Imposer seizes all or part of the target state's assets in the imposing country's jurisdiction.	34
Reduction in Foreign Aid	Imposer reduces or terminates foreign aid to the target country.	191
Travel Ban	Imposer bans travel to and from the target country, either in general or for specific individuals.	55

This table is based on the Threat and Imposition of Sanctions categories. The number of imposed sanction events are reported in the third column.

Table 3.2: Sanction Summary Statistics

Variable	Mean	Std. Dev.
Sanction	0.0056	0.0748
Intense San.	0.0008	0.0295
Moderate San.	0.0035	0.059
Light San.	0.0041	0.0639
Threat	0.005	0.071

These statistics are based on the 282,625 observations of the combined dataset. The mean of the sanctions and threat are the percentage of country-year observations featuring a sanction or threat.

Table 3.3: Trade Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Log Imports	15.766	3.309	-3.78	26.9
Log Exports	15.592	3.408	-5.74	26.74
Log Difference	0.174	1.556	-14.853	20.193

These statistics are based on the 282,625 observations of the combined dataset.

Table 3.4: Imposed Sanction Cheating

Importer Sanction	-0.0986**
	(0.0383)
Exporter Sanction	0.0746**
	(0.0312)
Trade Agreement	-0.00273
	(0.00582)
Observations	282,582
R-squared	0.495

Country Pair Clustered Robust standard errors in parentheses
Regression includes country-pair and country-year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.5: Tiered Sanction Cheating

Intense Importer San.	-0.149
	(0.107)
Moderate Importer San.	-0.0739
	(0.0464)
Light Importer San.	-0.0488
	(0.0514)
Intense Exporter San.	0.247**
	(0.124)
Moderate Exporter San.	0.0302
	(0.0401)
Light Exporter San.	0.0433
	(0.0390)
Trade Agreement	-0.00276
	(0.00582)
Observations	282,582
R-squared	0.495

Country Pair Clustered Robust standard errors in parentheses
Regression includes country-pair and country-year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.6: Reporting During Sanction Threats

Importer Sanction	-0.0785*
	(0.0411)
Exporter Sanction	0.0887**
	(0.0410)
Imp. Sanction Threats	-0.0368
	(0.0466)
Exp. Sanction Threats	-0.0245
	(0.0517)
Trade Agreement	-0.00269
	(0.00582)
Observations	282,582
R-squared	0.495

Country Pair Clustered Robust standard errors in parentheses
Regression includes country-pair and country-year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.7: 3rd Party Reporting Changes

Importer Sanction	-0.100***
	(0.0386)
Exporter Sanction	0.0761**
	(0.0313)
3rd Party Sales	-0.0147
	(0.0186)
3rd Party Purchases	0.00588
	(0.0192)
EIA	-0.00270
	(0.00581)
Observations	282,582
R-squared	0.495

Country Pair Clustered Robust standard errors in parentheses
Regression includes country-pair and country-year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.8: Heterogeneous 3rd Party Reporting Changes

Importer Sanction	-0.102***
	(0.0386)
Exporter Sanction	0.0740**
	(0.0314)
3rd Party Sales (Int. San)	0.00728
	(0.0468)
3rd Party Sales (Mod. San)	0.00442
	(0.0214)
3rd Party Sales (Light San)	-0.0466
	(0.0313)
3rd Party Purchases (Int. San)	-0.0674
	(0.0519)
3rd Party Purchases (Mod. San)	-0.00603
	(0.0216)
3rd Party Purchases (Light San)	0.0232
	(0.0260)
Trade Agreement	-0.00264
	(0.00582)
Observations	282,582
R-squared	0.495

Country Pair Clustered Robust standard errors in parentheses
Regression includes country-pair and country-year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.9: USA Cheating Behavior

Exporter Sanction	0.142***
	(0.0473)
USA Sanctioner / Exporter	-0.145**
	(0.0609)
Importer Sanction	-0.0355
	(0.0515)
USA Sanctioner / Importer	-0.129
	(0.0788)
USA Target / Importer	-0.0544
	(0.197)
USA Target / Exporter	-0.262
	(0.174)
Trade Agreement	-0.00256
	(0.00582)
Observations	282,582
R-squared	0.495

Country Pair Clustered Robust standard errors in parentheses
Regression includes country-pair and country-year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.10: Russia Cheating Behavior

Exporter Sanction	0.0733**
	(0.0313)
Russia Sanctioner / Exporter	0.667***
	(0.140)
Importer Sanction	-0.0990***
	(0.0384)
Russia Sanctioner / Importer	0.272
	(0.180)
Russia Target / Importer	-0.703**
	(0.296)
Russia Target / Exporter	-0.497**
	(0.202)
Trade Agreement	-0.00275
	(0.00582)
Observations	282,582
R-squared	0.495

Country Pair Clustered Robust standard errors in parentheses
Regression includes country-pair and country-year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

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