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Sticks and Stones:

Sanction Threats, Impositions, and their Effect on International Trade

Tristan Kohl and Chiel Klein Reesink

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chapter in forthcoming book *Disrupted Economic Relationships: Disasters, Sanctions, Dissolutions*, Tibor Besedeš and Volker Nitsch (eds), CESifo Seminar Series, The MIT Press, May 2019.

1 Introduction

Economic sanctions¹ have been used throughout modern history and are usually accompanied or preceded by war (Elliott et al. 2008). It was only after the horrors of World War I, that Woodrow Wilson put sanctions on the agenda as a substitute for military aggression. From this moment on, history witnessed an increase in the use of economic sanctions by nation states and supranational institutions such as the United Nations to attain foreign policy goals. According to Kobayashi (2013), the number of sanctions has doubled every decade between 1971 and 2000. The state that, by far, has utilized the sanction policy tool the most is the United States. “In most instances in the post-WWII period where economic pressure was brought to bear against the exercise of military power, the United States played the role of international policeman” (Hufbauer et al. 1990, p. 5).

The increasing frequency with which nations use economic sanctions as policy instrument calls for a better understanding about their economic consequences. However, the

¹ Throughout this paper, we refer to economic sanctions although we use the term interchangeably with “sanctions” for brevity.

effect that sanctions have on bilateral trade flows has received relatively little attention in recent years, despite significant advances in the analytical toolkit commonly applied to this type of research. Moreover, most economic sanction studies only assess the impact of sanctions actually imposed (Lacy & Niou 2004), thereby ignoring how *threatening* to impose sanctions may alter economic agents' actions.

This chapter measures the impact of sanction threats, in addition to sanction impositions, on bilateral trade flows. We show that threats, while often much discussed in media and causing uncertainty to economic agents, do not have a significant impact on international trade. Sanctions, once imposed, do have a detrimental effect on international trade, but the magnitude of these effects is a fraction of what has been documented in the literature.

The remainder of this chapter is structured as follows. Section 2 surveys the literature on the impact of economic sanctions on international trade. Recent improvements to the gravity model of international trade are reviewed in Section 3, along with details of our empirical strategy. Section 4 presents the results and sensitivity analyses. Section 5 discusses our key findings and concludes with pointers for future research.

2 Literature

2.1 Economic sanctions

Morgan et al. (2014, p. 2) define economic sanctions as “actions that one or more countries take to limit or end their economic relations with a target country in an effort to persuade that country to change its policies.” Therefore, a sanction must (a) involve one or more sender states and a target state and (b) be implemented by the sender(s) in order to change the

behavior of the target state.² Actions taken by states that restrict economic relations with other countries for solely domestic economic policy reasons do not qualify as sanctions.³

Economic sanctions are built upon two basic premises (Van Bergeijk 2009). First, sanctions are meant to deprive the target country of (part of) the gains it experiences from international trade and investment. Second, this (threat of) disutility will affect the target's behavior. In other words, economic sanctions reduce welfare in the target country in order to force a change in its behavior. Sanctions can take many forms: tariffs, export controls, embargoes, import bans, travel bans, freezing assets, cutting aid, and blockades; all of which (with the exception of blockages) being legal barriers to trade.

Roughly three categories of sanctions can be discerned: boycotts, embargoes and financial sanctions (Barber 1979; Caruso 2003). A boycott is a restriction of imports of one or more goods from the target country. It is meant to lower demand for the product from the target country. In addition, the import restriction attempts to reduce the foreign exchange earnings of the target country and thus its ability to purchase goods in international markets. These measures are usually deemed ineffective because of the ease with which target countries can circumvent the import restrictions by finding other trading partners or setting up triangular schemes to sell their products.

A sender country may also restrict its own exports to a target country, which is called an embargo. These exports often comprise goods that are of strategic importance to the target country. An example is the 2014 situation in Ukraine, which led to the European Union restricting the export of arms and related materials, technology for military use, energy-related equipment and technology, and oil exploration services to Russia (EU 2015). Financial sanctions are meant to cut off lending and investment in the target country through the international credit markets, but also to freeze the target country's foreign assets.

² Following convention, the sanctioning state is referred to as "sender" and the sanctioned state as "target".

³ For example, if Vietnam decides to place an import tariff on foreign computers to protect its domestic industry, this is not considered an economic sanction.

An economic sanction is an action by state A against state B in order to bring state B's "behavior" in line with state A's view of what that behavior should be. Economic sanctions therefore usually have a desired outcome, namely the change in behavior/policies of the target state. Whether real outcomes meet desired outcomes is questioned and thus, economic sanctions are a constant subject of debate (Kaempfer & Lowenberg 1988). Likewise, sanctions have been subject to a rich literature of scientific inquiry owing to the mixed findings as to their effectiveness in yielding the "desired" outcomes (see, e.g., Van Bergeijk 1989; Hufbauer et al. 1990; Pape 1997; Drezner 2000).

2.2 Datasets on sanctions

Research on economic sanctions has progressed significantly ever since Hufbauer, Schott and Elliott published their work and corresponding dataset (hereafter referred to as HSE) in 1990. Prior to their research, most work focused on a single sanction case and tried to explain why sanctions did and could not work (Galtung 1967; Hoffman 1967; Baer 1973; Schreiber 1973; Olson 1979; von Amerongen 1980; Wallenstein 1983).

Since the release of HSE, research has explored the effects of economic sanctions on foreign direct investment (Biglaiser & Lektzian 2011), human rights (Peksen 2009), the level of democracy (Peksen et al. 2010), jobs and wages (Hufbauer et al. 1997), along with the impact that sanctions have on international trade (Caruso 2003). A related line of inquiry deals with third-country effects or sanctions busting, i.e., the situation in which a sanctioned state reroutes its trade to other trading partners that are not taking part in the sanctioning of the aforementioned state, thus eliminating the effect of the sanction (Early 2009; Yang et al. 2009).

In 2006, Morgan et al. introduced their dataset on economic sanctions called Threat and Imposition of Economic Sanctions (hereafter referred to as TIES). In their companion paper, they state that "in order to continue to advance our understanding of economic

sanctions by testing hypotheses derived from recent theory, new data are needed” (Morgan et al. 2009, p. 93).

The largest advantage of the TIES dataset is that it contains far more cases than the HSE dataset. This suggests that the use of this new dataset might very well change what is currently understood about the impacts of economic sanctions (Morgan et al. 2009). For example, research conducted using TIES has given valuable new insights into multilateral sanctions. When using the TIES dataset, Bapat & Morgan (2009) found that, in contrast to the results that were produced with the HSE dataset, multilateral sanctions are more effective than unilateral sanctions. Theory suggested this outcome long before the TIES dataset was created, however, it could not be proved with the HSE dataset.

A comparison of both datasets reveals that the TIES dataset has several advantages over the HSE dataset. TIES contains far more cases than HSE—1,412 compared to 204—and it includes information about sanction threats as well (of the 1,412 cases, 567 cases constitute threats and 845 are impositions. In HSE, all 204 cases refer to impositions only.) Also, the US is the primary sender in 60% of the cases in HSE, compared to 48% in TIES. This means that HSE is more biased towards the US than TIES. Moreover, the mean duration of the cases in TIES is far shorter (2.43 years) than those in HSE (6.6 years), which indicates that HSE severely underestimates the number of relatively short sanction episodes.

2.3 Effects of imposed sanctions on international trade

For the purpose of this chapter, impact is defined as the change in bilateral trade flows brought on by the threat or imposition of an economic sanction. The gravity model of international trade has long been used to by international economists to empirically examine the determinants of bilateral trade flows (Tinbergen 1962). While many recent methodological improvements have been made to determine the impact of economic

integration on international trade (see, e.g., Baier & Bergstrand 2007), they have yet to be applied in the context of disruptive policies such as economic sanctions.

Hufbauer et al. (1997) and Caruso (2003) delved into the impact that economic sanctions have on international trade by applying a gravity model. Hufbauer et al. (1997) contemporaneously searched for effects on jobs and wages. Yang et al. (2004) applied a gravity model to investigate the impact of U.S. sanctions on U.S. trade with target countries, and on third countries.

Hufbauer et al. (1997) is one of the first studies that aim to empirically measure the impact of U.S. economic sanctions on bilateral trade flows. The authors investigated three years—1985, 1990 and 1995—and 88 countries. Sanctions were categorized in three types: limited, moderate and extensive. Minor financial, export, cultural, or travel sanctions were labeled as “limited” sanctions. Broader trade or financial sanctions were classified as “moderate”. The authors considered comprehensive trade and financial sanctions or a combination of moderate sanctions to be “extensive”. Other scholars have used this categorization of sanctions as well (Elliott & Hufbauer 1999; Caruso 2003; Wood 2008; Peksen 2009). Hufbauer et al. (1997) show that extensive U.S. sanctions can reduce bilateral trade by up to 90%. The results on limited and moderate sanctions are not as robust as the results on extensive sanctions, but they show an average reduction of about 30%.

In his work, Caruso (2003) utilizes the HSE dataset on economic sanctions to reveal what impact the imposition of U.S. economic sanctions has on international trade. He shows that the imposition of extensive economic sanctions by the U.S. reduces bilateral trade with the U.S. by up to 89%, depending on the country-pair. He finds a small, positive yet insignificant effect on trade for limited and moderate sanctions. Caruso also shows that extensively sanctioning other G7 nations induces a disruption of trade for countries other than the U.S. as well, which he calls negative network effects.

Yang et al. (2004) also employ a gravity model to investigate the impact of U.S. economic sanctions on U.S. trade with target countries, and on third countries. Their results are similar to the previously mentioned studies. Extensive and comprehensive sanctions have large negative impacts through bilateral trade reductions while the impact of limited and moderate sanctions seems weak or absent.

Previous research on the impact of economic sanctions suggests that extensive and comprehensive sanctions have a larger negative impact than limited and moderate sanctions, and that this impact is very high (up to 90% reductions in bilateral trade flows). However, as will be argued below, these results are significantly biased owing to (i) limited data on sanctions and (ii) researchers' theoretically inconsistent specification of the gravity equation of international trade.

<< TABLE 1 ABOUT HERE >>

Table 1 provides an overview of the main results so far that are relevant for this literature review. Limited/moderate sanctions typically include partial economic embargoes, import restrictions, export restrictions, the termination of foreign aid, and travel bans. Examples of extensive sanctions include total economic embargoes, blockades, asset freezes, suspension of economic agreements, and composite sanctions combining several types of sanctions.

2.4 Effects of sanction threats on international trade

A phenomenon that scholars are only able to research relatively recently is economic sanction threats. The imposition of economic sanctions has been widely researched for decades, however; only since the inception of the TIES dataset there is data available on sanction threats. Because of data restrictions, authors chose to focus on a single case such as the U.S. threatening to sanction China because of the Tiananmen Square massacre in 1989 (Li &

Drury, 2004; Drury & Li, 2006). Sanction threat cases are situations in which a sender state threatens to implement sanctions against a target state if the target does not comply with the sender's demands. Usually these demands, much like an imposition case, entail policy changes or a different standpoint in a political matter.

The question when it comes to sanction threats so far has been whether threats are as effective as sanction impositions. Most recent research focused on this question and looked solely at the effectiveness of threats (Lacy & Niou 2004; Drury & Li 2006). A threat is effective when the outcome of the threat case is equal to the desired outcome. Therefore, effectiveness is more concerned with success rates of changing policy, rather than the economic consequence (i.e. change in trade flows).

To our knowledge, the impact that sanction threats might have on trade flows has not yet been examined empirically. One of the few papers offering theoretical guidance in this regard is by Lacy & Niou (2004), who present their model as a multistage game of two-sided incomplete information between a sender and a target. The authors state that the threat stage of a case is critical to understanding the outcome of the sanction. "The model reveals that the threat of sanctions can be as potent a policy tool as the imposition of sanctions" (Lacy & Niou 2004, p. 38). This chapter suggests that threats are just as capable of changing a target's behavior as actual impositions.

Regarding the impact of sanction threats, two scenarios are possible. Let us assume that the government of the sender state has become displeased with the policies adopted by the target. The sender threatens to impose economic sanctions on the target. Firms in these states witness the struggle their governments are in and act according to what they deem fit. In both scenarios firms expect an economic sanction to follow the sanction threat. However, it is the reaction to the threat that differs in each scenario. In the first scenario, firms expect a sanction episode and anticipate this by pulling out of deals with firms in the target. This line of events would impact negatively on the countries' bilateral trade flows. The alternative

scenario expects firms to expedite business deals with firms in the target state in order to fully reap the benefits of trade ‘while they still can’. In this situation, a rise in trade between sender and target should be witnessed.

Looking at it this way, it becomes clear that a threat case is significantly different from a case in which a sender actually imposes a sanction on a target, since there is no definite harm done yet. Until now, this aspect of sanction threats has not been tested. We therefore use the TIES dataset to empirically determine how threatening to impose economic sanctions affect international trade.

3 Methodology

3.1 Gravity Model

For the purposes of this chapter, we follow the literature by applying a gravity equation of international trade. The basic gravity model explains bilateral trade flows by using a log-linear equation:

$$(1) \quad \ln \text{TRADE}_{ijt} = \beta_0 + \beta_1 \ln \text{GDP}_{it} + \beta_2 \ln \text{GDP}_{jt} + \beta_3 \ln \text{DISTANCE}_{ij} + \beta_4 \text{TA}_{ijt} \\ + \beta_5 \text{THREAT}_{ijt} + \beta_6 \text{IMPOSITION}_{ijt} + e_{ijt}$$

where TRADE_{ijt} denotes bilateral trade between state i and state j at time t , GDP_{it} and GDP_{jt} represent their gross domestic products respectively, and DISTANCE_{ij} the physical distance between states. TA_{ijt} is a binary variable which is 1 if both countries in a given dyad-year have a trade agreement and 0 otherwise. THREAT_{ijt} is a binary variable that takes the value 1 when a sanction threat is active between countries i and j in year t , and 0 if not. The same goes for IMPOSITION_{ijt} , however in this case it involves a sanction imposition. e_{ijt} is the random error term.

To date, empirical analyses on the trade impacts of sanctions have relied on this very basic version of the gravity equation (Hufbauer et al. 1990; Caruso, 2003; Yang et al. 2004). However, the gravity equation has since then undergone several significant improvements (for an overview of how the methodology has evolved, see Kohl 2014). The most important advances are (i) (time-varying) multilateral resistance terms and (ii) accounting for endogeneity bias (cf. Baier & Bergstrand 2007).

In 2003 “multilateral resistance terms” (MRT) entered the gravity model (Anderson & Van Wincoop 2003) to take into account that trade between two trading countries is also affected by their bilateral trade barrier relative to their average trade barriers vis-à-vis all of their other trade partners. Feenstra (2004) demonstrates that these unobserved price indices can be controlled for by adding importer and exporter fixed effects to equation (1), which yields:

$$(2) \quad \ln \text{TRADE}_{ijt} = \beta_0 + \beta_1 \ln \text{GDP}_{it} + \beta_2 \ln \text{GDP}_{jt} + \beta_3 \ln \text{DISTANCE}_{ij} + \beta_4 \text{TA}_{ijt} \\ + \beta_5 \text{THREAT}_{ijt} + \beta_6 \text{IMPOSITION}_{ijt} + F_i + F_j + F_t + e_{ijt}$$

where F_i represents fixed effects for the importing country and F_j for the exporting country. Year effects (F_t) deal with common trends and shocks. Changes in trade costs on one bilateral route can influence trade flows on all other routes because of relative price effects, this is picked up in the model (2). Because the multilateral resistance terms, which are correlated with trade costs, are not included in the basic model this model suffers from omitted variables bias.

The model as shown in equation (2) only offers a partial solution to the problem of modeling multilateral trade resistance terms in panel data. From work by Baier & Bergstrand (2007) follows that in a panel setting, “Anderson and van Wincoop’s (2003) multilateral resistance terms are actually time-varying, which means that the importer and exporter effects

also need to be time-varying to fully capture the MRT” (Kohl 2014, p. 8). When country fixed effects are not interacted with time, country fixed effects control for average trade resistance over time. However, key elements of trade resistance may be time varying. Without accounting for time-varying MRT, the results are likely to suffer from an omitted variables bias (Baier & Bergstrand, 2007). If we adjust our model to this, the result is a time-varying fixed-effects version of the gravity equation:

$$(3) \quad \ln \text{TRADE}_{ijt} = \beta_0 + \beta_1 \ln \text{GDP}_{it} + \beta_2 \ln \text{GDP}_{jt} + \beta_3 \ln \text{DISTANCE}_{ij} + \beta_4 \text{TA}_{ijt} \\ + \beta_5 \text{THREAT}_{ijt} + \beta_6 \text{IMPOSITION}_{ijt} + F_{it} + F_{jt} + F_{ij} + e_{ijt}$$

where F_{it} and F_{jt} denote importer-year and export-year effects, respectively. This equation represents a time-varying form of equation (2). F_{ij} controls for unobserved circumstances that may be correlated with both a country-pair’s level of trade and factors related to the dyad experiencing a sanction episode. In other words, the dyad fixed effect controls for any endogeneity concerns related to a country-pair’s bilateral trade and inclination to (threaten to) impose a sanction.

Notice that the country-year fixed effects are perfectly collinear by definition with country-specific time-varying dependent variables. As is by now common in the literature, we will therefore estimate the following structural gravity equation with Ordinary Least Squares (OLS):

$$(4) \quad \ln \text{TRADE}_{ijt} = \beta_0 + \beta_1 \text{TA}_{ijt} + \beta_2 \text{THREAT}_{ijt} + \beta_3 \text{IMPOSITION}_{ijt} + F_{it} + F_{jt} + F_{ij} + e_{ijt}$$

One drawback of estimating the gravity equation in its log-linear form, is that zero trade flows are ignored, which may several bias our parameter estimates (see Santos Silva and Tenreyro

2006). Zero trade flows can be incorporated by estimating the following equation with a Poisson Pseudo-Maximum Likelihood (PPML) estimator:

$$(5) \quad \text{TRADE}_{ijt} = \beta_0 + \beta_1 \text{THREAT}_{ijt} + \beta_2 \text{IMPOSITION}_{ijt} + \beta_3 \text{TA}_{ijt} + F_{it} + F_{jt} + F_{ij} + e_{ijt}$$

We estimate equation (4) and (5) with a high-dimensional fixed effects Stata packages for OLS (`reghdfe`) and PPML (`ppml_panel_sg`), respectively (see Correia 2017; Larch, Wanner, Yotov and Zylkin 2017).

Armed with these latest advances from the gravity literature, our empirical strategy adds to the literature a model that incorporates time-varying multilateral resistance terms, controls for potential endogeneity bias, and accounts for zero trade flows.

3.2 Data

The panel dataset is arranged by country-pair and year. Each pair occurs twice, once as importer-exporter (ij), and once as exporter-importer (ji). Nominal bilateral trade flows are from the IMF Direction of Trade Statistics (2013) database, GDP from the World Bank Development Indicators (2013) and trade agreement data from Kohl (2014). Data on distance are from Mayer & Zignago (2011). Following Baldwin & Taglioni (2007), $\ln(\text{TRADE}_{ijt}) = \ln[\text{IMPORTS}_{ijt} * \text{EXPORTS}_{ijt}]^{(1/2)}$. For PPML, Trade is simply the sum of imports and exports, where missing values are assumed to be zero. Table 2 lists all countries (223) covered in the dataset, even if only for a limited time span.

<< TABLE 2 ABOUT HERE >>

Sanction data come from the Threat and Imposition of Economic Sanctions (TIES) project. This dataset contains data for both economic sanctions imposed (impositions) and sanction

threats. Note that a case may contain multiple types of threats or impositions. Should a sender state convert a sanction threat into an actual imposition, then the case is split into a threat case and an imposition case. The TIES dataset contains 1412 cases of which 845 (60%) are cases in which sanctions were imposed and 567 (40%) cases involved threats (Morgan et al. 2014), and the period covered is 1948-2005.

Given the richness of the TIES dataset, we can also seek to understand how international trade is affected by different types of threats and impositions. Following the literature, we refine the binary THREAT and IMPOSITION variables to distinguish between “Limited/moderate” and “Extensive” threats and impositions, respectively. “Limited/moderate” threats and impositions refer to events when governments threatened to impose, or factually imposed, partial economic embargoes, import restrictions, export restrictions, terminate foreign aid, or travel bans. We consider “Extensive” threats/impositions to include total economic embargoes, asset freezes, suspension of economic agreements/protocols, and multiple types/cases in a given year (based on the authors’ calculations). Note that TIES also identifies a few threats/impositions as “other”, which were recoded to “missing” so as to be entirely excluded from our analysis. Note that estimating regressions for specific types of threats and impositions is inadvisable due to large asymmetries in the number of observations per type of threat or imposition. For example, we only observe 6 (29) times that a sender has threatened to free assets (impose travel bans), while threats to impose import restrictions (terminate foreign aid) were observed 900 (1492) times.

4 Results

The main results are reported in Table 3. Column 1 shows the parameter estimates of model 2, which is a naïve gravity equation with importer, exporter, and year fixed effects. The

coefficients for GDP, distance and trade agreements are in line with the literature (for an overview, see Head and Mayer 2014).

<< TABLE 3 ABOUT HERE >>

For threats and impositions, we first simply include both variables in column 1 and find that threats do not have a significant effect on trade. Surprisingly, impositions have a small, positive effect on trade. Recall that previous studies found that sanctions (impositions) decrease trade by around 90%. We explain this difference by pointing out that previous literature did not use gravity equations with extensive sets of fixed effects. Moreover, these datasets were more restrictive in terms of country and period coverage, and, importantly, the number of impositions recorded.

A possible limitation to our first specification is that our data are on an annual basis, but that threats and impositions could easily occur in the same year. We therefore deem it sensible to include an interaction term so that we can isolate for a given year the effect of threats only, impositions only, and threats in combination with impositions.

As reported in column 2, the interaction term is negative – suggesting that threats followed by impositions in the same year have a negative effect on trade – but the parameter estimate is not statistically significant.

What about sanctions which were only imposed in the year following a sanction threat? We construct a binary indicator variable to account for such cases. Similar to column 2, the coefficient in column 3 shows that threats followed by impositions in the subsequent year also have a negative trade impact, albeit not significant.

As discussed above, a main drawback of equation 2 is that the set of fixed effects does not properly account for time-varying multilateral resistance terms and neither does it control

for potential endogeneity bias. The remainder of Table 3 therefore repeats the steps reported in column 1-3 with equation 4 in column 4-6.

First, notice that the coefficient for trade agreements drops substantially – consistent with the literature (see Kohl 2014). Interestingly, the theoretically consistent gravity equation estimated in column 4 shows that threats have a positive and significant effect on trade (approximately 7%), while impositions decrease trade (approximately 15%).⁴

However, the inclusion of the interaction terms in column 5 and 6 overturns this finding. Specifically, threats without impositions do not affect trade – at least not for trade flows recorded at an annual level. In contrast, impositions that were not preceded by any type of threat show a decrease in trade of about 20%. However, this reduction in trade is almost entirely reversed if the sanction had been ‘announced’ by means of a threat (because the interaction terms are positive and of a similar magnitude).

Two main preliminary conclusions can be drawn from Table 3. First, earlier estimates of how sanctions affect international trade are overestimated. We find that the effect of sanctions (impositions) on trade is about -20%, around a fifth of the estimate typically found in the literature. In our view, this difference is due to the substantial coverage of sanctions in the TIES dataset (compared to the HSE dataset) and our theoretically consistent specification of the gravity equation with time-varying multilateral resistance terms and country-pair fixed effects to control for endogeneity bias. Second, while sender states’ threats to impose sanctions could have an economic impact on trade, this positive effect only materializes if sanctions are imposed. Threats alone are of no significant consequence for trade.

To further understand how threats and impositions affect trade, we now proceed to distinguish various *types* of threats and impositions. The setup of Table 4. is exactly the same as Table 3. The only difference is that we now replace the binary THREAT (IMPOSITION)

⁴ The formula used is $[(\text{natural number } e \text{ to the power of the estimated coefficient}) - 1]$ multiplied by 100%.

variable with a categorical variable which is 1 if the sanction threatened with (imposed) is classified as being of limited or moderate scope, 2 if it is extensive, and 0 otherwise.

<< TABLE 4 ABOUT HERE >>

Table 4 sheds some light on how the extensiveness of a sanction (threat) affects trade. For example, the point estimates for extensive threats tend to be smaller (negative) than those of limited/moderate threats (while not being significant). Columns 4-6 also show that extensive impositions have the largest negative (and significant) effect on trade, compared to impositions that are of a limited/moderate nature.

As with Table 3, inclusion of the interaction terms suggests that trade responds more negatively to sanctions which were only implemented without preceding threats, compared to threats which led to sanction impositions. Yet, in contrast to Table 3, the main and interaction effects no longer entirely cancel out – suggesting that the type of sanction threatened with and imposed, matters for trade. Threats without an actual sanction implemented do not have a significant effect on trade. Our results show that limited/moderate (extensive) impositions without threats reduce trade by 14% (27%). Combined with the interaction terms, the findings suggest that limited/moderate threats followed by a limited/moderate imposition in the same (subsequent) year decrease trade by 14 (4)%. In contrast, extensive threats followed by extensive impositions in the same (subsequent) year increase (decrease) trade by 20 (11)%.

The magnitude and instability of the coefficients suggests that sanction impositions may have a delayed effect on trade flows. In other words, trade might only gradually respond to changes in sanctions-imposed trade costs akin to trade only gradually responding to decreases in trade agreement-induced trade costs over the course of 5-10 years. We augment our model to include annual lags for up to 5 years to explore the extent to which delayed effects might affect trade flows.

<< TABLE 5-6 ABOUT HERE >>

The results for this *one*, single regression are presented in Table 5 for OLS, and Table 6 for PPML. Note that for each table, column 2-6 provides the parameter estimates of THREAT, IMPOSITION and the interaction terms which all have been lagged by 1-5 years. Strikingly, while the bulk of the parameter estimates have the expected (negative) sign, they tend to be small on average and not statistically significant. Re-estimating our models after excluding the top-5 senders (i.e. United States, Canada, Russia United Kingdom and India) from the sample, or by excluding all senders except the top-5 senders, does not give rise to substantially different results (not reported for brevity).

5 Discussion and Conclusion

We set out to answer whether results from earlier economic sanction research stood the test of time, since developments in the field have been numerous in recent years. By including an extensive dataset on sanctions—both threats and impositions—and employing a theoretically consistent gravity equation, we find that sanctions are hardly as harmful as indicated in the previous literature. Where Hufbauer et al. (1997), Caruso (2003), and Yang et al. (2004) found results of up to 90% decreases in bilateral trade, our findings suggest – if anything – a reduction of around 20% owing to greater data coverage and improvements in the econometric strategy.

From our results, it follows that there is a difference between threatening to sanction a target state and actually sanctioning said state. Threats alone do not affect trade, while actual impositions decrease trade. The rich nature of the sanctions dataset provided by Morgan et al. (2014) provides several ways to further explore how sanction mechanisms may be effective in

altering modes of international exchange. We now highlight several such avenues for future research.

A topic that has fallen outside the scope of this chapter but generated mixed results in the past is unilateral versus multilateral sanctions. Elliott et al. (2008) found that multilateral sanctions were less effective than unilateral sanctions, yet this result is counteractive and contrasts sharply with work by Bapat & Morgan (2009). Caruso (2003) found no significant difference in impact between unilateral and multilateral sanctions. An application with a state-of-the-art gravity equation is advisable.

Our findings do not indicate an impact of sanction threats on international trade. To some extent, we have argued that there could be good reasons to expect that markets anticipate future changes in trade policy and respond immediately when threats are issued. However, threats are not issued in a vacuum, and having a better understanding of the context may be important to capture the pure effect of sanction threats on trade. For example, media coverage of the Crimea crisis was so extensive, and the event so significant, that it should not seem surprising that many observers expected the EU and US to impose sanctions even before the respective governments formally announced that they would consider imposing sanctions on Russia. Yet in other cases, a government's announced threats may be less expected, even if only due to limited media coverage. Therefore, a refined measure on media coverage of events leading to sanctions being threatened with and/or imposed, combined with novel measures of economic uncertainty (see Baker, Bloom and Davis, 2016) could improve the empirical setup employed in this chapter.

Another avenue for further research is to use monthly trade data and/or product-level data, rather than the annual aggregate data used in this chapter. The TIES dataset is sufficiently rich to explore the impact of sanctions on a product level, yet such a project would be very data intensive. Furthermore, monthly data could provide a more fine-grained picture of how trade responds to announced threats and news of sanctions actually imposed.

One more issue that deserves further attention is the period following a sanction episode. We know that impositions decrease trade, but what happens when the sanctions are lifted? It would be interesting to find out how long it takes before trade returns to the level from before the episode to determine whether there is a so-called ‘rebound effect’. Perhaps trade does not recover for a longer period after the sanctions are already lifted; this would mean that the damage done by sanctions may be more substantial than we expect.

While research has studied the effect of sanctions on international trade, sanction data call into question whether impact studies should mainly be concerned with international trade flows. Travel bans, asset freezes and cuts in foreign aid, for instance, may be more important for foreign direct investment (FDI) than for international trade. As data quality on bilateral FDI improves, future research may shed more light on how sanctions impact modes of international economic exchange in a broader sense than only international trade.

More generally, the question is whether sanctions should ultimately be perceived to have an effect on international trade at all. Ideally, sanctions incentivize targets to adopt a change in policy desired by the sender. From a policy perspective, the effectiveness of sanction should therefore not consider the impact of economic exchange, but on changes in targets’ policy. A challenge for applied research would be to construct consistent, time-varying and transparent measures on government policy.

Economic sanctions will most likely remain in the arsenal of the policy makers for the foreseeable future, and therefore scholars should continue to scrutinize them. This chapter calls into question whether (threatening to impose) sanctions really affect international trade to the extent assumed true in the literature (our simple answer is: No) and signals several improvements that future research should incorporate to better understand if – and how – sanctions affect world trade.

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Table 1: Overview of results in the literature.

	Hufbauer et al. (1997)	Caruso (2003)	Yang et al. (2004)
Years studied	1985, 1990, 1995	1960–2000	1980, 1985, 1990, 1995
Number of countries studied	88	50	225
Focus	Impact on US trade	Impact on US trade	Impact on US trade
Dataset used	HSE	HSE	HSE
Threats/impositions	Impositions only	Impositions only	Impositions only
Effect found	LM: -30% * X: -90% *	LM: +13% X: -89% *	LM: +34% X: -78% *

Note: Effects are averages of multiple parameter estimates. LM is for limited/moderate sanctions, X is for extensive/comprehensive sanctions. * indicates statistically significant parameter estimates.

Table 2: List of countries.

Afghanistan, Albania, Algeria, American Samoa, Andorra, Angola, Anguilla, Antigua & Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia & Herzegovina, Botswana, Brazil, British Indian Ocean Territory, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, Cayman Islands, Central African Republic, Chad, Chile, China, Colombia, Comoros, Cook Islands, Costa Rica, Croatia, Cuba, Cyprus, Czech Republic, D.R. Congo, Denmark, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Faeroe Islands, Falkland Islands, Fiji, Finland, France, French Polynesia, French Southern Territories, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Greenland, Grenada, Guam, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kosovo, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, Macao, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mayotte, Mexico, Micronesia, Moldova, Mongolia, Montenegro, Montserrat, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Netherlands, Netherlands Antilles, New Caledonia, New Zealand, Nicaragua, Niger, Nigeria, Niue, North Korea, Norway, Oman, Pakistan, Palau, Palestinian Authority, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Pitcairn, Poland, Portugal, Qatar, Republic of Congo, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia, Serbia & Montenegro, Seychelles, Sierra Leone, Singapore, Slovak Republic, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Helena, St. Kitts & Nevis, St. Lucia, St. Pierre-Miquelon, St. Vincent & Grenadines, Sudan, Suriname, Swaziland, Sweden, Switzerland, Syria, Taipei, Taiwan, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tonga, Trinidad & Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Virgin Islands, Wallis & Futuna, Yemen, Zambia, Zimbabwe.

Table 3: Main results with binary threat/imposition variables.

	(1)	(2)	(3)	(4)	(5)	(6)
ln(GDP) importer	1.136***	1.136***	1.136***			
	(0.0368)	(0.0368)	(0.0368)			
ln(GDP) exporter	1.172***	1.172***	1.172***			
	(0.0329)	(0.0329)	(0.0329)			
ln(Distance)	-1.359***	-1.359***	-1.359***			
	(0.0202)	(0.0202)	(0.0202)			
Trade Agreement	0.686***	0.686***	0.686***	0.392***	0.392***	0.391***
	(0.0320)	(0.0320)	(0.0320)	(0.0212)	(0.0212)	(0.0212)
Threat	0.0264	0.0544	0.0543	0.0753**	0.00297	0.00435
	(0.0483)	(0.0590)	(0.0591)	(0.0277)	(0.0348)	(0.0348)
Imposition	0.0955*	0.108*	0.108*	-0.168***	-0.201***	-0.225***
	(0.0454)	(0.0495)	(0.0532)	(0.0311)	(0.0342)	(0.0369)
Threat * Imposition		-0.0795	-0.0801		0.200***	0.226***
		(0.0791)	(0.0825)		(0.0490)	(0.0513)
Threat * Imposition _[t+1]			-0.00495			0.162***
			(0.0577)			(0.0364)
Fi, Fj, Ft	Yes	Yes	Yes	No	No	No
Fit, Fjt, Fij	No	No	No	Yes	Yes	Yes
N	333,898	333,898	333,898	333,898	333,898	333,898
adj. R2	0.761	0.761	0.761	0.916	0.916	0.916

Notes: Estimated with Ordinary Least Squares (OLS). Dependent variable: ln(trade). Robust standard errors (clustered by country-pair) in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Parameter estimates for fixed effects omitted for brevity.

Table 4: Main results with categorical threat/imposition variables.

	(1)	(2)	(3)	(4)	(5)	(6)
ln(GDP) importer	1.136***	1.136***	1.136***			
	(0.0367)	(0.0367)	(0.0367)			
ln(GDP) exporter	1.172***	1.172***	1.171***			
	(0.0329)	(0.0329)	(0.0329)			
ln(Distance)	-1.359***	-1.359***	-1.359***			
	(0.0202)	(0.0202)	(0.0202)			
Trade Agreement	0.686***	0.686***	0.686***	0.392***	0.392***	0.392***
	(0.0320)	(0.0320)	(0.0320)	(0.0212)	(0.0212)	(0.0212)
Threat						
... Limited/Moderate	0.0894	0.114	0.114	0.0569	0.0166	0.0181
	(0.0505)	(0.0627)	(0.0627)	(0.0313)	(0.0405)	(0.0405)
... Extensive	-0.119	-0.234	-0.234	0.140***	-0.0534	-0.0484
	(0.0782)	(0.126)	(0.126)	(0.0399)	(0.0414)	(0.0414)
Imposition						
... Limited/Moderate	0.152**	0.182***	0.193***	-0.131***	-0.138***	-0.153***
	(0.0493)	(0.0541)	(0.0576)	(0.0301)	(0.0334)	(0.0357)
... Extensive	0.0522	0.0157	0.0126	-0.228***	-0.296***	-0.319***
	(0.0723)	(0.0842)	(0.0887)	(0.0543)	(0.0650)	(0.0690)
Threat * Imposition						
... Limited/Moderate * Limited/Moderate		-0.214*	-0.203*		0.0514	0.0592
		(0.0866)	(0.0907)		(0.0543)	(0.0564)
... Limited/Moderate * Extensive		0.0784	0.115		0.268***	0.257***
		(0.118)	(0.117)		(0.0735)	(0.0759)
... Extensive * Limited/Moderate		-0.0118	-0.0197		0.300***	0.297***
		(0.159)	(0.160)		(0.0649)	(0.0649)
... Extensive * Extensive		0.258	0.243		0.377***	0.387***
		(0.154)	(0.154)		(0.0811)	(0.0827)
Threat * Imposition _[t+1]						
... Limited/Moderate * Limited/Moderate			-0.0115			0.0948*
			(0.0689)			(0.0404)
... Limited/Moderate * Extensive			0.199*			0.128*
			(0.0827)			(0.0561)
... Extensive * Limited/Moderate			-0.592***			0.220***
			(0.146)			(0.0656)
... Extensive * Extensive			-0.138			0.153*
			(0.0901)			(0.0641)
Fi, Fj, Ft	Yes	Yes	Yes	No	No	No
Fit, Fjt, Fij	No	No	No	Yes	Yes	Yes
N	333,898	333,898	333,898	333,898	333,898	333,898
adj. R2	0.761	0.761	0.761	0.916	0.916	0.916

Notes: Estimated with Ordinary Least Squares (OLS). Dependent variable: ln(trade). Robust standard errors (clustered by country-pair) in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Parameter estimates for fixed effects omitted for brevity.

Table 5: Extended OLS results with categorical threat/imposition variable and lags.

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Contemporaneous</i>	<i>Lag 1</i>	<i>Lag 2</i>	<i>Lag 3</i>	<i>Lag 4</i>	<i>Lag 5</i>
Trade Agreement	0.382***					
	(0.0234)					
Threat						
... Limited/Moderate	0.0106	0.0591**	-0.0579*	0.0338	-0.0227	0.0884**
	(0.0305)	(0.0218)	(0.0257)	(0.0263)	(0.0239)	(0.0316)
... Extensive	-0.0210	0.0405	-0.0342	-0.0478	-0.0443	-0.0480
	(0.0359)	(0.0294)	(0.0344)	(0.0343)	(0.0378)	(0.0414)
Imposition						
... Limited/Moderate	-0.0456	-0.0444*	-0.0178	-0.0280	-0.0194	-0.0454
	(0.0318)	(0.0215)	(0.0230)	(0.0232)	(0.0205)	(0.0294)
... Extensive	-0.123*	-0.0193	-0.0688	0.0172	-0.0661*	-0.0598
	(0.0516)	(0.0355)	(0.0377)	(0.0297)	(0.0331)	(0.0459)
Threat * Imposition						
... Limited/Moderate * Limited/Moderate	-0.0186	-0.0141	0.0672	0.0320	0.0713	0.0176
	(0.0518)	(0.0419)	(0.0438)	(0.0464)	(0.0494)	(0.0704)
... Limited/Moderate * Extensive	0.0728	-0.0782	0.0938	0.0273	0.151*	0.0388
	(0.0563)	(0.0474)	(0.0481)	(0.0435)	(0.0699)	(0.0813)
... Extensive * Limited/Moderate	0.134*	0.0719	0.103	0.208***	0.0744	0.121
	(0.0566)	(0.0541)	(0.0619)	(0.0607)	(0.0674)	(0.113)
... Extensive * Extensive	0.102	0.0370	0.104	0.0845	0.110*	0.0926
	(0.0634)	(0.0556)	(0.0541)	(0.0452)	(0.0500)	(0.0822)
Threat * Imposition[t+1]						
... Limited/Moderate * Limited/Moderate	0.0397	0.0882	0.00217	-0.0145	-0.0314	0.0655
	(0.0555)	(0.0543)	(0.0592)	(0.0665)	(0.0750)	(0.0499)
... Limited/Moderate * Extensive	0.0163	-0.0387	-0.0515	-0.0771	-0.0595	0.0333
	(0.0661)	(0.0689)	(0.0662)	(0.0766)	(0.0793)	(0.0647)
... Extensive * Limited/Moderate	0.0770	0.0605	0.0564	0.170	0.0734	0.104
	(0.0783)	(0.0882)	(0.0896)	(0.108)	(0.122)	(0.0917)
... Extensive * Extensive	-0.0386	0.0746	0.147*	0.0630	0.0855	0.0556
	(0.0808)	(0.0622)	(0.0646)	(0.0791)	(0.109)	(0.0711)
Fi, Fj, Ft	No					
Fit, Fjt, Fij	Yes					
N	199,473					
adj. R2	0.937					

Notes: Estimated with Ordinary Least Squares (OLS). Dependent variable: $\ln(\text{trade})$. Robust standard errors (clustered by country-pair) in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Parameter estimates for fixed effects omitted for brevity.

Table 6: Extended PPML results with categorical threat/imposition variable and lags.

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Contemporaneous</i>	<i>Lag 1</i>	<i>Lag 2</i>	<i>Lag 3</i>	<i>Lag 4</i>	<i>Lag 5</i>
Trade Agreement	0.135***					
	(0.0258)					
Threat						
... Limited/Moderate	0.00484	0.000932	-0.0182	0.0148	0.000477	0.00177
	(0.0163)	(0.0111)	(0.0102)	(0.0110)	(0.0112)	(0.0159)
... Extensive	0.00109	-0.000289	-0.00499	-0.00110	-0.0134	-0.051***
	(0.0178)	(0.00993)	(0.00809)	(0.00866)	(0.00783)	(0.0136)
Imposition						
... Limited/Moderate	0.0268*	-0.00205	0.00107	0.00266	0.00731	-0.00393
	(0.0135)	(0.00675)	(0.00742)	(0.00742)	(0.00700)	(0.0139)
... Extensive	0.00379	-0.00405	-0.00446	-0.0135	0.0190	0.0110
	(0.0228)	(0.0112)	(0.0137)	(0.0141)	(0.0167)	(0.0234)
Threat * Imposition						
... Limited/Moderate * Limited/Moderate *	-0.0539	-0.0327	0.00577	-0.00318	0.00663	-0.00592
	(0.0336)	(0.0311)	(0.0262)	(0.0288)	(0.0239)	(0.0330)
... Limited/Moderate * Extensive	0.0536	0.0324	0.0746**	0.0481	0.0217	0.0139
	(0.0314)	(0.0198)	(0.0254)	(0.0257)	(0.0297)	(0.0346)
... Extensive * Limited/Moderate	-0.0221	0.0154	0.0116	0.000596	-0.0228	-0.00883
	(0.0243)	(0.0167)	(0.0201)	(0.0182)	(0.0153)	(0.0255)
... Extensive * Extensive	0.0188	0.0412*	0.0369*	0.00378	-0.00684	0.00498
	(0.0276)	(0.0182)	(0.0172)	(0.0172)	(0.0187)	(0.0313)
Threat * Imposition[t+1]						
... Limited/Moderate * Limited/Moderate *	-0.00001	0.00297	-0.00680	-0.0113	-0.0444	-0.0366
	(0.0349)	(0.0297)	(0.0305)	(0.0262)	(0.0298)	(0.0214)
... Limited/Moderate * Extensive	-0.00681	-0.0494	-0.0887*	-0.0228	0.00159	-0.00622
	(0.0272)	(0.0349)	(0.0381)	(0.0316)	(0.0364)	(0.0223)
... Extensive * Limited/Moderate	-0.0379	-0.00355	0.00739	0.0819*	0.0123	-0.0332
	(0.0401)	(0.0395)	(0.0385)	(0.0396)	(0.0418)	(0.0386)
... Extensive * Extensive	-0.0447	-0.0292	-0.0154	-0.0371	-0.0403	-0.0666*
	(0.0304)	(0.0261)	(0.0297)	(0.0262)	(0.0347)	(0.0281)
Fit, Fjt, Fij	Yes					
N	1,098,984					
R2	0.9981					

Notes: Estimated with Poisson Pseudo-Maximum Likelihood (PPML). Dependent variable: Trade. Robust standard errors (clustered by country-pair) in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Parameter estimates for fixed effects omitted for brevity.