



The global sanctions data base

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ARTICLE INFO

Article history:

Received 15 October 2019

Revised 26 July 2020

Accepted 30 July 2020

Available online 21 August 2020

JEL classification:

F1

F13

F14

F5

F51

H5

N4

Keywords:

Sanctions

Sanction databases

Effects of sanctions on trade

ABSTRACT

This article introduces the Global Sanctions Data Base (GSDB), a new dataset of economic sanctions that covers *all* bilateral, multilateral, and plurilateral sanctions in the world during the 1950–2016 period across *three dimensions*: type, political objective, and extent of success. The GSDB features by far the most cases amongst data bases that focus on effective sanctions (i.e., excluding threats) and is particularly useful for analysis of bilateral international transactional data (such as trade flows). We highlight five important stylized facts: (i) sanctions are increasingly used over time; (ii) European countries are the most frequent users and African countries the most frequent targets; (iii) sanctions are becoming more diverse, with the share of trade sanctions falling and that of financial or travel sanctions rising; (iv) the main objectives of sanctions are increasingly related to democracy or human rights; (v) the success rate of sanctions has gone up until 1995 and fallen since then. Using state-of-the-art gravity modeling, we highlight the usefulness of the GSDB in the realm of international trade. Trade sanctions have a negative but heterogeneous effect on trade, which is most pronounced for complete bilateral sanctions, followed by complete export sanctions.

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1. Introduction

Throughout history, but especially since World War II, economic sanctions have evolved into a powerful instrument in coercive foreign diplomacy.¹

As such, the motivation and policy aims of economic sanctions are considered to be primarily political.² More specifically, though, sanctions have been interpreted as actions (or threats) undertaken by sanctioning states or international organiza-

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¹ Prominent recent examples of actual and/or threatened sanctions include: the re-imposition of “new and significant” sanctions on Iran by the Trump administration in 2018 and 2019; the recent US sanctions on Venezuela against President Nicol’s Maduro; and the repeated imposition of sanctions by the EU and the US on Russia, North Korea, and Iraq.

² Nonetheless, the traditional differentiation of trade policy from foreign policy in the United States has been blurred by the Trump administration which is “... using tariffs as apparent political weapons in a way that could eventually backfire on Washington” (Taylor, 2018).

tions (the senders) to punish, constrain or, more generally, to influence the behavior of sanctioned states, private entities and/or powerful elites (the targets).

Often substituting for military force, sanctions have been used extensively, repeatedly and, in recent times, with increased frequency, especially by the United States (US), the European Union (EU) and the United Nations (UN). In the relatively distant past, sanctions mostly took the form of trade restrictions and economic blockades. But, as discussed below, nowadays their content, implementation and targets differ substantially.

The scholarship on economic sanctions consists of numerous theoretical and quantitative contributions by political scientists, economists, historians and international relations analysts. It is rich, diverse and contentious. One might also posit that it has largely aimed at addressing two key questions: (i) the reasons of why countries impose sanctions, and (ii) whether economic sanctions are effective in achieving their purported objectives.³ Moreover, to facilitate their formal (primarily empirical) analyses of the effectiveness of sanctions, researchers have created extensive databases documenting their timing, intensity, and evolution, among others (see below).

We contribute to this literature in two ways. First, and foremost, we introduce and describe our newly constructed database, the Global Sanctions Data Base (GSDB). A distinct trait of the GSDB is that it is well-suited to address issues related to bilateral and multilateral linkages in trade relations and the intricate structure of applied sanctions. Second, we demonstrate the value of the GSDB with an empirical application that quantifies the heterogeneous effects of sanctions on international trade.

A fundamental issue in assessments of the effectiveness of economic sanctions is that it requires analysts to understand and capture not just the nature of the sanctions objective(s), but also the global spectrum of instruments employed by senders and targets, the intensity of their use, the distribution of interventions by type and over time, and a well-defined metric capable of capturing the degree of success. By virtue of its rich dimensionality, the GSDB can help address these issues.

The GSDB covers 729 publicly traceable, multilateral, plurilateral, and purely bilateral sanction cases over the 1950–2016 time period.⁴ Additionally, the GSDB classifies these sanctions on the basis of three important dimensions. First, by the type(s) of sanctions considered (e.g., trade sanctions vs. financial sanctions vs. travel sanctions, etc.). Second, by the political objective(s) behind the observed sanction(s). In particular, the GSDB systematically groups sanction objectives into distinct categories (e.g., policy change, destabilization of a regime, war prevention, human rights, etc.) of recorded policy objectives. Third, by the perceived degree of success for each identified sanction, captured by five distinct categories ranging from failed sanctions to the target's full acceptance of the sender's demands. We describe these three dimensions of the GSDB in detail in the next section.

Starting with the first dimension, we illustrate the evolution of all sanctions between 1950 and 2016. This enables us to take a close look at the distribution of applied sanctions by type (e.g., trade versus financial sanctions), extent of the intervention (e.g., partial versus complete sanctions), and region (e.g., whether sanctions are imposed unilaterally or reciprocally). In addition to allowing us to visualize the identity of senders and targets, the GSDB helps obtain a clear view of the evolution of sanctions over time and relative to each country. We view these features of the GSDB, especially the bilateral structure of recorded sanctions, as salient and indispensable. We think their application can help bridge the current gap in scholarship between the sophisticated developments in empirical trade tools and their application to policy assessments related to the possible costs and benefits of sanctions. We also believe it can shed valuable light on the heterogeneous effects of sanctions (e.g., their effects on international trade) and other issues related to, for example, the recent extraterritorial application of sanctions by the US through litigation.⁵

The policy objectives that drive sanctions and are reported in the GSDB are defined on the basis of official declarations, including UN resolutions and/or executive orders. We highlight the distribution of the various policy objectives associated with identified sanctions across all years and cases. We also illustrate how policy objectives of sanctions have changed over time. Interestingly, the evidence suggests that, in recent years, policy objectives related to human rights and democracy have become more prominent in contrast to the post-war decades which were dominated by objectives aimed to policy and regime changes.

Finally, the third dimension of the GSDB documents and assesses the policy outcomes of classified sanctions policy objectives. The achievement of a policy objective is evaluated on the basis of information contained in official government statements or indirect confirmations in international press announcements. Notably, the GSDB permits analysis to track the success rate of sanctions policies over the years under consideration. Our descriptive figures identify a significant change in the success rate of sanctions. Specifically, the number of sanction cases that are considered as 'full success' increased until the mid 1990s and declined thereafter. Moreover, during the same time period, the duration of sanctions has risen steadily.

³ Influential and noteworthy theoretical contributions include Baldwin (1985, 1999), Tsebelis (1990), Eaton and Engers (1992, 1999), Drezner (1999), Kaempfer and Lowenberg (2007), and Joshi and Mahmud (2019). Valuable analytical and quantitative contributions include Pape (1997), Hufbauer and Oegg (2003), Caruso (2003), Yang et al. (2004), Hufbauer et al. (2007), Morgan et al. (2009), Crozet and Hinz (2017), Haidar (2017), Draca et al. (2018), Afesorgbor (2018), Ahn and Ludema (2019) and Besedes et al. (2018).

⁴ In an updated version of the GSDB we are working on, the time of coverage has been extended to the year 2019 and contains new cases for a total of 1045.

⁵ In Section 5, we discuss several additional potential applications of the GSDB.

Overall, the average rate of success of sanction policies is about 30% across all identified policy objectives, which is – despite its extended coverage – fairly similar to the effectiveness rate reported in [Hufbauer et al. \(2007\)](#) and [Morgan et al. \(2014\)](#).

An important motivation behind the creation of the GSDB is to deliver a comprehensive and detailed database on trade sanctions of all dimensions in order to study their effectiveness. Additionally, besides having a case-level version, the GSDB is available in a dyadic structure version. Hence, it can be effectively utilized in evaluations of the effects of diverse trade sanctions based on empirical trade models, such as the structural gravity framework.

For proper perspective, in [Section 3](#), we provide a brief overview of several prominent databases, including the HSE/HSEO database (by [Hufbauer et al., 2007/2009](#)), the TIES database (by [Morgan et al. \(2014\)](#)), the TSC database (by [Biersteker et al., 2018](#)), and the EUSANCT database (by [Weber and Schneider, 2018](#)). The GSDB complements and extends these databases in several ways. For example, its bilateral structure and rich dimensionality allow researchers to shed new light on the efficiency and effectiveness of trade sanctions by utilizing on structural gravity. Nonetheless, while the GSDB's coverage is relatively more extensive and offers more detailed analysis related to trade sanctions, we also recognize that it lacks some other important dimensions. For example, in contrast to the TIES database, it does not include sanction threats. Thus, depending on the research focus and goals, we see significant potential benefits in combining the GSDB with several other sanctions databases.

We complete the paper by highlighting the significance of some of the salient traits of the GSDB. Specifically, in [Section 4](#), we quantify the impact of economic sanctions on international trade. Capitalizing on the latest developments in the literature on structural gravity, we obtain the following results. First, the impact of economic sanctions on trade depends on the type of sanction(s) considered. When the impact of sanctions is constrained to be common across all sanction types, we do not obtain meaningful estimates. However, when we distinguish sanctions across types, we obtain plausible results. The effects of trade sanctions in this case are clearly negative and significant. This highlights that lumping together sanctions across types is problematic.

Second, from a methodological perspective, our analysis reveals that proper quantification of the impact of sanctions on trade hinges on proper specification of the time-invariant trade costs (e.g., with pair fixed effects).

Third, the heterogeneous impact of trade sanctions depends on whether sanctions are bilateral or directional (i.e., export sanctions vs import sanctions). In particular, we find that bilateral sanctions and export sanctions are more effective in reducing trade than are sanctions on imports. As expected, we also find that complete trade sanctions are more effective than partial trade sanctions. In quantitative terms, our analysis implies that complete trade sanctions that are imposed in both directions of trade flows lead to a 77% decrease in trade (equivalent to a 44.5% increase in tariffs) between the target and the sender. Complete export sanctions have similar effects (a 76% decrease in trade with a corresponding tariff-equivalent increase of 42.8%), while the impact of complete import sanctions is still large but significantly smaller (a 52% decrease in trade with a corresponding tariff-equivalent increase of 20.2%). As expected, the effects of partial sanctions are smaller.

Our estimates of the effects of economic sanctions on trade appear intuitive and plausible for the most part. Importantly, though, our substantiation of the heterogeneity of these effects hinges on the GSDB's distinction of sanctions based on the direction of trade flows (i.e., export sanctions vs import sanctions vs bilateral sanctions), their stringency, and their coverage (e.g., partial sanctions vs complete sanctions). For this reason, it is eminently sensible to allow for the heterogeneous effects of sanctions across these dimensions. Relying on the GSDB can help achieve this goal.

As already noted, the GSDB is well suited to analyze effects of trade-related sanctions based on structural gravity. But the GSDB can also be used to address a broad range of policy-related questions, especially in economics. For example, one can capitalize on the theoretical developments in the empirical trade literature to nest structural gravity into various production models that allow the partial estimates of the effects of sanctions to be used to study the effects of sanctions on wages, employment, the environment, and other variables of interest. By quantifying the impact of sanctions on key economic indicators, this approach may also help increase the accuracy of the estimates on the costs of sanctions. Such costs estimates could be used as measures of the effectiveness of sanctions and contribute to the literature and the debate on sanction effectiveness and success. In addition, such costs estimates could be used to test models of war or democratic change, where the size of the perceived costs of the action (war, for instance) by the leaders is a key element.

Importantly, the new dataset should not be viewed as being designed exclusively for the analysis of issues related to international trade. On the contrary, the GSDB's information on sanctions can be utilized to study their effects in a broad range of areas/fields, including their implications for financial flows, tourism, the determinants of war, and the significance of democratization efforts. What's more, the detailed identification of different types of sanctions in the GSDB may help deepen researchers' understanding of the interplay between different sanctions policies, thereby enabling them to determine which combinations of sanction types are more effective in achieving various policy objectives. We hasten to add that the dyadic structure of the dataset can help extract more nuanced information on the nature of interactions, not just among senders and targets, but also among non-sanctioning countries. This is important because it can help resolve the ongoing debate on the effects of extraterritorial (or secondary) sanctions that the US would use against any country that interacts economically with Iran.⁶

⁶ Extraterritorial sanctions by the US on Iran apply to enterprises or individuals who do not have direct links with the US. These sanctions target activities that are not within US jurisdiction by threatening to apply punishment to any enterprise or persons that engage in the targeted activity.

Finally, to the best of our knowledge, the GSDB is the first dataset that systematically lists the official sanction objectives and combines these objectives with an assessment of the success score behind the stated sanctions. In combination with the GSDB's coverage of sanctions over an extended period, this new dimension opens up several new avenues for analysis. As indicated by the descriptive statistics in subsequent sections, in recent years a large share of sanction objectives appears to have been increasingly linked to democratization efforts and to support for human rights while, at the same time, the success score of recent sanctions has declined and the duration of sanctions in force over the observed decades has increased. We think the GSDB can be used to assess the rationale and effectiveness of these two new dimensions, as well as their timing, which are of interest to economists and political scientists alike and which has been under-explored due to the lack of appropriate data (c.f., [Peksen, 2019](#)). In sharp contrast to data from existing sanctions datasets – which are static and limit researchers' ability to study time-specific factors that may affect the probability of sanction success – the GSDB allows a comprehensive dynamic analysis.

The paper is organized as follows. In [Section 2](#), we provide an overview of the GSDB that documents the dimensions and coverage of sanctions discussed above. [Section 3](#) contains a brief review of the various databases. [Section 4](#) contains our empirical application. [Section 5](#) concludes.

2. The global sanctions data base: overview, dimensions and coverage

The Global Sanctions Data Base (GSDB) extends the dataset of [Hufbauer et al. \(2007\)](#) and complements several datasets developed by political scientists.⁷ It is a comprehensive database with a long time series coverage that includes sanction cases with diverse objectives along multiple dimensions. As a result, the GSDB covers 729 publicly traceable multilateral, plurilateral and purely bilateral sanctions that were enforced over the 1950–2016 period.⁸

The GSDB defines sanctions as binding restrictive measures applied by individual nations, country groups, the United Nations (UN), and other international organizations, to address different types of violations of international norms by inducing target countries to change their behavior or to constrain their actions. Sanctions are classified in the GSDB across three broad dimensions including: (i) sanction type, (ii) sanction objectives, and (iii) sanction success. In addition to including all enforced sanctions that occurred in response to economic and/or political concerns,⁹ the GSDB covers sanctions that were imposed in response to specific environmental issues,¹⁰ as well as sanctions applied to specific individuals and/or groups within the target country. Another important dimension of the GSDB is its special focus on trade sanctions which are classified across several dimensions including, for example, the direction of affected trade flows as well as their stringency and coverage.

To ensure maximum coverage, consistency and reliability, the sanction cases in the GSDB were collected from alternative sources that were cross checked across several dimensions. Multilateral sanctions are mostly based on United Nations Security Council Resolutions and collected from publicly available UN documents. In the cases of the US and the EU, policy orders and corresponding national sources were screened. Moreover, for each individual country in the GSDB, national sources were searched for additional cases. Finally, international newspapers and history books were screened, and keyword web searches in online search engines were conducted to identify country specific sanctions, particularly for some older and bilateral sanction cases. To ensure reliability and consistency a regular review process was implemented during the coding period to check each identified case by at least three different individuals. In addition, the newly created GSDB was cross checked against existing sources and databases including the Stockholm International Peace Research Institute, the original sanctions database of [Hufbauer et al. \(2007\)](#), and the Threat and Imposition of Economic Sanctions (TIES) database of [Morgan et al. \(2014\)](#).

Before we provide details on several key dimensions of the GSDB, we present two figures that capture the complexity and increasing importance of sanctions. [Fig. 1](#) illustrates the number of countries confronted with sanctions during the 1950–2016 period. The figure unveils several noteworthy patterns. First, we observe a steady increase in the number of sanctions. A couple of explanations could explain this trend. (i) The popularity of sanctions might have increased because the deepening of integration in the world economy together with the US's and the EU's recent (and relatively costly, in terms of economic, human and political resources) experiences in Iraq and Afghanistan may have induced policymakers into viewing sanctions as more effective tools (as compared to, for example, military interventions) in foreign affairs. (ii) In principle, sanctions are not subject to the rules of the World Trade Organization (WTO), which have governed the evolution of most trade policies during the period of investigation. With more countries joining the WTO, national governments were left with a smaller number of policy tools to pursue their foreign policy objectives, thereby having to rely more on sanctions. In addition to the general trend of increasing use of sanctions, [Fig. 1](#) captures some idiosyncratic changes. For example, there is a spike in sanctions in the 70s most likely due to the rise in prospects of potential escalation of nuclear conflicts (uranium

⁷ We are very grateful to Gary Hufbauer and his team for sharing their original data with us. See [Section 3](#) for a review of the existing datasets that we view as complementary to the GSDB.

⁸ The GSDB is currently being updated by the authors of this paper to cover 1045 sanction cases over 1950–2019. Details are available on request.

⁹ Unlike other prominent sanctions databases (e.g., [Hufbauer et al., 2007](#) and [Morgan et al., 2014](#)), the GSDB does not include sanction threats but only sanction cases that have been enforced.

¹⁰ The US diplomatic sanctions imposed on Iceland in 2014 for whaling as "Iceland's actions jeopardize[d] the survival of the fin whale" is a prominent example of this sanction type.

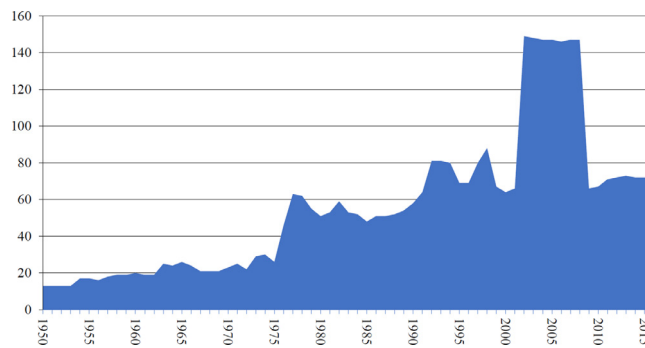


Fig. 1. Yearly number of countries confronted with sanctions. *Note:* This figure depicts the number of countries that are confronted with sanctions in each year of the sample coverage.

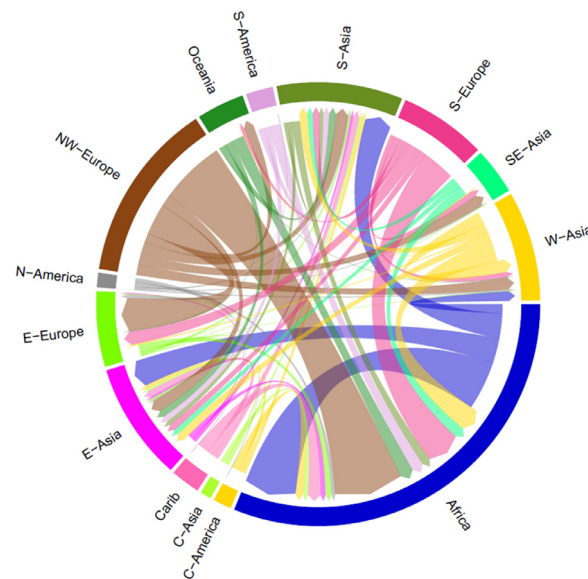


Fig. 2. The bilateral structure of sanctions. *Note:* This radial chord diagram depicts sanction activities between different regions in the world for the year 2015. The classification of the listed regions is based on the UN geoscheme. A detailed list of member countries for each region is presented in the Appendix. The direction of the arrows indicates the sender and target countries, while the thickness of the arrows reflects the number of imposed trade sanctions between regions.

shipments from Canada to the EEC members were halted due to the EEC's refusal to safeguard uranium against its use in nuclear weapons), as well as the escalation of Arab-Israeli conflict on the Sinai Peninsula (the Arab League boycotted Israeli-made goods and the US sanctioned the Arab nations as an opposition to the Arab League boycott). The second spike, which is observed in the 90s, is due to sanction impositions related to multiple civil wars in Africa, the Yugoslav Wars and the collapse of the Soviet Union. Finally, the third spike occurs in the early 2000s which is caused by the US sanction imposed on the International Criminal Court (ICC) Rome Statute Signatories in 2002.

Fig. 2 utilizes the GSDB's bilateral structure to present a radial dendrogram (a chord diagram) that illustrates sanction activities among major regions in 2015.¹¹ The direction of the arrows in Fig. 2 indicates the sender and target countries, while the thickness of the arrows reflects the number of imposed trade sanctions between regions. Countries from North-Western Europe (NW Europe) imposed the largest number of trade sanctions in Africa (brown arrow). Interestingly, not a single state from Africa imposed a trade ban against a North-Western European state. This non-reciprocity is a striking feature of the data. What's more, some regions are barely sanctioned by other regions while others have been confronted with sanctions in almost every listed region. For example, East and South Asia have been sanctioned by almost all regions in 2015.

¹¹ The regions are classified according to the UN Geoscheme – a list of the countries contained in each of these regions is provided in the Appendix.

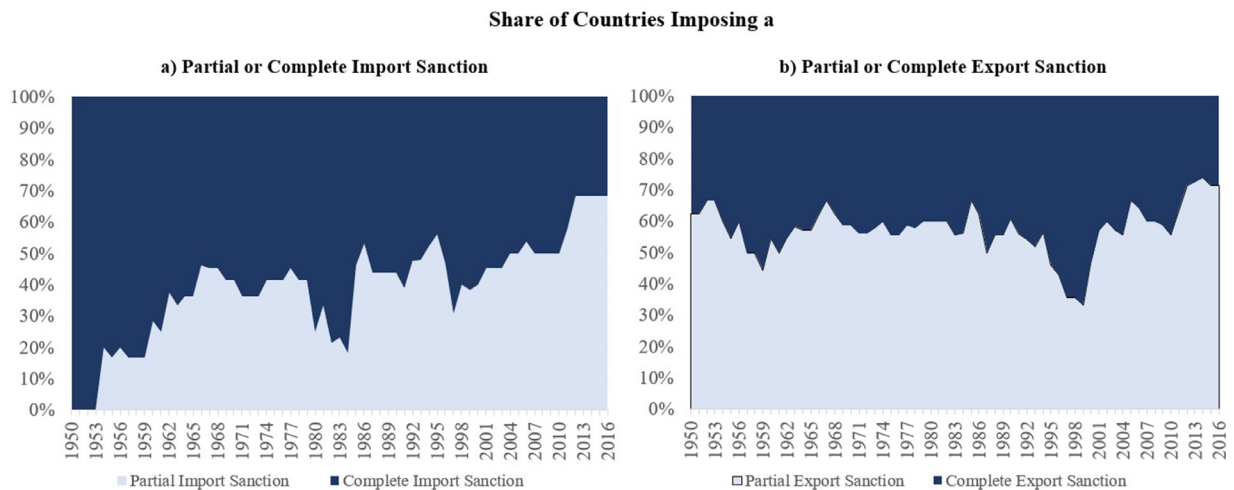


Fig. 3. Partial versus complete trade sanctions. *Note:* The figure illustrates the evolution of partial and complete trade sanctions between 1950 and 2016. Panel a) shows the share of sanctioning countries imposing a partial or a complete import sanction. Panel b) shows the share of sanctioning countries imposing a partial or a complete export sanction. See main text for further details and analysis.

2.1. Types of sanctions

The GSDB classifies sanctions by type in five categories covering trade, financial activity, arms, military assistance, travel, plus a residual category collecting other sanctions. This section describes the classification criteria and offers brief examples for each type.

2.1.1. Trade sanctions

The GSDB defines trade sanctions as measures that aim to restrain economic interactions with a target country by limiting international trade.¹² As noted in the Introduction, a key motivating factor for creating the GSDB was the need to quantify the economic impact of trade sanctions. To achieve this objective, the GSDB aims to capture three important dimensions of trade sanctions.¹³

First, depending on the direction of trade flows, the GSDB distinguishes among sanctions on exports from the sender to the target (i.e., export sanctions), sanctions on imports from the target to the sender (i.e., import sanctions), and sanctions that simultaneously apply to both exports and imports between the two sides (i.e., bilateral trade sanctions). Second, the GSDB distinguishes between sanctions that apply only to specific goods and/or particular sector(s) of trade (i.e., partial trade sanctions) or to all sectors (i.e., complete trade sanctions). Third, the GSDB distinguishes between sanctions imposed by one country (i.e., a unilateral sanction) vs. sanctions that are imposed simultaneously by many countries (i.e., a multilateral sanction).^{14,15}

Fig. 3 depicts several interesting patterns in the evolution of partial vs. complete and imports vs. exports trade sanctions over time. Panel (a) reveals that in the early 1950s, all countries participating in import sanctions restricted imports to the full extent. Interestingly, in the succeeding years, an increasing number of countries restricted imports only partially (e.g., by banning imports of specific goods). In 2015, around 70% of all countries applying import sanctions restricted their corresponding trade flows only partially (i.e., by preventing imports only for a specific range of products). Two possible explanations for this change could be: (i) the presence and increased importance of global value chains (GVCs); and (ii) pronounced specialization in production, which makes certain countries more dependent on others (e.g., Europe depends on imports of oil and natural gas from Russia). In contrast, as shown in panel (b) of Fig. 3, the evolution of export sanctions with respect to the extent of trade restrictions looks quite different. Over the past 65 years, countries have been less eager

¹² The definition of trade sanctions in the GSDB is similar to Hufbauer et al. (2007) in that the imposition of classic trade policy instruments such as tariffs or anti-dumping is not viewed as sanction. The motivation behind this distinction is that standard trade policy measures are used to protect domestic economic interests while sanctions are imposed to punish or compel a target country to achieve the sender(s) political objective(s). We do recognize, however, that the distinction between sanctions and standard trade policy tools is increasingly becoming blurred.

¹³ Fig. A.1 in the Appendix provides a schematic illustration.

¹⁴ For example, the UN sanction against Iran based on UN Resolution 1696 (2006) represents a full multilateral trade sanction. An example of a unilateral full trade sanction is the sanction of the US on Cuba in 1962. Lastly, an example of a unilateral partial trade sanction is the US sanction on Liberia in July 2004.

¹⁵ In addition to the three main dimensions noted above, the GSDB includes detailed information on some very specific trade interventions such as, for example, export controls of small aviation, helicopter, aviation parts and electronics, or export restrictions of high-tech products. The partial character of these types of trade sanctions is very heterogeneous as the product ranges differ substantially.

to restrict exports in their entirety. Between 1950 and 1990 about 60% of countries that sanctioned exports imposed a partial restriction. In the ten years that followed, about half of all export restricting countries applied complete export sanctions, whereas in the early 2000s the imposition of partial export sanctions was on the rise again. These heterogeneous patterns depicted in [Fig. 3](#) illustrate the importance of accounting properly for the distinct dimensions of trade sanctions (e.g., partial vs. complete and imports vs. exports) in the GSDB. We will confirm this argument with formal econometric analysis in [Section 4](#).

2.1.2. Financial sanctions

Another important category of sanctions covered in the GSDB are financial restrictions. The prominence of financial restrictions rose significantly over time, primarily for two reasons. The first is due to the expansion of global economic activities, including the integration of financial markets. The second is related to the fact that financial sanctions can be implemented, monitored and enforced relatively more easily due to advances in technology. In many cases these sanctions involve freezing the exchange of financial assets and investments. Foreign assets can be frozen as a whole or partially for certain individuals, usually influential politicians or leaders in industry (targeted sanctions). Technically, bank accounts in targets are frozen by senders. Similarly, financial sanctions may restrict direct investments and/or limit the availability of credit for payments in the exchange of commodities including aid payments.¹⁶ In recent years the effectiveness of financial sanctions has been additionally improved by technically prohibiting any financial transaction related to a sanctioned economy,¹⁷ and by resorting to new enforcement methods (such as the prohibition of Iran's participation in SWIFT - Society for Worldwide Interbank Financial Telecommunication).¹⁸ In ongoing work, we have identified several pronounced and repeatedly used types of financial sanctions (e.g., freeze of financial assets vs. freeze of investment activities) which, as in the decomposition of the impact of trade sanctions, we believe promises to offer a refined decomposition that will prove helpful in quantifying properly their impact. We plan to augment the GSDB so that it can distinguish between several alternative types of financial restrictions.

2.1.3. Travel restrictions

We classify sanctions as travel restrictions when they restrict the freedom of geographical movement of individuals. The GSDB identifies two types of travel sanctions: (i) travel restrictions for people into the sender country; and (ii) journeys from the sanctioning to the sanctioned country. Some cases include travel bans only on diplomatic staff of the sanctioned countries. This type of individual travel restriction is identified separately in the GSDB. One example of such a sanction is Russia's travel ban against Georgia. A total ban on Georgians traveling to Russia was imposed after Tbilisi expelled Russian officers for spying in 2006 ([Russia Starts Deporting Georgian Immigrants \(2006\)](#)). Similarly, a multilateral travel ban was introduced by the UN against Sudan in 1996. In the corresponding [UN Resolution 1054 \(1996\)](#), the UN decided that all states shall take steps to restrict the entry into or transit through their territory of members of the Government of Sudan and members of the Sudanese armed forces. A more extreme travel restriction was the ban between Armenia and Azerbaijan that resulted from The Nagorno-Karabakh War between these nations that has been in place since 1989 ([Fraser et al., 1990](#)). Unlike the UN travel sanction on Sudan, in which only the blacklisted officials were affected, the Armenia-Azerbaijan border closure has also affected civilians and the conflict still persists.

2.1.4. Arms sanctions

Arms sanctions restrict arms sales. Specifically, the GSDB documents whether arms exports to and/or arms imports from a sanctioned country are temporarily banned. For example, the United States imposed an arms sanction on Afghanistan in June 1996, following the establishment of the Taliban regime ([61 FR 33313, 1996](#)). Another example is the autonomous sanction policy of the Australian government against Russia from March 19, 2014, when the Australian Government announced it would impose a sanctions regime in response to the Russian threat to the sovereignty and territorial integrity of Ukraine. On September 1, 2014, the Prime Minister announced autonomous sanctions in relation to Russia, Crimea and Sevastopol ([Australia Implements an Autonomous Sanctions Regime in Relation to Russia, 2014](#)). Accordingly, Australian law prohibited the direct or indirect supply, sale or transfer to Russia, for use in Russia, or for the benefit of Russia, of arms or related materials. An example of a multilateral arms sanction is the UN ban of arms sales to Lebanon from August 2006 as the consequence of Hezbollah's attack on Israel in July 2006 ([UN Resolution 1701 \(2006\)](#)). This sanction is still in place.

¹⁶ This was the case, for example, when the US imposed sanctions against Haiti due to human rights violations ([Foreign Operations Appropriations Act for FY2001, 2001](#)). Similarly, the EU stopped aid payments to Mali after 2012 due to terrorist acts carried out against the Malian Armed Forces that jeopardized the country's territorial integrity and the safety of its population.

¹⁷ The case of the latest Iran sanctions illustrates the degree of sophistication of financial sanctions. In [UN Resolution 1737 \(2006\)](#) and with reference to [UN Resolution 1696 \(2006\)](#) it is stated that the UN should prohibit the provision to Iran of any financial assistance, investment, brokering or other services, and the transfer of financial resources.

¹⁸ Belgium-based SWIFT, which provides banks with a system for moving funds around the world, accepted the international decision in 2012 to block Iranian banks from using its network to transfer assets [SWIFT Instructed to Disconnect Sanctioned Iranian Banks Following EU Council Decision \(2012\)](#). Expelling Iranian banks from Worldwide Interbank Financial Telecommunication de facto shut down Iran's ability to do business with the rest of the world.

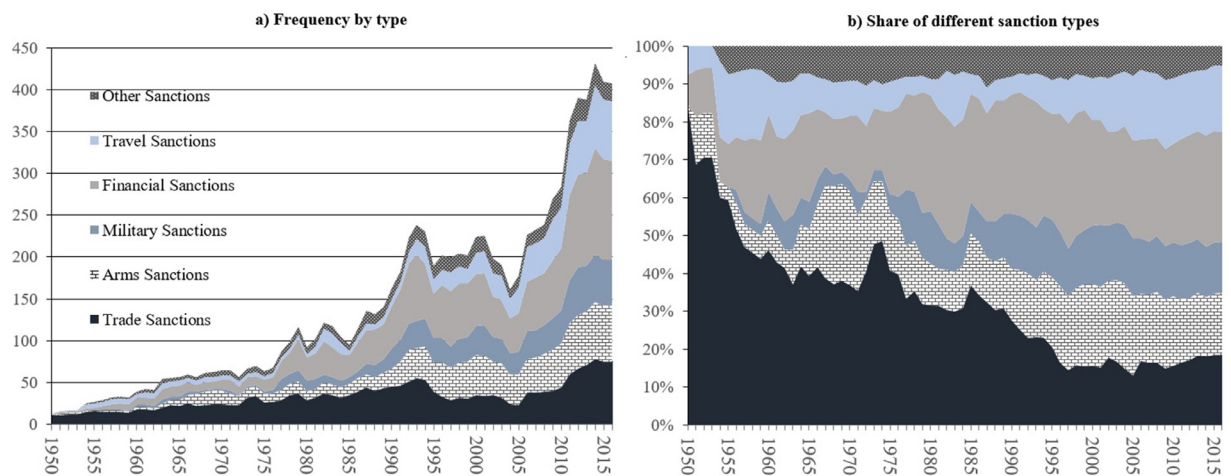


Fig. 4. The evolution of sanctions over time. *Note:* This figure presents the evolution of sanctions by type. Panel a) shows the number of imposed sanctions by type for the period 1950–2016, and Panel b) illustrates the share of sanctions impositions by type in each year for the period 1950–2016. See main text for further details and analysis. For a better readability the order of different sanction types in the legend corresponds to the order of the shaded areas in the two panels.

2.1.5. Military assistance

Due to the large number of cases and repeated imposition of this type of sanction, the GSDB classifies sanctions on military assistance as a separate category. Bans in this category can cover either monetary or personal assistance. An example for such a sanction is Switzerland's reaction to political developments in Somalia in 2009 ([Verordnung über Massnahmen gegenüber Somalia vom 13. Mai 2009 \(Regulations on Measure Against Somalia\) \(2009\)](#)). In compliance with the Swiss law on sanctions, the federal council decided to prohibit the provision of services such as financing, mediation and technical training relating to the supply, sale, transit, production, maintenance and use of armaments, and to military activities in Somalia. Another example of the military assistance sanction is the previously mentioned UN sanction on Lebanon imposed in August 2006 ([UN Resolution 1701, 2006](#)).

2.1.6. Other types of sanctions

We collect cases that do not arise very frequently into a residual category labeled “other types”. The number of such sanctions is relatively small and they primarily entail diplomatic measures (such as the exclusion from or the interruption of diplomatic relations with the African Union), as well as flight and harbor restrictions. An example of a specific port entry restriction is the one by Turkey against Cyprus ([Turkish Measures against Cyprus' Shipping \(1987\)](#)) in 1987, when Turkey introduced the exclusive prohibition of Cypriot flagged vessels to call at Turkish ports. In 1997 Turkey issued new instructions to its ports to clarify uncertainties arising from the imposition of the restrictions, thus extending them against vessels under a foreign flag (of any nationality) sailing to Turkish ports directly from any Cypriot port under the effective control of the Republic of Cyprus, or against vessels of any nationality related to the Republic of Cyprus in terms of ownership or ship management. Another example of a diplomatic sanction is the exclusion of the Central African Republic from the African Union in 2013; this decision was repealed in 2016 ([AU Communiqué PSC/PR/COMM.\(CCCLXIII\), 2013](#)). An example of an even more severe diplomatic sanction is the complete suspension of Fiji from the Commonwealth as a result of democracy issues in Fiji ([Withdrawals and Suspension \(0000\)](#)).

Fig. 4 depicts the evolution and relative importance of the 729 sanctions in the GSDB by type over the 1950–2016 period. For each year, panel (a) reports the total number of sanctions and decomposes these sanctions by type. Panel (b) shows the relative importance of sanctions by reporting the yearly share of each type. Several distinct patterns stand out. A modest but steady overall increase in sanctions is observed between 1950 and 1975. During this period, trade restrictions were the dominant form of sanction. In addition, during the same period, the use of financial sanctions gradually became more prominent while all other types of sanctions played a relatively small role. The mid-70s witnessed a sudden and strong rise of imposed sanctions, followed by a period of modest change until the early 90s. Trade and financial sanctions remained dominant in this period. From the mid 80s to the mid 90s the use of sanctions went up. During this period, trade sanctions seemingly loose importance while financial sanctions remain popular. Notably, the imposition of arms sanctions rose disproportionately. Both the number and fraction of sanctions across the different types remained stable during the period from late 1990 until 2010. Lastly, since 2010 there has been a steady and homogeneous increase across all types of sanctions. Overall, **Fig. 4** suggests that the popularity of sanctions as a tool of coercive diplomacy has been on the rise. At the

same time, it unveils several significant changes in the relative importance of certain types of sanctions during the period 1950–2016.¹⁹

2.2. Objectives of sanctions

In the public debate, sanctions are most often perceived as a means to induce a change in a sanctioned country's policy regime. However, a closer look into the official government orders or resolutions suggests that sanctions aim at achieving a broader range of policy objectives. The GSDB identifies nine possible policy objectives that repeatedly appear in official documents. It does this by capitalizing on the fact that all sanctions related documents declare the targeted objectives that sanctioned countries have to fulfill for the imposed sanction(s) to be lifted. When sanctions have several policy objectives, the GSDB includes up to three of these objectives. In many cases, defined policy objectives can be classified into several categories. It is not possible to rank the defined objectives with respect to their priority.²⁰ Next, we describe the classification criteria for each of the nine stated policy objectives in the GSDB and we offer succinct examples for each type.

Policy Change The GSDB allocates sanction objectives to this category when they aim at enforcing a domestic (i.e., an economic, political or social) policy change in the sanctioned state. For example, in 2006 the US sanctioned Venezuela in order to enforce a change in the government's efforts to combat terrorism. The US government banned arms sales to Venezuela while accusing President Hugo Chavez's government of not helping enough to combat terrorism (71 FR 47554, 2006). Another example of a sanction imposed to induce a policy change is Japan's sanction against Russia in 2014 (Japan Releases Full list of Additional Sanctions against Russia, 2014). At that time, Japan decided to impose sanctions on Russian individuals and organizations that were judged to be directly responsible for rising political instability in eastern Ukraine.

Destabilize Regime Under this objective, sanctions aim at destabilizing the regime of a sanctioned state or just to exert political influence. In particular, for older sanction cases this objective includes cases where ideological reasons evoke sanctions (e.g., to prevent the spread of communism). An example of a sanction included in this objective can be found in the US restrictions against Niger (US to Suspend Aid to Niger, 2009). In 2009 the United States suspended about 27 million dollars in aid to Niger and banned visits by Niger President Mamadou Tandja's supporters to force Tandja to step down. Sanctions with this specific objective turn out to be predominantly implemented by the US.

Territorial Conflict The GSDB sorts sanction objectives into this category when the sanctioning and sanctioned states are parties to a militarized conflict over territory. An example for this objective can be found in the UK sanction against Argentina due to the Falklands crisis in 1982 (Martin, 1992). On April 3, the British government broke diplomatic relations with Argentina and imposed economic sanctions that included: freezing Argentine assets in British banks (valued at about \$1.5 billion); banning arms sales to Argentina; suspending export credit insurance and banning imports from Argentina. If sanctioning countries are not part of an underlying conflict related to a sanction, then the objective in the GSDB is generally defined as "end war" (see below).

Prevent War Sanctions with this objective aim to de-escalate a military conflict with other countries. An example can be found in the UN Resolution 1521 (2003). The UN imposed sanctions on Liberia because it viewed this state as a threat to international peace and security in West Africa.

Terrorism The GSDB classifies sanction objectives in this category when they aim to motivate a country to stop supporting or tolerating terrorist groups. An example can be found in the US Executive Order 13399 (2006). The US imposed sanctions on Syria because it held it responsible for planning, sponsoring, organizing, and/or perpetrating the terrorist act in Beirut, Lebanon that resulted in the assassination of then Prime Minister of Lebanon Rafiq Hariri, as well as other deaths.

End War These sanctions aim to end inter-state war, intra-state war, civil wars, and territorial conflict, including genocide. Examples can be found in the EU sanctions against Sudan. In paragraph 3 of the EU Council Common Position 2005/411/CFSP (2005) the EU declared that the arms sanction against Sudan was imposed to promote lasting peace and reconciliation within the nation. Also, the just noted Common Position sanctions individuals that are proclaimed a threat to stability in Darfur and/or violate human rights.

Human Rights The GSDB classifies sanction objectives in this category when their goal is to end human rights violations in sanctioned states, including minority rights violations. The number of sanctions used because of human rights violations has been on the rise over the years, as will be further illustrated. An example for this type of sanction can be found in Canada's reaction to political events (specifically the deteriorating human rights situation such as the unwarranted imprisonment of democratic supporters) in Belarus in 2006 (Export Controls to Belarus, 2006).

Democracy These sanctions aim at restoring democratic order mostly after a coup d'état. An example can be found in the EU Council Regulation No 377/2012 (2012). This is a targeted sanction against certain persons, entities and bodies who sought to prevent or block a peaceful political process, or who took action to undermine stability in the Republic of Guinea-Bissau.

Other Objectives This category includes objectives that rarely appear in official documents and, therefore, are not prominent enough to form a separate group. Such objectives include: ending drug trafficking, changing trade practices, releasing imprisoned citizens, and fighting corruption. An example can be found in the EU Council Decision

¹⁹ Fig. A.2 in the Appendix confirms this development with increasing number of imposed sanctions over time.

²⁰ The GSDB only includes officially listed objectives. However, it is possible that the true objectives of sanctions can differ from those officially proclaimed.

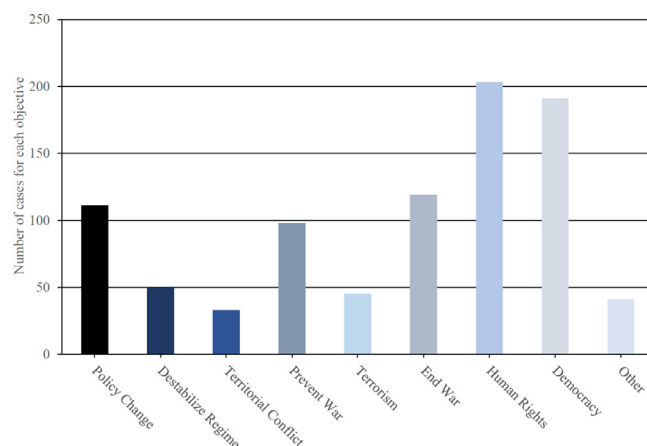


Fig. 5. Distribution of policy objectives in sanctions (1950–2016). *Note:* This figure depicts the number of observed policy objectives declared in all sanctions listed in the GSDB. For each sanction up to three objectives are documented. See main text for further details and analysis.

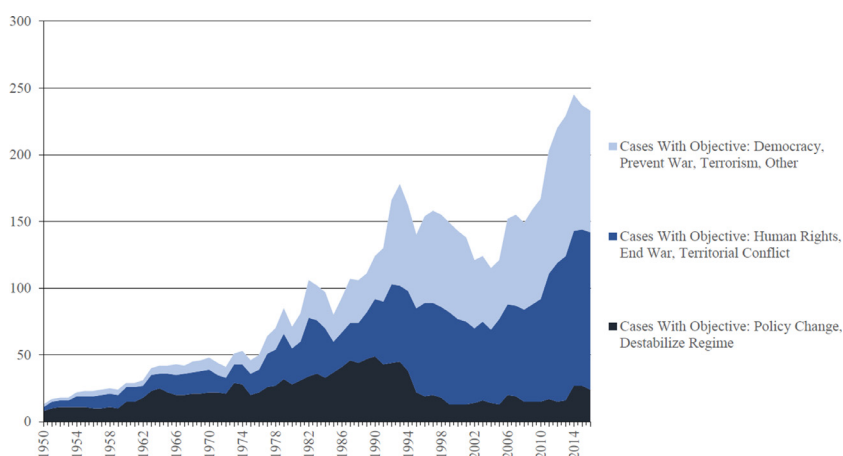


Fig. 6. Yearly distribution of policy objectives in sanctions (1950–2016). *Note:* This figure depicts the yearly number of observed policy objectives declared in all sanctions listed in the GSDB. For each sanction up to three objectives are documented. For clarity we have combined the objectives in the three groups that we discuss in the main text. A corresponding figure describing the evolution of individual objectives appears in the Appendix. See main text for further details and analysis.

2011/72/CFSP (2011) against Tunisia for misuse of funds (corruption). As a result of the sanction, the economic resources and funds held by the persons responsible for misappropriating Tunisian State funds (including natural or legal persons or entities associated with them, as listed in the Annex of the Decision) were frozen.

We conclude this section with a descriptive analysis of the distribution and evolution of sanction objectives between 1950 and 2016. Fig. 5 shows the distribution of sanction objectives across all sanction cases in the GSDB between 1950 and 2016. Because some sanction cases, especially in recent years, include a number of policy goals, the total number of observed objectives in Fig. 5 is larger than the corresponding number of sanction cases in the GSDB. By a discrete margin, the most often declared policy objective is related to human rights issues, followed by democracy related objectives. The second group of most popular objectives involves policy change, preventing wars, and ending wars. Regime destabilization, terrorism and territorial conflict related issues, as well as other policy goals are observed less frequently.

While informative, the numbers in Fig. 5 may miss some significant changes in the evolution of objectives over time. Fig. 6 aims to fill this void. For clarity, Fig. 6 groups the objectives in three categories, which are designed to capture common patterns across the evolution of sanction objectives. Specifically, we combine policy change and regime destabilization in one group, the objectives of human rights, endings wars, and territorial conflict issues into a second group, and the remaining objectives into a third group. However, we also offer individual analysis for each objective, which appear in Fig. A.3 of the Appendix and which are consistent with the general conclusions we draw based on the aggregated groups here. The first noteworthy pattern in Fig. 6 emerges between 1950 and 1994. During this period, the number of all policy objectives increased significantly and at a similar rate, with the category including policy change and regime destabilization being predominant. The pattern changed dramatically after the mid-90s, when the objectives of policy change and regime destabilization almost disappeared and were substituted especially by goals related to human rights, endings wars, and ter-

territorial conflict issues. In recent years, democracy related policy objectives have re-gained relevance and have even exceeded the levels of the 80s and 90s. A yearly relative distribution of policy objectives in all sanction cases is presented in Fig. A.4 in the Appendix.

2.3. Success of sanctions

An important dimension of the academic and policy debates on sanctions is whether they are effective in achieving their objectives or not (c.f., Galtung, 1967 and Hufbauer et al., 2007). The GSDB relies on official government statements or indirect confirmations in international press announcements to document whether sanction objectives have been achieved once a sanction was imposed. For each of the policy objectives in the GSDB five different success scores are possible:

Partial Success/Achievement The GSDB classifies a sanction as partially successful if the sanctioned state partially accepts the requests from the sanctioning state(s). An example can be found in the US sanctions against Ecuador in 1995 (Gedda, 1995). The United States imposed an arms sanction on Peru and Ecuador in February, following the outbreak of a border skirmish between the two states, which left 78 dead and hundreds wounded. In the same year, the State Department announced a partial lifting of sanctions against Ecuador and Peru. The US government declared that the action was taken following the deployment of an international observer group in the contested area.

Full Success/Achievement The GSDB classifies a sanction as fully successful when a sanctioned state fully accepts the requests of the sanctioning state(s). The US sanction against Haiti (Department of State Suspension Notice, 1991) is a notable example. In 1991 president George Bush stepped up the pressure on coup leaders who deposed Haitian President Jean-Bertrand Aristide and ordered a halt to US trade with the Caribbean nation. Three years later, on October 15, 1994, the UN welcomed with great satisfaction the return to Haiti of President Jean-Bertrand Aristide. The ban on economic interactions was lifted by the US while military sanctions related to further policy objectives (democracy and policy change) remained in place.

Settlement by Negotiations The GSDB indicates whether the sanctioning and sanctioned parties agree to settle a conflict by negotiations. This category appears not only in war and conflict related objectives but also in human rights, democracy, and territorial conflict cases. For example, in March 1999, in reaction to the war between Ethiopia and Eritrea, the Council of the European Union adopted EU Council Common Position 1999/206/CFSP (1999) which imposed an arms sanction on Ethiopia and Eritrea. In 2001, the European Union declared that it expected both Ethiopia and Eritrea to fully implement the peace agreement (EU Council Common Position 2001/215/CFSP, 2001). Final success of the initial policy objective still remains unclear after the lifting of sanctions. (Otherwise, the sanction policy would be classified accordingly.)

Enhancement/Failure The GSDB classifies sanctions in this category when the reason for a particular sanction policy does not go away or even becomes stronger. Moreover, in some cases the priorities of sanctions imposing countries change, thereby resulting in a lifting of sanctions even though the original policy objective might not have been achieved. These sanction cases are classified as failed. An example of a failed sanction policy can be found in the case of Indonesia (Gelling, 2005). The United States dropped its military sanction against Indonesia, six years after the Indonesian army killed 1500 people in the occupied country of East Timor. The decision allowed the US government to provide financial assistance to Indonesia to buy American weapons and to train its officers in US military colleges. While the initial US sanction aimed to improve human rights in Indonesia, a change in American foreign policy priorities resulted in an unsuccessful sanction policy. The new policy reflected Washington's desire to maintain closer relations with Indonesia which, as the Bush administration believed, would allow considerable progress against terrorism.

Ongoing The GSDB classifies sanctions as ongoing when they are still imposed or replaced by equivalent sanctions.

We conclude this section with a descriptive analysis of the evolution of the sanction success scores over time and depending on the sanction objectives. Fig. 7 traces the evolution of policy outcomes for all sanctions (regardless of objective) over the period 1950–2016. Several interesting patterns emerge. First, until the mid-60s almost 50% of the policy objectives of all sanctions are declared as failed. For the same period, between 20% and 30% of defined sanction policy objectives are declared as totally successful. Second, from the mid-60s until 1995, sanction policy objectives are steadily and increasingly assessed as totally successful, while the share of policy aims assessed as unsuccessful analogously declines. Third, after 1995 there has been a dramatic drop in sanction policy objectives that are deemed successful. At the same time, almost no defined policy objective is assessed as unsuccessful in recent years. Clearly, in the last 20 years a dominant feature depicted in Fig. 7 is the large share of ongoing sanctions that are considered neither successful nor failed. This is a possible indicator because of the increased complexity of sanctions and the mixture of issues they target.

Fig. 8 complements Fig. 7 by offering an alternative perspective on the assessment of sanction policy outcomes across the observed policy objectives. Interestingly, except for terrorism related policy objectives, where the success rate is very low, around one third of the listed aims are assessed as successful. A significantly stronger positive assessment is observed for policy objectives related to democracy issues. When it comes to negative assessments, the picture is much more heterogeneous. Terrorism, regime destabilization, and policy change related objectives are by far more often assessed as failed, as compared to the other policy objectives. Overall, the average success rate of around 34% across different policy objectives is very much in line with the effectiveness rate of 34% that is reported in the analysis of Hufbauer et al. (2007) and falls in the middle of the success rates ranging between 27% and 37% from Threat and Imposition of Economic Sanctions (TIES) database of Morgan et al. (2014).

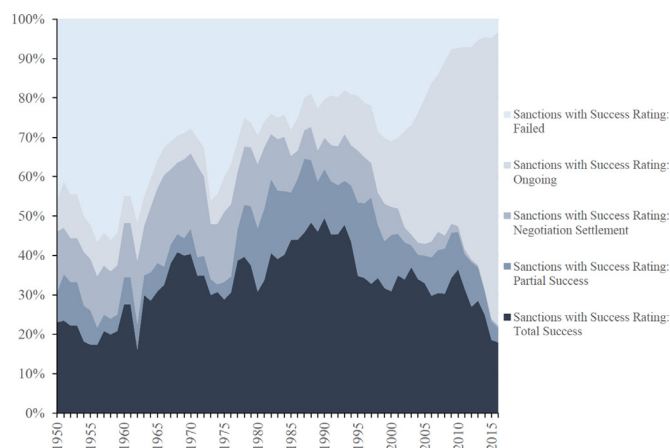


Fig. 7. Assessment of policy objectives in sanctions (1950–2016). *Note:* This figure depicts the yearly policy outcome registered for declared policy objectives in sanctions. For each sanction case up to three policy objectives are documented. See main text for further details and analysis. For a better readability the order of sanctions classified by outcome in the legend corresponds to the order of the shaded areas in the graph.

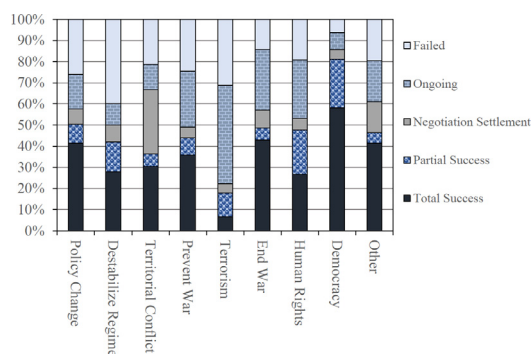


Fig. 8. Assessment of sanctions policy objectives (1950–2016). *Note:* This figure depicts the outcomes across the declared policy objectives in sanctions. For each sanction case up to three policy objectives are documented. See main text for further details and analysis. For a better readability the order of different outcomes listed in the legend corresponds to the order of the patterned colors in the bars.

3. The GSDB in the family of sanction databases

The GSDB offers a number of unique features and dimensions that should be useful to researchers and policy analysts not just in Economics but also in Political Science and International Relations. Nonetheless, as noted in the Introduction, we are aware that the GSDB does not include some characteristics that are thoroughly covered in other sanction datasets. Accordingly, we view the GSDB as complementary to several excellent existing datasets which we discuss below. We recommend interested readers to become familiar with these datasets because they offer unique features that could be employed separately or in combination depending on the research question examined. To facilitate this process, we briefly review the most well-known and commonly used sanction datasets.

HSE/HSEO The HSE is the oldest sanction database created by economists Gary Hufbauer, Jeffrey Schott and Kimberly Elliott (with the later addition of Barbara Oegg). It was first released in 1985 in a monograph titled *Economic Sanctions Reconsidered: History and Current Policy* and contained “economic sanctions.” The second edition of 1990 got supplemented with the addition of 11 recent sanction cases, and the third edition, which was released in 2007, contained a total of 204 cases. The database contains both threatened and imposed sanction cases, or ‘episodes’ as they are referred by the authors, and mostly deals with US sanctions. For each episode, the authors register the chronology of key events, goals of sender countries, responses of target countries, as well as the responses of the countries not directly involved in a case, economic costs of sanctions (such as trade losses and GNP reductions), and the authors’ assessment of sanction performance and evaluation of sanction success. The database covers the period of 1914 to 2006 and includes such types of sanctions as exports bans, imports bans, asset freezes and interruptions in financial flows. The database also categorizes the five objectives which senders of sanctions pursue: limited policy changes in a target country, regime change in a target country, disruption of military adventures, impairment of target’s military potential, and major policy changes in a target country. In addition, the authors define a success score for each case which is compiled from the two components: policy result scored from 1 (failure) to 4 (success) and contribution of a sanction to the achievement of its objective(s) scored from 1 (failure) to 4

(success). The success score is computed as the multiplication of the two ranked from 1 (total failure) to 16 (significant success).

TIES The TIES database was developed by political scientists T. Clifton Morgan, Navin Bapat, and Valentin Krustev (with the later addition of Yoshiharu Kobayashi) and was first released in 2006. The most recent version (from 2014) covers 1412 cases (both threatened and imposed) during 1945–2005. The database focuses mostly on economic (trade) and financial sanctions. Overall, it differentiates among measures such as import tariffs, export controls, asset freezes, foreign aid cuts, import bans, travel bans, agreement suspensions, and economic blockades. The database also differentiates among fifteen sanction objectives, classifies economic costs of sanctions for both sender(s) and target(s) as minor, major, and severe, and defines a success score or outcome for each sanction starting from 1 (partial acquiescence by the target) to 10 (negotiated settlement following sanctions imposition). A notable feature of the TIES database is that it gives sanctions a success score not only from a sender's perspective but also from a target's perspective (e.g., target may defeat sanctions regime).

TSC The Targeted Sanctions Consortium (TSC) database focuses exclusively on sanction measures imposed by the UN Security Council (UNSC). The database covers the period 1991–2014 and contains 23 sanction episodes sorted according to target country/group and further divided into 63 episodes that are classified according to the changing objectives sought from targets. The database outlines three outcomes of the UNSC sanctions: target coercion, target constriction, and signaling to both the target and the international community. The latter outcome of a sanction is a valuable distinction of the TSC because it introduces the idea of a sanction being successful even if that sanction does not result in compliance but still sends signals to the international community; the database also defines nine sanction objectives. Even though the database includes much fewer cases compared to the HSE(HSEO) and the TIES, it is very descriptive and provides a detailed overview of each sanction case as well as an evaluation of the effectiveness of each UNSC sanction and the description of unintended consequences.

EUSANCT The EUSANCT is a newly crafted sanction database by the political scientists Patrick Weber and Gerald Schneider that was firstly presented at the annual conference of the European Political Science Association in Vienna in 2018. The database was created by merging and updating the HSE, the TIES, and the GIGA²¹ databases and particularly focuses on the EU sanctions, due to the EU being the second leading sender of sanctions after the US, along with the UN and US sanctions. It covers the period 1989–2015 and includes the total of 325 threatened and imposed sanctions cases, among which 106 cases have not been previously defined in any of the used three databases. The EUSANCT adopts the effectiveness measures of the HSE and TIES. Importantly, it also identifies its own outcome for each sanction. A distinctive feature of this database is that it includes a number of political variables such as V-Dem Electoral Democracy Score (Coppedge et al., 2017), Political Terror Scales (Gibney et al., 2016), instances of coups (Powell and Thyne, 2011) and others. As the GSDB, the EUSANCT has a dyadic structure that makes it convenient to utilize in bilateral analyses.

Table 1 offers a concise comparison between the sanctions datasets described in this section, together with the GSDB, across several salient dimensions in table format. To reiterate the opening discussion of this section, we believe that the GSDB complements the datasets discussed above by offering several unique features and dimensions. However, we do recognize that these datasets also offer unique and important characteristics that are not present in the GSDB. Accordingly, we recommend that researchers and analysts who work on sanctions become familiar with all these datasets and use them separately or in combination depending on the needs and goals of their specific projects.

4. Sanctions and trade: an application of the GSDB

One of the key characteristics of the GSDB and a distinct motivational factor behind its creation is its rich, trade-related dimensionality. Specifically, as discussed earlier, the GSDB differentiates sanctions on the basis of the direction of trade flows (i.e., sanctions on exports vs. sanctions on imports) and the stringency of coverage (i.e., partial sanctions vs. complete sanctions). This section capitalizes on these novel features of the GSDB and its extended time coverage to offer empirical evidence on the impact of sanctions on international trade.

Specifically, we implement the latest developments in the estimation of the gravity model in the empirical trade literature represented by the following estimating equation:²²

$$X_{ij,t} = \exp[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \text{GRAV}_{ij,t}\alpha + \text{SANCT}_{ij,t}\beta] + \epsilon_{ij,t}. \quad (1)$$

Here, $X_{ij,t}$ denotes nominal trade flows from exporter i to importer j at time t .²³ Following the recommendations of Santos Silva and Tenreyro (2006, 2011), the exponential function on the right-hand side in (1) reflects our choice to employ the Poisson Pseudo Maximum Likelihood (PPML) estimator to obtain the main results. The benefits of using PPML can be described as follows: (i) it successfully handles the heteroskedasticity in trade data, which leads to inconsistent OLS estimates; and (ii) due to its multiplicative form, PPML utilizes the information contained in the zero trade flows. As demonstrated below, sensitivity analysis confirms our main findings with the standard OLS estimator.

²¹ The GIGA database was created by Clara Portela and Christian von Soest and focuses on the UN, US and EU sanctions in the period from 1990 to 2010.

²² In what follows, we only briefly summarize the best current practices for estimating gravity equations with references to the most relevant papers. For a detailed summary of the challenges and corresponding solutions for structural gravity estimations we refer interested readers to Yotov et al. (2016). We also refer readers to Baldwin and Taglioni (2006) and Head and Mayer (2014) for excellent surveys of the empirical gravity literature.

²³ The data on trade flows employed in our analysis come from several sources, including the International Monetary Fund (IMF) Direction of Trade Statistics (DOTs) database, the United Nations (UN) Comtrade database, and the World Integrated Trade Solution (WITS) Trade Stats database.

Table 1

Comparison of HSE, TIES, TSC, EUSANCT, and GSDB databases.

Database Period	HSE(2007) 1914–2006	TIES(2014) 1945–2005	TSC(2014) 1991–2013	EUSANCT(2018) 1989–2015	GSDB(2020) 1950–2016
Focus	Trade and financial sanctions	Trade, financial, and travel sanctions	All sanctions (targeted, trade, military, diplomatic, transportation)	All sanctions (arms, trade, financial, travel, diplomatic, targeted)	All sanctions (arms, military, trade, financial, travel, diplomatic, targeted)
# of cases	204	1,412	63	325	729
Types of cases	Unilateral & Multilateral States	Unilateral & Multilateral States & Organizations (EEC / EU only)	Multilateral States & Organizations (Taliban & Al-Qaida only)	Unilateral & Multilateral States	Unilateral & Multilateral States & Organizations
Types of targets			UNSC	US / EU/ UNSC	
Types of senders	States & Organizations	States & Organizations			States & Organizations
Outcomes of sanctions	5: 1) modest policy changes; 2) regime change in a target nation; 3) disruption of military action; 4) impairment of military potential; 5) major policy changes.	3: 1) target acquiesces; 2) target state changes; 3) issue directed at a target alters.	3: 1) coercion of a target; 2) constraining of a target; 3) signaling to target or others.	<i>To be published on the project's webpage</i>	5: 1) partial success - target reacts; 2) full success - target fully reacts; 3) negotiations with target; 4) ongoing case (outcome is to be determined); 5) conflict persists.
Threat cases	Yes	Yes	No	Yes	No
Types of sanctions	1) export bans 2) import bans 3) financial flows interruptions	1) tariffs 2) export controls 3) asset freezes 4) foreign aid cuts 5) import bans 6) travel bans 7) agreement suspensions 8) economic blockades	1) arms sanctions 2) commodity sanctions 3) diplomatic sanctions 4) finance sanctions 4) transportation sanctions	1) arms sanctions 2) trade sanctions 3) foreign aid cuts 4) travel bans 5) blockades 6) agreement suspensions	1) arms sanctions 2) military aid sanctions 3) trade sanctions 4) financial sanctions 5) travel sanctions 6) other (diplomatic) sanctions

Note: This table provides an overview of the popular sanctions databases. It compares the databases on the basis of time period coverage, number of cases, types of targets and senders, types of sanctions included, defined outcomes for sanctions, and whether threats are part of the databases.

The three sets of fixed effects in Eq. (1) are standardly used in the gravity literature. π_{it} denotes the set of time-varying, exporting-country dummies, which control for the outward multilateral resistances of Anderson and van Wincoop (2003) as well as for any other observable and unobservable exporter-specific factors that may influence bilateral trade. Similarly, χ_{jt} encompasses the set of time-varying importing-country dummy variables that account for the inward multilateral resistances, as well as for any other observable and unobservable importer-specific characteristics that may influence international trade. μ_{ij} denotes the set of country-pair fixed effects, which serve the following purposes. First, the pair fixed effects are the most flexible and comprehensive measure of time-invariant bilateral trade costs because they absorb any observable and unobservable time-invariant bilateral determinants of trade costs, c.f., Egger and Nigai (2015) and Agnosteva et al. (2014). Second, on a related note, the pair fixed effects absorb most of the linkages between the RTAs and the remainder error term ϵ_{ijt} to control for potential endogeneity of RTAs, c.f., Baier and Bergstrand (2007). Similarly, and more importantly for our analysis, the pair fixed effects mitigate potential endogeneity concerns with respect to sanctions.

The vector $GRAV_{ijt}$ in Eq. (1) includes standard time-invariant gravity covariates, such as the logarithm of bilateral distance, and indicator variables for colonial relationships, common language, and common borders.²⁴ Our main results do

²⁴ These variables come from the Dynamic Gravity Database of the US International Trade Commission, c.f., Gurevich and Herman (2018).

not include these covariates because they are absorbed by the pair fixed effects. However, we employ the standard gravity variables in our first specifications in order to establish the representativeness of our estimating sample. In addition to controlling for all time-invariant determinants of trade, we add some time-varying policy covariates including: a dummy variable to account for the presence of economic integration agreements ($EIA_{ij,t}$), which takes a value of one if there is an EIA between countries i and j at time t , and is equal to zero otherwise; an indicator variable for membership in the European Union ($EU_{ij,t}$); and a dummy variable for membership in the World Trade Organization ($WTO_{ij,t}$).²⁵

Lastly, $SANCT_{ij,t}$ is a vector of sanction variables that are of central importance to the analysis. Initially, $SANCT_{ij,t}$ includes a single indicator variable that equals one if there is a sanction of any sort between countries i and j at time t , and equals zero otherwise. Then, gradually, we take advantage of the rich dimensionality of the GSDB, in combination with economic intuition, to study the impact of sanctions across different dimensions. First, we allow for differential effects across different types of sanctions (e.g., trade sanctions vs. arms sanctions vs. travel sanctions, etc.). Then, we quantify the impact of trade sanctions by distinguishing between export vs. import vs. bilateral sanctions. Third, we distinguish between the effects of complete vs. partial sanctions. Lastly, we simultaneously allow for heterogeneous effects across all types of sanctions in the GSDB.

Our main results are presented in Table 2. Column (1) reports estimates from a specification that includes only the standard gravity variables from the related literature. Without going into much detail, the main conclusion that we draw from column (1) is that our results are comparable to those in the existing literature (e.g., see the meta analysis indexes in Head and Mayer (2014)). This establishes the representativeness of our sample. Column (2) introduces a dummy variable for the presence of sanctions, ALL_SANCT , which does not distinguish between types of sanctions. We obtain an economically small and statistically insignificant estimate of the coefficient on ALL_SANCT , which suggests that economic sanctions do not affect international trade. A possible explanation for this result is the heterogeneous nature of the sanction variable, which includes all possible types of sanctions in our database. We now offer support for this hypothesis.

The estimates in column (3) reproduce the results from column (2) but allow for a differential impact of sanctions on international trade depending on the type of sanction considered. Two main findings stand out. First, our estimates reveal that trade sanctions impede trade, as expected; the estimate on $TRADE_SANCT$ is negative, large and statistically significant. The interpretation of this result in terms of trade volume effects is that, all else equal, trade sanctions reduce trade between senders and targets by 41%, with a corresponding tariff-equivalent of 14%.²⁶ To deepen our understanding of this result, below we outline a more detailed analysis of the effects of trade sanctions. Second, we obtain sizable and statistically significant estimates of the effects of other types of sanctions on trade. For example, the estimate on arms sanctions ($ARMS_SANCT$) is positive, large, and statistically significant, while the estimates on travel sanctions ($TRAVL_SANCT$) and military sanctions ($MLTRY_SANCT$) are negative and statistically significant. We defer the interpretation of these estimates to the next specification, which we deem more appropriate as it mitigates endogeneity concerns.

The estimates in column (4) of Table 2 are obtained with pair fixed effects, which absorb all time-invariant gravity covariates from the first two columns and also control for all other observable and unobservable time-invariant bilateral determinants of trade. Thus, consistent with the argumentation of Baier and Bergstrand (2007) to use pair fixed effects to account for endogeneity concerns related to free trade agreements, the pair fixed effects in our setting mitigate endogeneity concerns with respect to sanctions. The main conclusion we draw from column (4) is that the estimate on trade sanctions is still negative but it is significantly smaller. The natural explanation for this result is that the trade sanction variable from the previous column must have also captured the impact of time-invariant bilateral determinants of trade flows that were omitted in our specification. This underscores the importance of using pair fixed effects when estimating the effects of sanctions. Another important result from column (4) is that the estimates on all other sanctions become small and statistically insignificant.²⁷ A possible explanation for this result is that the effects of those sanctions on trade may be channeled through forces that operate at the country level and are controlled for in our specification by the country-time fixed effects.

The estimates in column (5) of Table 2 distinguish between the effects of export sanctions (EXP_SANCT) vs. import sanctions (IMP_SANCT) vs. sanctions that apply simultaneously to both exports and imports (EXP_IMP_SANCT). We christen the latter ‘bilateral trade sanctions’.²⁸ Several findings in column (5) stand out. First, the estimates of the common variables

²⁵ In order to take advantage of the full time span of our data, we limited our attention to EIAs, EU membership, and WTO membership. It will be interesting to examine and control for the interplay between sanctions and tariffs. We leave this for future work.

²⁶ The trade volume effect is calculated as $(\exp(-0.531) - 1) \times 100 = -41.2$, while utilizing the structural gravity model, the corresponding tariff equivalent is $(\exp(-0.531 / -4) - 1) \times 100 = 14.2$, under the assumption that the trade elasticity is equal to 4. See Yotov et al. (2016) for discussion and interpretation of the estimates from structural gravity regressions.

²⁷ The estimate on travel sanctions is significant. However, it is very small and switches sign. Just like with the other types of sanctions, we believe that the main impact of travel sanctions on trade is via general equilibrium forces, which are captured by the country-specific fixed effects in our econometric model.

²⁸ Note that, due to the directional nature of trade flows, we can identify separate effects of export sanctions vs. import sanctions within the same specification. Given the definition of the two types of sanctions in the GSDB, the way to think about them is as export tariffs and import tariffs. Also note that, even though EXP_IMP_SANCT takes a value of one only when a sanction is imposed in each direction of trade flows, EXP_IMP_SANCT is not really symmetric. For example, some sanctions shut down imports completely but affect exports only partially. In that sense these sanctions are indeed bilateral but not symmetric; that is, the dummy variable for EXP_IMP_SANCT is still equal to one and does not distinguish between complete sanctions in each direction and a partial sanction in one direction. In other words, if there is some sort of trade sanction in each direction, then EXP_IMP_SANCT is equal to one, and it is equal to zero otherwise. In subsequent analysis we further distinguish between complete vs. partial trade sanctions.

Table 2

On the impact of economic sanctions on trade.

	(1) GRAV	(2) SANCT	(3) TYPE	(4) FEs	(5) DIRCT	(6) CMPLT	(7) MAIN
Distance	−0.774 (0.029)**	−0.775 (0.029)**	−0.796 (0.029)**				
Contiguity	0.381 (0.056)**	0.383 (0.056)**	0.368 (0.053)**				
Language	0.254 (0.053)**	0.254 (0.052)**	0.269 (0.048)**				
Colonial Relations	0.537 (0.133)**	0.535 (0.134)**	0.526 (0.136)**				
EU	0.378 (0.073)**	0.394 (0.076)**	0.396 (0.071)**	0.449 (0.037)**	0.443 (0.037)**	0.446 (0.037)**	0.444 (0.037)**
WTO	0.453 (0.162)**	0.462 (0.161)**	0.442 (0.150)**	0.141 (0.065)*	0.144 (0.064)*	0.136 (0.065)*	0.125 (0.064)+
Economic Integration Agreement	0.262 (0.058)**	0.266 (0.057)**	0.303 (0.054)**	0.051 (0.030)+	0.051 (0.030)+	0.050 (0.030)+	0.050 (0.030)+
Sanctions							
Any Sanction		0.093 (0.083)					
Trade			−0.531 (0.098)**	−0.157 (0.049)**			
Arms			0.587 (0.112)**	0.032 (0.052)	0.048 (0.051)	0.040 (0.050)	0.036 (0.049)
Military			−0.141 (0.062)*	0.026 (0.028)	0.025 (0.027)	0.027 (0.028)	0.021 (0.027)
Financial			−0.122 (0.118)	−0.075 (0.047)	−0.073 (0.049)	−0.050 (0.041)	−0.106 (0.051)*
Travel			−0.283 (0.130)*	0.092 (0.050)+	0.057 (0.044)	0.103 (0.050)*	0.063 (0.041)
Other			0.084 (0.088)	−0.044 (0.050)	−0.050 (0.049)	0.044 (0.049)	0.019 (0.048)
Export and Import					−0.150 (0.069)*		−0.025 (0.071)
Export					−0.224 (0.058)**		−0.270 (0.060)**
Import					0.209 (0.085)*		0.390 (0.092)**
Complete						−1.507 (0.237)**	
Partial						−0.153 (0.039)**	
Complete Export and Import							−1.472 (0.271)**
Complete Export							−1.424 (0.628)*
Complete Import							−0.737 (0.227)**
N	1,935,070	1,935,070	1,935,070	1,936,973	1,936,973	1,936,973	1,936,973

Notes: This table reports estimates of the effects of sanctions on international trade. The dependent variable is trade in levels and all estimates are obtained with the PPML estimator and exporter-time and importer-time fixed effects. Column (1) reports estimates with the standard gravity variables and without controlling for sanctions. Column (2) introduces a single indicator for the presence of sanctions, regardless of type. Column (3) replicates the specification from column (2) but allows for differential effects depending on the type of sanction, i.e., it includes separate covariates for each type of sanctions in the GSDB. Column (4) introduces pair fixed effects. All subsequent columns include pair fixed effects as well. Column (5) decomposes the impact of the trade sanctions from column (4) to distinguish between the effects of export sanctions vs. import sanctions vs. bilateral sanctions. Column (6) decomposes the impact of the trade sanctions from column (4) to distinguish between the effects of complete sanctions vs. partial sanctions. Column (7) simultaneously allows for differential effects of partial vs. complete sanctions and depending on the direction of trade flows. Standard errors are clustered by country pair. + $p < 0.10$, * $p < .05$, ** $p < .01$. See text for further details. Labels in column 1 correspond to the following variables: DIST=Distance, CNTG=Contiguity, LANG=Language, CLNY=Colonial Relations, EIA=Economic Integration Agreement, ANY_SANCT=Any Sanction, TRADE_SANCT=Trade, ARMS_SANCT=Arms, MLTRY_SANCT=Military, FINCE_SANCT=Financial, TRAVL_SANCT=Travel, OTHER_SANCT=Other, EXP_IMP_SANCT=Export and Import, EXP_SANCT=Export, IMP_SANCT=Import, COMPL_SANCT=Complete, PARTL_SANCT=Partial, EXP_IMP_COMPL_SANCT=Complete Export and Import, EXP_COMPL_SANCT=Complete Export, IMP_COMPL_SANCT=Complete Import

between columns (4) and (5) are not statistically different from each other. Second, the estimate of the effect of bilateral sanctions is negative, statistically significant, and comparable in terms of magnitude to the common estimate of all trade sanctions from column (4). Third, the effect of export sanctions is also negative, sizable and statistically significant. Pushing inference to the limit, we note that the estimate on *EXP_SANCT* is larger than the estimate on bilateral sanctions, suggesting that export sanctions might be more effective at impeding trade. (We revisit this result again later.) Finally, we obtain a positive and significant estimate of the impact of import sanctions. We analyze this result and provide an explanation for

it below. In sum, the results from column (5) reveal significant differences in the efficacy of export vs. import vs. bilateral sanctions and reinforce the importance of allowing for such differences in our database.

The estimates in column (6) of Table 2 distinguish between the impact of *complete* vs. *partial* sanctions. The main message from column (6) is clear and intuitive. Specifically, our estimates reveal that the impact of complete trade sanctions is significantly stronger as compared to the impact of partial trade sanctions. In terms of trade volume effects, our estimates imply that, all else equal, complete trade sanctions decrease bilateral trade flows between a sanctioned and a sanctioning country by about 77.8%, while the corresponding impact of partial trade sanctions is a decrease in bilateral trade of about 14%. The corresponding tariff-equivalent effects are a 45.8% increase in the case of complete sanctions and a 3.9% increase for partial sanctions. The main implication from the results in column (6) is that the ability of the GSDB to distinguish between the impact of partial vs. complete trade sanctions is important.

In column (7) of Table 2, we present our main specification, which simultaneously decomposes the impact of sanctions depending on their stringency (i.e., *complete* vs. *partial* sanctions) and depending on the direction of trade flows (i.e., *export* sanctions vs. *import* sanctions vs. *bilateral* sanctions). To this end, we introduce three new covariates relative to the specification in column (5): *EXP_IMP_COMPL_SANCT* is an indicator variable that takes the value of one when there is a complete sanction in each direction of trade, and the value of zero otherwise; *EXP_COMPL_SANCT* is a dummy variable that equals one for a complete sanction on exports, and zero otherwise; and *IMP_COMPL_SANCT* is a dummy that equals one for a complete sanction on imports, and zero otherwise. To ease interpretation, in column (7) we redefined the bilateral and directional trade sanction covariates from column (5) by subtracting the corresponding “complete” variable from each of them (e.g., $EXP_IMP_SANCT = EXP_IMP_SANCT - EXP_IMP_COMPL_SANCT$). Thus, the estimates on *EXP_SANCT*, *IMP_SANCT*, and *EXP_IMP_SANCT* capture the impact of partial sanctions.²⁹

The estimates from column (7) of Table 2 reveal the following. First, we find that the impact of complete bilateral sanctions (*EXP_IMP_COMPL_SANCT*) is the strongest: it is also negative, very large, and statistically significant. In quantitative terms, our estimates suggest that complete sanctions are capable of reducing about 77% of international trade between the countries involved (equivalent to a 44.5% increase in tariffs). Second, we find that the impact of the partial bilateral sanctions is no longer statistically significant. This suggests that the significant estimate on *EXP_IMP_SANCT* in column (5) was driven by the presence of complete sanctions. Third, the impact of both the partial and complete export sanctions is negative and statistically significant. However, as expected, the impact of complete export sanctions is much stronger. Finally, we obtain a negative, large and statistically significant estimate of the impact of complete import sanctions, implying a 52% reduction in bilateral trade flows (equivalent to a 20.2% increase in tariffs) *ceteris paribus*, while our estimate of the impact of partial import sanctions is positive and statistically significant. We explain this result next, when we turn to the robustness experiments. In sum, the results from column (7) suggest that it is important to simultaneously distinguish across the effects of all types of trade sanctions that are covered in the GSDB.

We conclude the analysis in this section with a series of sensitivity experiments, which are presented in Table 3. To ease comparison, column (1) of Table 3 reports our main estimates from the last column of Table 2. Column (2) reproduces the results from column (1) but with the OLS estimator (instead of PPML). The main conclusion that complete bilateral sanctions are most effective remains. In addition, all signs of the sanction variables remain the same. However, we do observe differences in the magnitude and the statistical significance for some of the sanction covariates. Specifically, the estimate on *EXP_COMPL_SANCT* remains negative and sizable but it is no longer statistically significant, while the estimate on *EXP_IMP_SANCT* is still negative but becomes larger and gains statistical significance. The third difference between columns (1) and (2) is that the impact of partial import sanctions is no longer significant, both economically and statistically. Possible explanations for the differences between the OLS and the PPML estimates include the presence of zeros, heteroskedasticity of trade data, and possible misspecification of the underlying trade cost vector for the variables with widely differing estimates. Still, overall, and especially with respect to the key variables of interest to us, the two estimators deliver similar results.

The specifications in columns (3) and (4) of Table 3 are designed to gauge the importance of the zero trade flows in our estimating sample. The estimates in column (3) are obtained by retaining only the zeroes that appeared in the original trade data, while the estimates in column (4) drop all zero trade flows. Comparison between the estimates in columns (3) and (4) against the benchmark results in column (1) reveals that the results for the impact of sanctions with and without taking into account the zeroes are very similar to each other. This result is consistent with the main argument from Santos Silva and Tenreiro (2006) that the main value in using PPML is to account for heteroskedasticity and not to take into account the information contained in zero trade flows. From a technical point of view, consistent with the analysis of Hinz et al. (2020), a possible explanation for the finding that the zeroes do not matter is that usually the zero trade flows are associated with small countries, which are discounted in the PPML first order conditions.

The estimates in column (5) are obtained with 5-year interval data. This specification is motivated by the argument in Cheng and Wall (2005) that, in order to allow for proper adjustment of trade flows in response to policy changes (e.g., the imposition of sanctions), gravity estimations should not be performed with data on consecutive years but instead with

²⁹ Alternatively, we could have used the original variables *EXP_SANCT*, *IMP_SANCT*, and *EXP_IMP_SANCT* without any transformation. In that case, the estimates should still be interpreted as the effects of partial sanctions. However, the estimates on *EXP_IMP_COMPL_SANCT*, *EXP_COMPL_SANCT* and *IMP_COMPL_SANCT*, should be interpreted as deviations from the corresponding average sanctions regressor. For example, the estimate on the complete import sanctions, *SANCT_EXP_IMP_COMPL*, should be interpreted as a deviation from the estimate on *SANCT_EXP_IMP*.

Table 3

On the impact of economic sanctions on trade. Robustness analysis.

	(1) MAIN	(2) OLS	(3) ZERO	(4) PSTV	(5) INTERV5	(6) RUSS
EU	0.444 (0.037)**	0.862 (0.043)**	0.439 (0.037)**	0.439 (0.037)**	0.480 (0.039)**	0.438 (0.038)**
WTO	0.125 (0.064)+	0.159 (0.046)**	0.125 (0.062)*	0.125 (0.062)*	0.070 (0.080)	-0.001 (0.089)
Economic Integration Agreement	0.050 (0.030)+	0.131 (0.028)**	0.052 (0.030)+	0.052 (0.030)+	0.069 (0.033)*	0.048 (0.030)
Sanctions						
Complete Export and Import	-1.472 (0.271)**	-1.079 (0.151)**	-1.446 (0.286)**	-1.448 (0.285)**	-1.018 (0.254)**	-1.500 (0.280)**
Complete Export	-1.424 (0.628)*	-0.488 (0.364)	-1.143 (0.637)+	-1.143 (0.637)+	1.156 (0.261)**	-1.420 (0.632)*
Complete Import	-0.737 (0.227)**	-0.676 (0.185)**	-0.726 (0.231)**	-0.726 (0.231)**	-0.983 (0.384)*	-0.747 (0.232)**
Export and Import	-0.025 (0.071)	-0.205 (0.076)**	-0.059 (0.058)	-0.059 (0.058)	0.003 (0.095)	-0.036 (0.079)
Export	-0.270 (0.060)**	-0.538 (0.048)**	-0.346 (0.056)**	-0.346 (0.056)**	-0.150 (0.087)+	-0.288 (0.061)**
Import	0.390 (0.092)**	0.020 (0.222)	0.375 (0.093)**	0.375 (0.093)**	0.350 (0.120)**	0.139 (0.113)
Arms	0.036 (0.049)	0.246 (0.050)**	0.056 (0.048)	0.056 (0.048)	0.044 (0.064)	0.057 (0.052)
Military	0.021 (0.027)	-0.057 (0.051)	0.027 (0.028)	0.027 (0.028)	0.039 (0.031)	0.013 (0.028)
Financial	-0.106 (0.051)*	-0.101 (0.034)**	-0.105 (0.046)*	-0.105 (0.046)*	-0.196 (0.075)**	-0.097 (0.052)+
Travel	0.063 (0.041)	0.035 (0.050)	0.071 (0.040)+	0.071 (0.040)+	0.088 (0.065)	0.018 (0.048)
Other	0.019 (0.048)	-0.043 (0.049)	0.006 (0.046)	0.006 (0.046)	0.088 (0.069)	-0.013 (0.049)
N	1,936,973	1,100,827	1,101,759	1,100,827	381,929	1,926,159
R ²		0.800				

Notes: This table reports estimates from a series of sensitivity experiments. All estimates are obtained with exporter-time, importer-time, and country-pair fixed effects. For comparison, column (1) reports our main estimates from the last column of Table 2. Column (2) reproduces the results from column (1) but with the OLS estimator. All other results are obtained with PPML. The estimates in column (3) are obtained after only keeping the zero trade flows that appeared in the original trade data. Column (4) only uses positive trade flows. Column (6) uses 5-year interval data. Finally, the results in column (5) are obtained without the partial import sanctions on Russia and Ukraine. Standard errors are clustered by country pair. + $p < 0.10$, * $p < .05$, ** $p < .01$. See text for further details. Labels in column 1 correspond to the following variables: EIA=Economic Integration Agreement, ARMS_SANCT=Arms, MLTRY_SANCT=Military, FINCE_SANCT=Financial, TRAVL_SANCT=Travel, OTHER_SANCT=Other, EXP_IMP_SANCT=Export and Import, EXP_SANCT=Export, IMP_SANCT=Import, EXP_IMP_COMPL_SANCT=Complete Export and Import, EXP_COMPL_SANCT=Complete Export, IMP_COMPL_SANCT=Complete Import

interval data.³⁰ More recently, Egger et al. (2020) challenge the use of data with intervals for estimating the impact of trade policy in favor of gravity estimations that use all data and employ pair fixed effects, which is the case in our specification. Comparison between the estimates in columns (5) and (1) reveals that the estimates with intervals and consecutive years are very similar to each other with no systematic pattern in the direction of the potential bias, thus supporting the argument of Egger et al. (2020) to use all years instead of “arbitrarily” dropping observations for estimations with interval data.

In the last column of Table 3 we try to understand the curious finding that partial import sanctions seem to promote bilateral trade between the sanctioned and the sanctioning country, which is captured by the positive and statistically significant estimate on *IMP_SANCT* in column (1) of the same table. Inspection of *IMP_SANCT* revealed that, in addition to a series of economically small countries, this variable also includes the partial sanction cases on Russia and Ukraine, specifically the sanction between Russia and Ukraine from 1993, where overall trade has increased between these two countries despite the imposition of the partial sanction between them, and the sanction between Ukraine and Japan from 2014, where trade flows have also increased despite the sanction.³¹ Therefore, in column (6) we drop the observations for the partial import sanctions on Russia and Ukraine. The estimate on *IMP_SANCT* becomes statistically insignificant. The main implications of this experiment can be summarized as follows: (i) the effects of the partial sanctions should be estimated at the sectoral level of aggregation at which they are imposed; and (ii) the effects of sanctions, even within the same type, can be quite het-

³⁰ A series of empirical gravity papers have used interval data. For example, Baier and Bergstrand (2007) use 5-year intervals, Anderson and Yotov (2010) use 4-year intervals, and Olivero and Yotov (2012) experiment with 3-year and 5-year interval trade data.

³¹ As for the sanction between Russia and Ukraine, the latter increased transit fees on Russian gas exports to Europe in response to Russia cutting oil supplies to Ukraine in 1993. As for Ukraine and Japan, the latter imposed a complete ban on Crimean imports in 2014. The sanction was actually targeting Russia in support of Ukraine, but Crimea is regarded as an integral part of Ukraine by the international community.

erogeneous across countries and country pairs. The latter is consistent with the main argument in [Felbermayr et al. \(2020\)](#), who offer a detailed analysis of the heterogeneous impact of the sanctions on Iran.

5. Conclusion

The popularity of economic sanctions over the last decades has increased. Moreover, in the light of intensifying geopolitical rivalries, this trend is expected to persist. Yet, there is substantial uncertainty about whether such sanctions affect economic outcomes and, in particular, whether they bring about the intended political changes.

To facilitate econometric work on the effects of sanctions, in this paper, we introduce the Global Sanctions Data Base (GSDB). By virtue of the facts that it includes all countries and covers the period 1950–2016, it is the largest database focusing on effective sanctions (i.e., threats are excluded). It distinguishes among five types of sanctions (trade sanctions, financial sanctions, travel restrictions, arms sanctions, military assistance) and a residual category. It reports the directionality of sanctions and their coverage. It also documents nine distinct objectives sought by sanctions and the extent to which sanctions have been successful, grouped into five outcomes.

Equipped with these data, we report a number of stylized facts, the most important being: (i) the use of sanctions has risen over time; (ii) European countries are the most frequent users and African countries the most frequent targets, with sanctions being mostly non-reciprocal; (iii) sanctions are becoming more diverse, with the share of trade sanctions declining and the share of financial and travel sanctions rising; (iv) the main objectives of sanctions are increasingly related to democracy and/or human rights and less on classical questions of international diplomacy; (v) the success rate of sanctions had been increasing until 1995 and has fallen since then; on average the success rate is about 30%.

The motivation of crafting the GSDB is to empirically test for the effects of sanctions. While this paper is mostly about describing the new data, it remains useful in showing that the data allow for sensible empirical work. Specifically, we look at bilateral international trade data and apply state-of-the-art gravity modeling to estimate the effect of sanctions. We find that trade sanctions have a negative but heterogeneous effect on trade, which is most pronounced in the case of complete bilateral sanctions, followed by export sanctions. Importantly, our empirical analysis reveals that, in order to obtain meaningful results, one has to distinguish between the different types of trade sanctions, which is a salient feature of the GSDB.

In combination with the rich dimensionality of the GSDB, the structural gravity model of trade offers several immediate opportunities for meaningful contributions to the literature on sanctions. For example, [Felbermayr et al. \(2020\)](#) use the GSDB in a full general equilibrium setting to demonstrate that sanctions are effective in reducing trade and welfare but that their impact is widely heterogeneous both at the partial and the general equilibrium levels. The GSDB can be used, together with structural gravity, to obtain a rich database of partial and GE estimates of the effectiveness of sanctions to impede trade. In turn, this database can be used to study the determinants of the effectiveness of sanctions. Further, as noted in the Introduction, researchers may capitalize on the theoretical developments in the trade literature to nest the structural gravity model into more elaborate production models to obtain more detailed measures of the costs and benefits of sanctions.

Another important direction for future work is to study the trade-diversion effects of sanctions. Unlike the trade-diversion effects of free trade agreements, which are due to general equilibrium forces (e.g., when two countries start trading more with each other due to preferential trade liberalization, they trade less with other countries), the trade-diversion effects of sanctions are also due to extraterritorial pressure exerted by senders on third countries to limit their trade with the target. The separability of the structural gravity model at the sectoral level makes disaggregated analysis of the impact of sanctions possible and consistent with theory. As indicated by our analysis, this is particularly important for analyzing the effects of partial sanctions. We expect that a sectoral analysis of the impact of sanctions will deliver important insights on the impact of sanctions by type (e.g., arms sanctions and travel sanctions).

As emphasized earlier, we expect the GSDB to serve researchers working on sanctions in a number of ways. One valuable direction of research is to investigate the effects of sanctions on foreign direct investment (FDI) and, utilizing the various dimensions of the GSDB, put it to work to assess the possible presence of FDI diversion and its associated welfare effects. The financial sanctions in the GSDB could be used as measures of financial shocks. It is also of interest to examine how trade sanctions interact with financial sanctions to assess how extraterritorial sanctions affect all trade flows note. The GSDB's information on military assistance sanctions, which differentiates between cuts in humanitarian and military aid – and which, as far as we know, other databases are silent on – could be used to study the effects of sanctions on nations' military spending/arming patterns.

In ongoing research, we are in the process of extending the database until the year of 2019. The most urgent task is to obtain a more comprehensive analysis of the effects of different types of sanctions on trade flows, international financial transactions, and mobility of individuals. With the help of the GSDB, one should be able to conduct a more in depth analysis of the determinants of the success of sanctions. Finally, to make progress beyond the projects mentioned, a more theory-based, structural approach would be worthwhile. We hope that the new dataset stimulates such work.

Disclaimer

The GSDB is a public good that was earnestly created in response to market demand. Its initial development and maintenance took a substantial long-term effort by a number of us. Accordingly, in return for that effort, we expect two things

from all users of the GSDB. First, if you use the GSDB please cite this paper. Second, if you detect an error in the dataset, please inform us as soon as possible. In order to accommodate the detection of errors and inconsistencies in the early life of the GSDB, our team is committed to updating it bi-annually during the first two years after its official release on July 1, 2020. After the initial two-year period, the GSDB will be updated annually. We expect that the December 2020 release of the GSDB will cover more than 300 additional cases, which we have already tracked over the period 2016–2019. The GSDB is freely available and we will be happy to share it with interested researchers, who can request it by e-mail at GSDB@drexel.edu.

Acknowledgements

Our team is grateful for encouragement and research support from the ifo Institute, the University of Applied Sciences in Konstanz (HTWG), the School of Economics at LeBow College of Business at Drexel University, and the Kiel Institute for the World Economy. None of these organizations are responsible for any errors in the GSDB.

Appendix A

Classification of regions based on UN Geoscheme

Africa Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Cote d'Ivoire, DR Congo, Djibouti, Egypt, Eritrea, Ethiopia, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mayotte, Morocco, Mozambique, Namibia, Niger, Nigeria, Réunion, Republic Congo, Rwanda, Saint Helena, Ascension and Tristan da Cunha, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, South Sudan, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Western Sahara, Zambia, Zimbabwe.

Northern America Bermuda, Canada, Greenland, Saint Pierre and Miquelon, United States of America.

Central America Belize, Costa Rica, Clipperton Island, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Caribbean Anguilla, Antigua and Bermuda, Aruba, Bahamas, Barbados, Bonaire, Sint Eustatius and Saba, British Virgin Islands, Cayman Islands, Cuba, Curaçao, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Navassa Island, Puerto Rico, Saint-Barthélemy, Saint Kitts and Nevis, Saint Lucia, Saint Martin, Saint Vincent and the Grenadines, Sint Maarten, Trinidad and Tobago, Turks and Caicos Islands, United States Virgin Islands.

Southern America Argentina, Bolivia, Bouvet Island, Brazil, Chile, Colombia, Ecuador, Falkland Islands, French Guiana, Guayana, Paraguay, Peru, South Georgia and the South Sandwich Islands, Suriname, Uruguay, Venezuela.

Northwestern Europe Shetland Islands, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Faroe Island, Finland, France, Germany (Federal Republic), Guernsey, Hungary, Iceland, Isle of Man, Jersey, Latvia, Lichtenstein, Lithuania, Luxembourg, Monaco, Netherlands, Norway, Poland, Republic of Ireland, Romania, Sark, Slovakia, Svalbard and Jan Mayen, Sweden, Switzerland, United Kingdom.

Southern Europe Albania, Andorra, Bosnia and Herzegovina, Croatia, Gibraltar, Greece, Italy, Republic of Macedonia, Malta, Montenegro, Portugal, San Marino, Serbia, Kosovo, Slovenia, Spain, Vatican.

Eastern Europe Belarus, Republic of Moldova, Russian Federation, Ukraine.

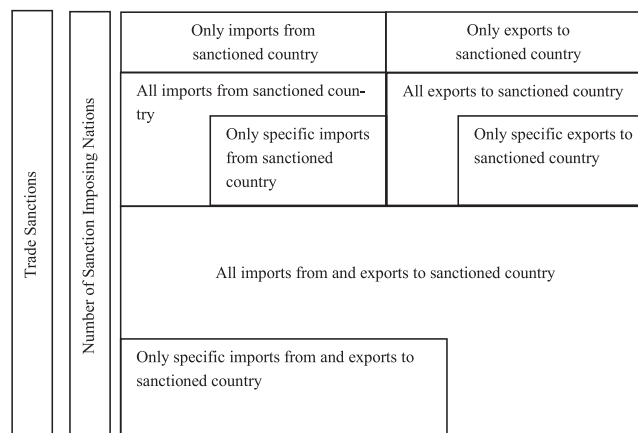


Fig. Appendix A.1. Possible structure of trade sanctions. *Note:* This figure illustrates the various features of trade sanctions accounted for in the GSDB. Trade sanctions can restrict only exports or imports from specific countries or both exports and imports. Moreover, the GSDB distinguishes between sanctions on exports from the sender to the target, sanctions on imports from the target to the sender, and sanctions that simultaneously apply to both the exports and the imports between the two sides (sender and target country). Trade sanctions sometimes apply only to specific goods (partial trade sanctions) or to exports and/or imports as a whole (complete trade sanctions).

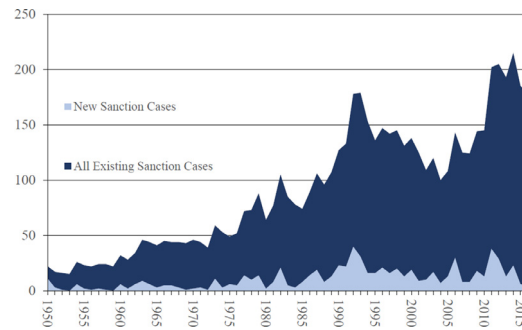


Fig. Appendix A.2. Yearly number of imposed sanctions (1950–2016). *Note:* This figure depicts the number of active sanction cases as well as the number of new sanction impositions per year.

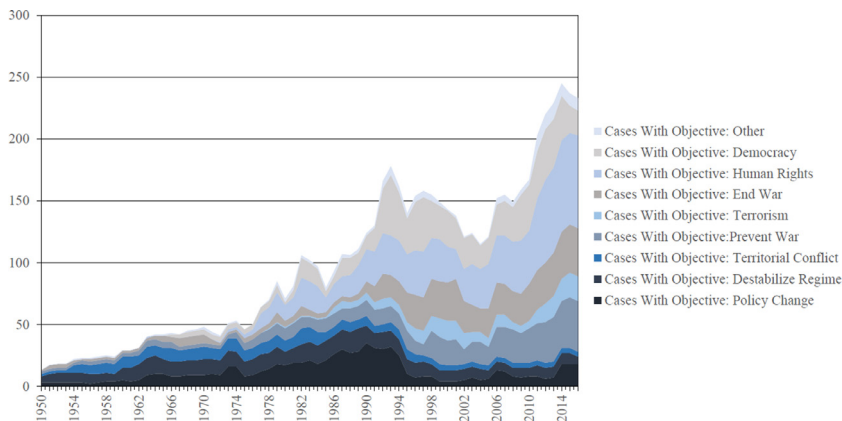


Fig. Appendix A.3. Yearly distribution of policy objectives in sanctions (1950–2016). *Note:* This figure depicts the yearly number of observed policy objectives declared in all sanctions listed in the GSDB. For each sanction up to three objectives are documented. See main text for further details and analysis. For a better readability the order of sanctions classified by objective listed in the legend corresponds to the order of the shaded areas.

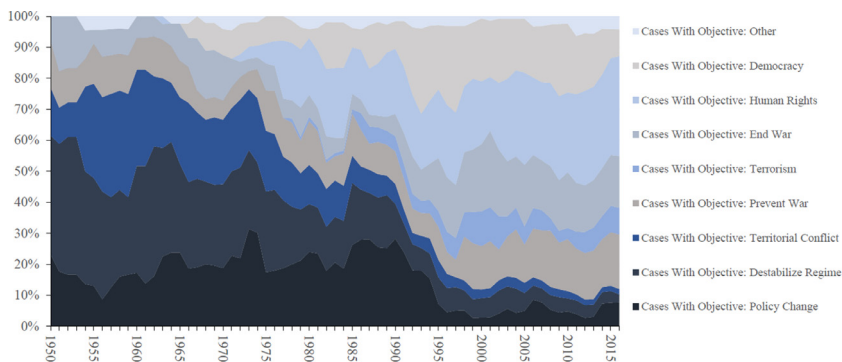


Fig. Appendix A.4. Yearly distribution of policy objectives in sanctions (1950–2016). *Note:* This figure depicts the yearly distribution of observed policy objectives declared in all sanctions listed in the GSDB. For each sanction up to three objectives are documented. For a better readability the order of sanctions classified by objective listed in the legend corresponds to the order of the shaded areas.

Western Asia Armenia, Azerbaijan, Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, State of Palestine, Syria, Turkey, United Arab Emirates, Yemen.

Central Asia Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan.

Southern Asia Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, Sri Lanka.

Southeastern Asia Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Vietnam.

Eastern Asia China, Taiwan, Hong Kong, Japan, Macau, Mongolia, DPR Korea, Republic of Korea.

Oceania Australia Christmas Island, Cocos (Keeling) Island, New Zealand, Norfolk Island, Fiji, New Caledonia, Papua New Guinea, Solomon Islands, Vanuatu, Guam, Kiribati, Marshall Islands, Micronesia, Nauru, Northern Mariana Islands, Palau, American Samoa, Cook Islands, French Polynesia, Niue, Pitcairn Islands, Samoa, Tokelau, Tonga, Tuvalu, Wallis and Futuna.

Supplementary material

Supplementary material associated with this article can be found, in the online version, at [10.1016/j.euroecorev.2020.103561](https://doi.org/10.1016/j.euroecorev.2020.103561).

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