

Syropoulos, Constantinos; Felbermayr, Gabriel J.; Kirilakha, Aleksandra; Yalcin, Erdal; Yotov, Yoto V.

Working Paper

The Global Sanctions Data Base – Release 3: Covid-19, Russia, and Multilateral Sanctions

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*Constantinos Syropoulos, Gabriel Felbermayr, Aleksandra Kirilakha,
Erdal Yalcin, Yoto V. Yotov*

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Poschingerstr. 5, 81679 Munich, Germany

Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de

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The Global Sanctions Data Base – Release 3: Covid-19, Russia, and Multilateral Sanctions

Abstract

This paper introduces the third update/release of the Global Sanctions Data Base (GSDB-R3). The GSDB-R3 extends the period of coverage from 1950-2019 to 1950-2022, which includes two special periods – COVID-19 and the war between Russia and Ukraine. The new update of the GSDB contains a total of 1,325 cases. In response to multiple inquiries and requests, the GSDB-R3 has been amended with a new variable that distinguishes between unilateral and multilateral sanctions. As before, the GSDB comes in two versions, case-specific and dyadic, which are freely available upon request at GSDB@drexel.edu. To highlight one of the new features of the GSDB, we estimate the heterogeneous effects of unilateral and multilateral sanctions on trade. We also obtain estimates of the effects on trade of the 2014 sanctions on Russia.

JEL-Codes: F100, F130, F140, F500, F510, H500, N400.

Keywords: sanctions, Covid, Russia, multilateral sanctions, unilateral sanctions.

Constantinos Syropoulos
School of Economics
Drexel University / Philadelphia / PA / USA
c.syropoulos@drexel.edu

Gabriel Felbermayr
WIFO & Vienna Institute
Vienna / Austria
gabriel.felbermayr@wifo.ac.at

Erdal Yalcin
Konstanz University of Applied Sciences
Konstanz / Germany
erdal.yalcin@htwg-konstanz.de

Aleksandra Kirilakha
School of Economics, Drexel University
Philadelphia / PA / USA
ak3494@drexel.edu

Yoto V. Yotov
School of Economics, Drexel University
Philadelphia / PA / USA
yotov@drexel.edu

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For questions, suggestions, and data requests, please e-mail the authors at GSDB@drexel.edu.

Disclaimer. The Global Sanctions Data Base (GSDB) is a public good that was created in response to demand of scholars and institutions. The initial development of the database and its subsequent updates required substantial long-term efforts by the authors. Accordingly, in return for that effort, we expect two things from all users of the GSDB. First, please cite the current paper along with the following two papers if you use Release 3 of the database:

- Felbermayr, Gabriel, Aleksandra Kirilakha, Constantinos Syropoulos, Erdal Yalcin, and Yoto V. Yotov, “The Global Sanctions Data Base,” *European Economic Review*, 2020, 129 (C).
- Kirilakha, Aleksandra, Gabriel Felbermayr, Constantinos Syropoulos, Erdal Yalcin, and Yoto V. Yotov, “The Global Sanctions Data Base: An Update that Includes the Years of the Trump Presidency.” In the *Research Handbook on Economic Sanctions*, Edited by Peter A.G. van Bergeijk, 2021.

Second, if you believe that you have discovered a mistake in the database or that the database can be improved by incorporating additional or more reliable data, even if only for an individual sanctions case or any of its dimensions, please let us know by writing to the GSDB’s e-mail address (GSDB@drexel.edu). We will try to accommodate any detection of errors, inconsistencies, and suggestions as soon as possible. Please visit <http://www.globalsanctionsdatabase.com> for updates.

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“[T]he Global Sanctions Database ... has become the most comprehensive tally of its kind.”

The New York Times, March 2022

1 Introduction

Since its introduction in 2020 (Felbermayr et al. (2020)) the Global Sanctions Data Base (GSDB) has established itself as the leading database for economic sanctions.¹ Stimulated by the record-setting pace of sanction imposition by the Trump administration, we delivered its second edition (Kirilakha et al. (2021)) a year after the original release of the GSDB. That update extended the first version of the data by adding approximately 50% previously unrecorded sanction cases, including cases imposed during Trump’s presidency. This resulted in a total of 1,101 sanction cases imposed in the period 1950-2019.

Due to Russia’s invasion of Ukraine and the subsequent sanctions on Russia, interest in economic sanctions and the GSDB, increased dramatically in 2022. This paper came into being in response to this heightened interest. It aims to contribute to the literature in three ways. First, it introduces the third release of the GSDB (i.e., the GSDB-R3), which contains a total of 1,325 sanction cases imposed between 1950 and 2022, including the most recent sanctions on Russia from February 2022 onwards.² Second, in response to multiple inquiries from researchers and policy makers, both versions of the GSDB-R3 include a new variable that distinguishes between unilateral and multilateral sanctions. To highlight the usefulness of this new feature, we estimate the heterogeneous effects on trade of these two sanction types. Third, we obtain estimates of the effects on trade of the sanctions on Russia in 2014 due to its annexation of Crimea.³

¹Since its first release in mid-2020, access to the GSDB has been requested by more than 1700 academic researchers and policy makers throughout the world.

²GSDB-R3 covers the sanctions that were imposed until May 2022. As before, the GSDB comes in two versions, case-specific and dyadic, and is freely available upon request at GSDB@drexel.edu.

³Even though these sanctions were imposed at an earlier time, they are consistent with a number of observed patterns associated with the 2022 sanctions on Russia. We did not consider the effects of the latter sanctions because sufficient data on trade are not yet available.

We took the following steps to expand the GSDB. First, we conducted thorough keyword web searches to identify mostly country-specific sanctions imposed between 2019 and 2022. Second, our reporting of the most recent sanctions on Russia in relation to its conflict with Ukraine, relied on a new source – the Peterson Institute for International Economics. More specifically, we added 99 sanction cases on Russia between late February and early May 2022. Third, we re-visited the previously recorded cases and cross-checked the related sources for correctness and consistency, e.g., Hufbauer et al. (2007), Morgan et al. (2014), Weber and Schneider (2018), and the Intrastate Dispute Narratives of the DADM Project led by the Political Science Department of the University of Central Arkansas (UCA). Lastly, we incorporated the feedback we received from researchers and policy makers who used earlier versions of the GSDB.

The current version of the GSDB enabled us to perform a descriptive analysis of the sanctions imposed between 1950 and 2022 that highlighted several important patterns. Despite Covid-19 and the shift of focus on global health in recent times, there was a dramatic increase in the imposition of sanctions during the 2019-2022 period. Specifically, 2021 boasts the largest number of new sanctions. Although the majority of these sanctions were imposed by the United States, a large number of them were also imposed unilaterally by the UK, as a consequence of Brexit. By 2022, the number of active sanctions also reached its historical maximum since 1950.

In terms of composition, the use of financial sanctions maintained its steady rise since the early 1980s, primarily because of growing humanitarian concerns. In the last decade, we also observe a sharp increase in the use of trade sanctions on Russia in response to the Crimean conflict and, more recently, an increase in the so-called “smart” trade sanctions (i.e., bans on trade with elite and their affiliated businesses) on Russia and Belarus due to the war in Ukraine. Moreover, since 2014, we observe a steady growth in the number of sanctions aiming to bring about a policy change: the number of these sanctions also reached a historical maximum in 2022. The increased frequency of sanctions use in recent times

surely captures the growing political tensions in global affairs. It may also indicate that sanctions as less effective in achieving their professed political objectives.

To highlight some of the new features of the GSDB, we use the workhorse model of trade – the gravity equation – and rely on the recommendations for gravity estimations by Yotov et al. (2016) to (i) obtain estimates of the effects of unilateral vs. multilateral sanctions on international trade, and (ii) study the effects of the sanctions imposed on Russia in 2014 after its annexation of the Crimean Peninsula. Capitalizing on the rich dimensionality of the GSDB, we distinguish between the effects of complete vs. partial trade sanctions and estimate their heterogeneous effects depending on whether they are unilateral or multilateral.⁴

Our estimates reveal that, on average, the effects of complete trade sanctions are similar regardless of whether they are unilateral or multilateral. The implication is that, despite the similarity of the estimates, complete multilateral trade sanctions tend to cause significantly more damage to the target country since, by definition, they are imposed by many countries simultaneously. Interestingly, we also find that the effects of multilateral partial trade sanctions are significantly stronger than the corresponding effects of unilateral partial trade sanctions. A closer look at the effects of multilateral vs. unilateral sanctions suggests that the average estimates may be masking significant heterogeneity.

Following the classification in Morgan et al. (2022), who identify several eras in the evolution of sanctions, including the ‘sanctions decade’ of the 1990s, we allow for heterogeneous sanction effects before and after 1990. We find that the effects of multilateral complete trade sanctions were stronger than the effects of unilateral complete trade sanctions prior to 1990 but weaker after 1990. Thus, in recent years unilateral complete trade sanctions have been more effective in decreasing trade than multilateral complete trade sanctions.⁵

A possible explanation for this finding, which we also confirm in this paper, is that the

⁴Consistent with previous findings (e.g., Felbermayr et al. (2020) and Felbermayr et al. (2022)), we obtain negative estimates of the effects of both types of sanctions, but a significantly stronger negative impact for complete trade sanctions (a decrease of 73% in international trade between sanctioning and sanctioned countries), as compared to a 10% decrease in the case of partial trade sanctions.

⁵The relative effects of unilateral and multilateral partial trade sanctions are similar in the two periods and consistent with our average estimates (i.e., the effects of multilateral partial sanctions are always stronger).

effects of multilateral complete trade sanctions are very heterogeneous among senders and include insignificant effects for some of them. We confirm our main findings by obtaining dis-aggregated estimates for 170 sectors from the latest edition of the USITC’s *International Trade and Production Database for Estimation* (ITPD-E-R02), Borchert et al. (2022).

For completeness and also because the recent sanctions on Russia (due to its invasion of Ukraine) have attracted significant attention in academic and policy circles, the recording of these sanctions is an important component of the third release of the GSDB. However, due to lack of trade data, we cannot yet quantify the impact of these sanctions on trade. As the next best alternative, we chose to offer estimates of the effects of the 2014 sanctions on Russia (due to its annexation of the Crimean Peninsula), which appear to be consistent with some of the patterns associated with the most recent sanctions against Russia. For example, we find that the direct impact of the 2014 sanctions on Russia’s trade was negative and statistically significant but relatively small – a 21% decrease in Russia’s trade with the sanctioning states on average. Two possible explanations for the small size of these effects could be that: (i) the 2014 sanctions on Russia were only partial; and (ii) the effects of the sanctions were very heterogeneous across senders.

Zooming in on the heterogeneous effects of the sanctions on Russia, our estimates vary from negative and statistically significant (for Canada) to negative and statistically insignificant (for Montenegro and the United States), all the way to positive (for Japan). Moreover, we obtain small and widely heterogeneous (across member states) effects of the EU sanctions on Russia. For example, we obtain small and insignificant estimates for some countries (e.g., for Denmark and Italy); positive but insignificant estimates for other countries (e.g., for Belgium and Ireland); and a positive and significant estimate for Portugal. Interestingly, the largest negative effects emerged for new EU members and for countries that are geographically closer to Russia. The heterogeneous estimates of the EU sanctions on Russia are consistent with our explanation for the smaller effects of multilateral sanctions.

The rest of the paper is organized as follows. Section 2 summarizes the methods we relied

on to update the GSDB. Specifically, we provide a general overview of the third release of the database in Subsection 2.1. In Subsection 2.2, we detail the key new features of the data including the difference between unilateral and multilateral sanctions. In Subsection 2.3, we discuss the recent sanctions on Russia. After briefly describing our econometric model in Subsection 3.1, in Subsection 3.2 we present and discuss our main econometric findings on the effects of unilateral vs. multilateral sanctions, as well as the impact of the 2014 sanctions on Russia. The Appendix offers some additional estimates.

2 The Global Sanctions Database - Release 3

In Subsection 2.1, we briefly review the salient methods we relied on to construct the GSDB and describe its main features and updated dimensions. In Subsection 2.2, we highlight the novel and most important features of the GSDB. In addition, we distinguish between unilateral and multilateral sanctions. In Subsection 2.3, we discuss the recent sanctions on Russia.

2.1 A General Overview

Motivated by the increased popularity of sanctions in recent times, our team created and released the Global Sanctions Data Base (Felbermayr et al. (2020)) in 2020. The first update of the GSDB (cf. Kirilakha et al. (2021)) was released in 2021. We have been working on updating the GSDB further since then. In this section, we describe the salient characteristics of the GSDB-R3, the second update of the GSDB, and explain the new features contained in it. As noted earlier, the GSDB-R3 is available as a case-list version as well as a dyadic version that is suitable for analyses with bilateral data (e.g., trade or foreign direct investment (FDI)).

The original version of the GSDB contained 729 publicly traceable, multilateral, plurilateral, and bilateral sanction cases imposed between 1950 and 2016. Those cases were

collected from a limited number of sources. For instance, multilateral sanctions were primarily collected from publicly available United Nations (UN) Security Council Resolutions and European Union (EU) Common Positions, whereas unilateral US sanctions were primarily based on pertinent US Executive Orders. We also screened national sources for the sanctions imposed by / on corresponding nations. In addition, international newspapers and history books were screened and keyword web searches in online search engines were conducted to identify mostly country-specific sanctions, especially for pre-1990s bilateral sanction cases or sanctions imposed by / on smaller nations. We also cross-checked with the existing sanctions databases, such as Hufbauer et al. (2007) and Morgan et al. (2014), as well as the newly constructed EUSANCT database by Weber and Schneider (2020).

While working on the first update of the GSDB, we discovered new sources for sanctions search. A more comprehensive search resulted in 381 previously unrecorded sanction cases, so that the total number of sanctions covered in the period 1950 to 2019 increased to 1,101 multilateral, plurilateral, and bilateral sanction cases. Among the newly recorded sanction cases, 75 cases were imposed during the 2016-2019 period which overlaps with the years of the Trump presidency. During that period, the number of sanctions imposed by the US spiked. This came just after the Obama Administration had relaxed or repealed a number of sanction regimes (e.g., on Iran, Myanmar and Cuba).

To obtain the increase the number of sanction cases in the first update of the GSDB, we relied on the following new sources. First, we utilized the Sanctions Alert published by Debevoise & Plimpton for sanctions imposed between 2013 and 2017. Second, we were able to record additional sanction cases by relying on the Intrastate Dispute Narratives of the DADM Project led by the Political Science Department of the University of Central Arkansas (UCA), which was especially useful for recording aid cuts and travel bans. Third, we revisited existing sanction databases and, once again, cross-checked the GSDB cases against them. In particular, we studied in detail each sanction case reported in Hufbauer et al. (2007) and, within a number of sanction policies, we identified additional cases. Lastly, we added several

cases recommended by users of the GSDB.

For the third release of the GSDB (GSDB-R3), we have extended the time coverage up to May of 2022, which resulted in a total of 1,325 sanction cases imposed between 1950 and 2022. We recorded and finalized the list of the sanction cases in the new update in two steps. First, we added 379 previously unrecorded sanctions, among which 336 sanctions were imposed between 2019 and 2022. Second, we checked the list of previously recorded and new sanction cases for multiple cases in the same year that included the same sender and the same target. Such cases existed because the GSDB time dimension is annual and it is distinctly possible that there are several different sanctions (e.g., with different types and/or objectives) that were imposed by the same sender to the same target in the same year but in different months. We aggregated such cases at the sender-target-year level by combining their objectives and/or types.⁶ In total, we combined 196 sanctions into 53 merged cases. Finally, we also conducted additional checks on previously recorded cases, fixed few minor errors and inconsistencies, and eliminated five cases due to lack of information or because these cases were classified as duplicates.

Based on the definitions from Morgan et al. (2009) and Felbermayr et al. (2020), the GSDB defines sanctions as: *Restrictive policy measures that one or more countries take to limit their relations with a target country in order to persuade that country to change its policies or to address potential violations of international norms and conventions.*⁷ First, the GSDB classifies each case by type (e.g., trade sanctions, financial sanctions, travel restrictions, arms sanctions, military assistance sanctions, and the residual category of sanctions).

⁶The recent sanctions on Russia, which evolved very dynamically in the first half of 2022, are a good example. In fact, these cases comprised the biggest fraction of ‘duplicates’, which we combined. We have kept track of the evolution of the sanctions on Russia over time and may use this information in future updates of the GSDB that may include more detailed time periods.

⁷In the GSDB, trade tariffs are not considered sanctions. The motivation for this decision is that tariffs are normally used to protect domestic economic interests within defined rules (e.g., WTO tariff rules), while sanctions aim to punish or induce a targeted nation to conform to the sanctioning state’s political request(s)/objective(s). We do recognize, however, that the distinction between sanctions and tariffs is increasingly becoming blurred (cf. Hufbauer and Jung (2020)). For datasets on specific trade policy tools, we refer the reader to WTO and UN sources. For an excellent dataset that records both sanctions and tariffs, we also refer the reader to the Threat and Imposition of Economic Sanctions (TIES) by Morgan et al. (2014).

Additionally, the GSDB differentiates trade sanctions on the basis of their stringency (i.e., complete vs. partial trade sanctions) and the direction of impacted trade (i.e., export and/or import sanctions).

Second, for each sanction case, the GSDB lists a sanctioning country’s pronounced policy objectives based on official documents and/or press releases.⁸ When sanctions have several policy objectives, the GSDB acknowledges the presence of all objectives (not listed in order of importance).

The third dimension of the GSDB is related to its assignment of a success score for each recorded sanction case, based on its objective(s). For sanctions with multiple objectives, each of these objectives is assigned a corresponding success score, which may be ‘total success’, ‘partial success’, ‘negotiation settlement’, ‘failure’, and ‘ongoing sanctions.’ Although our assessment of success is based on official government statements or indirect confirmations in news releases, it still comes with the caveat that such assessments are highly subjective and possibly biased – because policymakers’ true objectives may be fabricated and their true objectives may be disguised. Though imperfect, the collected information allows for preliminary assessments of sanction success and can spur discussion. Moreover, this information may help unveil general trends regarding the success of sanctions over time.

Figure 1 includes four panels that are designed to highlight the main characteristics of sanctions as well as several new features of the GSDB. Panel (a) traces the evolution of sanctions between 1950 and 2022. While the general trend of sanctions is associated with a continuous rise over time, the graph unveils the presence of a dramatic jump starting in 2019. Specifically, 217 new sanctions were imposed between 2019 and 2022. What’s more, 53% of these sanctions were imposed by the United States. Due to Brexit during this period, a second big contributor to the increase in sanction cases was the United Kingdom. The most frequent targets were Russia and Belarus, which were blamed primarily for human rights violations, lack of democracy, and the Russia-Ukraine war.

⁸One may identify sanction objectives by capitalizing on the fact that sanction sources mention the political objectives associated with the related imposition of sanctions.

To elaborate on the spike in active sanctions starting 2019, panel (b) of Figure 1 highlights the percentage changes (relative to the previous year) in the number of active sanction cases during the time period between 2000 and 2022. Inspection of this panel unveils two key features. First, in 2020, amid the COVID-19 lockdowns worldwide, the number of active sanctions grew by 11.9%, as compared to 2019. Second, and strikingly, in 2021 we witnessed a growth of 29.4% relative to 2020 in the worldwide number of sanction impositions – the biggest yearly increase recorded during the last two decades.

The explanation for this trend is twofold. First, between 2019 and 2022 very few pre-existing sanctions were repealed. This is most likely due to the shift of focus from political to global health matters triggered by the COVID-19 pandemic and the global tensions it gave rise to. Second, during this time period, owing to growing political rivalries in the world, the imposition of new sanctions reached new heights. The United States led this trend by imposing a number of financial and travel (i.e., targeted or “smart”) sanctions on individuals deemed to be responsible for human rights violations or anti-democratic practice/policies. In particular, the Biden administration sanctioned military leaders who directed the military coup in Myanmar in February 2021. Moreover, in August 2021, it sanctioned Belarussian businesses and their owners who supported Alexander Lukashenko.

Panel (c) of Figure 1 presents the evolution of sanctions by type. Because of growing humanitarian concerns worldwide and consistent with the global shift from comprehensive/nation-wide sanctions to smart/targeted sanctions, the imposition of financial sanctions has increased steadily from the early 1980s onwards. During the past decade, we also observe a strong increase in the number of active trade sanctions. This trend is primarily driven by three factors. The first is the large number of trade sanctions on Russia due to its annexation of Crimea. The second is related to the increase of the so-called “smart” trade sanctions (i.e., bans on trade with elite and their affiliated businesses), whose popularity since 2019 has increased. Finally, the rise in active trade sanctions in 2022 is mostly due to Russia’s invasion of Ukraine and to multiple comprehensive (i.e., nation-wide) and “targeted” (i.e.,

imposed on the elite and their businesses) trade sanctions against Russia and Belarus.

For each sanction case, the GSDB also identifies a number of policy objectives. These objectives are defined in official legal documents and/or discussed in corresponding news releases. Panel (d) of Figure 1 displays the distribution of nine distinct political objectives regularly pursued by sanctions between 1950 and 2022, and captures several patterns. First, sanctions aiming to improve human rights have been rising steadily over time. Second, the numbers of sanctions aiming to resolve territorial conflict and to destabilize regimes have declined. Third, since the early 1990s, the numbers of active sanctions aiming to “prevent war”, “end war” and counter “terrorism” have grown. Finally, the number of sanctions aiming to change policy started to increase in 2014 and reached its historical maximum in 2022.⁹

We conclude this section by analyzing the evolution of the success rate of sanctions.¹⁰ Panel (a) of Figure 2 depicts the shares of sanctions with differing rates of success over the period of 1950-2022. Overall, the success rate of sanctions has been relatively low but increasing over time, until 2016.¹¹ At that time, which coincides with the beginning of the Trump presidency, the success drops sharply perhaps due to social and political unrest.

Another indicator of the unraveling political rivalry worldwide – which may explain the reduction in the capability of sanctions to achieve their ultimate goal(s) in recent times – is the striking increase in ongoing sanctions captured in panel (b) of Figure 2. The use of sanctions as international symbols of power could be yet another explanation for the significant growth in active sanctions – sanctions may be imposed, not necessarily to achieve sanctioners’ stated objective(s), but to project their power to targets and to the global community.

⁹A prominent example of these sanctions are the ones imposed on Russia in 2014 for its policy on Crimea. Another example is the US arms sanctions on Cambodia in response to Phnom Penh’s growing ties with Beijing.

¹⁰As noted earlier, the GSDB assigns a qualitative success score for each stated political objective. We base the evaluation on official statements but are cognizant of the immense inherent difficulty in assessing the success of a sanction regime due to the following: (i) policy objectives often are stated vaguely; and (ii) policymakers may have an interest in declaring, falsely, their sanctions successful.

¹¹Morgan et al. (2022) conjecture that the increased rate of success until 2016 may be due to learning effects related to the imposition of effective sanctions.

2.2 Unilateral vs. Multilateral Sanctions

A novel feature of the third release of the GSDB is the addition of a variable that indicates whether a sanction is imposed unilaterally or as part of a multilateral effort. In response to multiple inquiries related to the inclusion of such variable in the GSDB, we defined ‘unilateral sanctions’ as those imposed by an individual country on another country, and ‘multilateral sanctions’ as those imposed by a group of senders or on a group of targets. The vast majority of multilateral sanctions are on the sender side. However, there are a few cases in which sanctions are imposed on a group of targets. Moreover, within this category there may exist differences in the degree of coordination in policy, depending on whether countries are members of international organization like the United Nations or the European Union. Due to the more extensive participation in them, potential coordination, and possibly stronger enforcement, multilateral sanctions are likely to inflict more economic harm on target countries. Consequently, everything else being the same, such sanctions are more likely to be more successful in terms of achieving their political objectives.

Figure 3 illustrates several dimensions of the unilateral and multilateral sanctions in the GSDB-V3. Panel (a) highlights the evolution of the percentage shares of unilateral vs. multilateral sanctions over time. With a relatively stable share of about two-thirds of all cases, unilateral sanctions prevail in their frequency of use over all time periods. This dominance of unilateral sanctions could be explained by the relative ease with which they can be imposed – unilateral sanctions do not require potential sanctioners to align their potentially divergent political and economic interests, objectives, and the timing of decisions at the imposition stage.

As for the development of multilateral sanctions over time, two time periods stand out. First, the number of multilateral sanctions increased in 1973-1974. This rise is may be attributed to the imposition of multiple sanctions by the League of Arab States on Israel in response to the Arab-Israeli Wars. Second, the share of multilateral sanctions rises again between the late 1990s and around 2014. The rise in the relative importance of these sanc-

tions is most likely related to the increased importance of sanctions imposed by the United Nations in response to human rights violations and/or to anti-democratic behavior.

Panel (b) of Figure 3 offers a breakdown of multilateral sanctions by sender group including sanctions imposed by the UN, the EU, the EU and aligned countries (“EU Plus”), and the residual multilateral sanctions imposed by other groups of countries. The share of the UN sanctions has been relatively large and steady over time. The formal establishment of the European Union with the Maastricht Treaty led to the increase in the number of EU sanctions in the early 90s, which continued until the early 2000s. After that, sanctions imposed by the EU alone have been slowly replaced by sanctions imposed by the EU and the so-called aligned nations, which typically include candidate member countries or they are strongly linked to the EU through deep international agreements, e.g., Macedonia, Albania, Bosnia and Herzegovina, Serbia, Liechtenstein, Norway.

Finally, panel (c) of Figure 3 describes the evolution of unilateral sanctions by sanctioning nation. The sanctions imposed by the US have dominated the unilateral sanction impositions globally, with occasional ups and downs. Specifically, the US sanctions have spiked post-2016, which coincides with the years of the Trump’s presidency. Moreover, the figure depicts the shift in political power and political alignment in the world over time. In particular, the share of the sanctions imposed by Canada has been on the rise in the past decade implying Canada’s growing global political influence as well as its alignment with the US. The share of the sanctions imposed by the UK has declined over time, which could be an indicator of the loss of political influence of the UK on a global scale and also of aligned interests with the EU. The recent spike in UK sanctions is primarily due to Brexit, i.e., mainly due to the retention of the EU sanctions by the UK as an individual sender after Brexit, but also due new unilateral sanction impositions by the UK.

2.3 The Sanctions on Russia

Russia’s annexation of the Crimean Peninsula, the subsequent incursions into Eastern Ukraine, and the shutdown of a civilian aircraft in 2014, compelled the United States, the European Union, and several other countries to impose various sanctions on Russia for its violations of international law. The initial sanction measures of 2014 were significantly smaller in terms of their scope compared to the more recent restrictive policies since 2022,¹² and they mainly targeted individuals and institutions involved in the annexation, as well as entities attempting to do business with Crimea. Most of this first set of sanctions did not target Russia’s economy in its entirety. However, the intention of these sanctions was to impose significant costs for doing business especially in Crimea. Moreover, in 2014, some countries restricted partially their trade with Russia for specific products. For example, the EU and the US imposed restrictions primarily on trade in arms and on so called ‘dual-use’ goods, including technology intended for military use. At the same time, most of the sanctioning countries introduced export controls on equipment for the oil industry, financial restrictions on specific banks and individuals, and travel bans on prominent Russian citizens.

Table 1 lists all countries and the respective sanctions against Russia for three sanction waves (based on the GSDB). In 2014 (panel (a)), besides the EU and the US, eleven other countries imposed economic sanctions against Russia. All listed countries introduced only partial trade sanctions. The EU and the US restricted both imports and exports, while other countries imposed either only partial import or only partial export sanctions. Additionally, all listed countries imposed financial restrictions and the scope of these sanctions differed across sanctioners. For example, the US imposed severe financial restrictions on Russia’s largest bank (Sberbank) and these sanctions were also adopted by Japan and Switzerland. The EU and other countries introduced financial restrictions on the bond and equity markets. As shown in panel (a), a majority of the listed countries imposed travel bans on specific

¹²As noted earlier, Russia’s military invasion into Ukraine started in February 2022 and, due to lack of consistent data, an analysis of the effects of this sanction episode is still not feasible.

persons who have played a role in the Russian threat to Ukraine’s sovereignty.

Panel (b) in Table 1 illustrates that the US increased the scope of partial export and import sanctions as well as financial sanctions in several waves. The UK, which, in 2021, was no longer an EU member, tightened its sanctions as well. In the case of the EU, its sanctions were imposed within the framework of the Common Foreign and Security Policy (CFSP). First, specific measures (such as arms embargoes or travel restrictions) were laid down in the CFSP decision and then carried out by each member state. The Commission then verified that member states implemented the regulations in a proper and timely fashion. In short, all EU members embraced the same sanction policies against Russia.

Finally, panel (c) in Table 1 lists all sanction policies that appeared in 2022 after Russia’s military attack of Ukraine. As can be seen in all three main policy areas (i.e., trade, financial and travel restrictions), existing sanctions were extended and other countries (such as Taiwan, Singapore, and South Korea) joined the group of sanctioning states.

Figure 4 presents Russia’s top-50 trading partners for the year 2013, prior to the first wave of sanction policies against the country. Panel (a) unveils the presence of significant heterogeneity in the export volumes among exporters to Russia. China’s exports were valued at \$53 billion, far more than all other listed countries, followed by Germany’s exports which were valued at \$38 billion. The next ten countries, starting with the US and ending with Turkey, exported goods worth between \$16.7 billion and \$7 billion, respectively.

Interestingly, within the EU, exports to Russia differ significantly across member states and seem not to be primarily driven by the economic sizes of these states. For example, Finland’s value of exports to Russia was \$5.3 billion, while Austria’s exports were worth \$3.8 billion. The corresponding value of Hungary’s exports was \$3 billion, while Denmark only sold goods worth \$2 billion. Among the non-European industrial countries, Japan and South Korea were important exporters to Russia, with export values equal to \$13.5 and \$10.3 billion, respectively. Interestingly, among the emerging economies exports to Russia also differ significantly. While Brazil and India exported goods worth around \$3 billion,

exports of other countries (like Argentina, Mexico and South-Africa) were worth only about \$1 billion.

A closer look at the top-50 states importing Russian goods also unveils the presence of a heterogeneous distribution of importers that differs from the one associated with the top exporting nations. Germany is the largest importer of Russian goods: these imports are valued at over \$50 billion. Germany is followed by China and the Netherlands with corresponding import values of approximately \$39 billion. The US, Turkey, Italy, Poland, Japan, and Ukraine imported Russian goods worth between \$27 and \$22 billion. It is worth noting that imports of EU countries from Russia are considerably larger in value than their corresponding exports to Russia. One reason for EU's stronger import dependence on Russia is due to its large imports of oil and gas. Due to their geographic proximity to Russia, most EU countries have also imported various primary goods from Russia. However, this pattern is not true for all EU states. Croatia and Portugal, for example, are at the lower bound of this ranking with imports from Russia reaching around \$1.4 billion.

The above descriptive statistics unveil two important aspects of trade sanctions on Russia. First, the sanctions that were imposed on Russia in 2014 have been less comprehensive than the subsequent sanctions that were introduced in 2022. Thus, the changes in Russia's average exports and imports with the rest of the world due to the 2014 sanctions should be expected to be relatively smaller. Second, Russian trade with EU countries is very heterogeneous. In particular, exports of EU members to Russia differ significantly. In contrast, almost all EU members exhibit a high relative dependence on imports from Russia. Therefore, the effects of sanctions are very likely to differ among exporting EU states. Moreover, the effects of export and import related sanctions will most likely differ, too.

3 Empirical Analysis

The objective of this section is to highlight the importance of some of the new dimensions of the GSDB (e.g., the distinction between unilateral vs. multilateral sanctions) and to demonstrate how these dimensions matter in quantifications of the impact of economic sanctions on international trade. To this end, and as is standard in the related literature, we rely on an empirical gravity model. We specify this model in Subsection 3.1 below. Then, in Subsection 3.2, we present and discuss our estimation results.

3.1 Econometric Specification

To quantify the effects of sanctions on trade, and subject to the specifics of the data, we follow the best-practice recommendations of Yotov et al. (2016) and a recent application to sanctions from Felbermayr et al. (2022) to specify the following empirical gravity model:

$$X_{ij,t} = \exp[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \beta_1 RTA_{ij,t} + \beta_2 WTO_{ij,t} + \beta_3 EU_{ij,t} + SANCT_{ij,t}\alpha] \times \epsilon_{ij,t}. \quad (1)$$

Here, $X_{ij,t}$ denotes nominal trade flows (Baldwin and Taglioni (2006)) from exporter i to importer j at time t . Following recent work by Egger et al. (2022), we use consecutive-year data for every year in our sample instead of data with intervals or averaged data. Consistent with theory, some of our specifications include domestic trade flows (Yotov (2022)); however, our main results are obtained with data on international trade flows only.¹³ As recommended by Santos Silva and Tenreyro (2006), we rely on the Poisson Pseudo Maximum Likelihood (PPML) estimator to obtain all of our results. PPML handles the heteroskedasticity in the trade data flows and allows for the inclusion of zero trade flows in our estimations. In all specifications, we cluster the standard errors by country pair.

¹³The reason for this is that, while we could match international trade data with data in the GSDB for all years up to 2019, domestic trade flows are available only for more recent years. For our main analysis, we rely on the aggregate trade flows dataset from Felbermayr et al. (2022), which covers the period 1950-2019 and is constructed based on data from the *Direction of Trade Statistics* (DOTS) of the International Monetary Fund (IMF) and the United Nations' Comtrade Database.

Turning to the covariates, in equation (1), $\pi_{i,t}$ and $\chi_{j,t}$ denote the sets of exporter-time and importer-time fixed effects, respectively. These fixed effects are used to control for the multilateral resistances of Anderson and van Wincoop (2003) as well as for any other observable and unobservable exporter-time-specific and importer-time-specific determinants of trade flows. μ_{ij} denotes the set of country-pair fixed effects, which comprehensively account for all time-invariant bilateral trade costs (Egger and Nigai (2015) and Agnosteva et al. (2019)),¹⁴ including most of the linkages between the potentially endogenous bilateral policy variables (e.g., sanctions, etc.) and the error term (Baier and Bergstrand (2007)).¹⁵

The next three covariates in equation (1) are time-varying bilateral indicator variables that are standardly used as controls in gravity regressions. Specifically, $RTA_{ij,t}$ takes the value of one if there is a regional trade agreement (RTA) between countries i and j at time t , and it is equal to zero otherwise. The data on RTAs are from Egger and Larch (2008). $WTO_{ij,t}$ is equal to one when countries i and j are both members of the World Trade Organization (WTO) at time t , and it is equal to zero otherwise. Lastly, $EU_{ij,t}$ takes a value of one if an exporter and an importer are jointly members of the EU at a given year, and it is equal to zero otherwise. The data on WTO and EU membership come from the *Dynamic Gravity Database* of the USITC (Gurevich and Herman (2018)).

Most important for our purposes, $SANCT_{ij,t}$ is a vector of sanction variables. We use vector notation because we will employ different sanction variables in the alternative specifications. Based on the analysis in Felbermayr et al. (2020), and capitalizing on the rich dimensionality of the GSDB, our benchmark specification distinguishes between the effects of complete trade sanctions ($COMPL_SANCT_{ij,t}$) vs. partial trade sanctions ($PARTL_SANCT_{ij,t}$) vs. other types of sanctions ($OTHER_SANCT_{ij,t}$). Then, consis-

¹⁴The pair fixed effects in our econometric model fully absorb the effects of all time-invariant gravity covariates such as the logarithm of bilateral distance and indicator variables for colonial relationships, common language, etc. Following Baier et al. (2019), we use directional pair fixed effects, which account for potential asymmetries in the time-invariant bilateral trade costs.

¹⁵As discussed in Felbermayr et al. (2022), “another factor that mitigates potential endogeneity concerns with respect to sanctions is that, by definition, sanctions are usually imposed in response to actions/inactions that are specific to the target country. Therefore, the use of exporter-time and importer-time fixed effects in our econometric specification completely controls for any such target-specific linkages.” (p. 27).

tent with our goal to highlight the new features of the GSDB, we allow for the effects of partial and complete trade sanctions to vary depending on whether they are unilateral or multilateral. Moreover, we study the evolution of the effects of unilateral vs. multilateral complete and partial trade sanctions over time, and finally we zoom in on the effects of certain multilateral sanctions (e.g., the 2014 sanctions on Russia). In all cases, our sanction variables are defined as dummy variables capturing the presence of sanctions between i and j at time t . We motivate and describe each step of decomposing vector $SANCT_{ij,t}$ in detail in the next section.

3.2 Estimation Results and Analysis

Our first set of results appears in Table 2. All estimates in this table are obtained from specification (1) and the only difference between them is in the covariates that comprise vector $SANCT_{ij,t}$. All specifications include exporter-time, importer-time, and directional pair fixed effects along with the covariates that control for RTAs, WTO and EU membership, and other types of sanctions. For brevity and clarity of exposition, we omit the estimates on all other variables but the sanction estimates that are of central interest to us.

To obtain the results in our benchmark specification in column (1) of Table 2, we follow Felbermayr et al. (2022) and distinguish between the effects of complete trade sanctions vs. partial trade sanctions. Our estimates reveal that both types of trade sanctions decrease international trade flows between senders and targets. However, as expected (cf. Felbermayr et al. (2020) and Felbermayr et al. (2022)), the negative impact of complete trade sanctions is significantly stronger. Specifically, our estimates suggest that, on average, complete trade sanctions have reduced international trade by about 73%, while the impact of partial trade sanctions is smaller – about 10%. As discussed in Felbermayr et al. (2022), the smaller estimate of the effects of partial sanctions on aggregate trade is not surprising since, by definition, these sanctions apply only to specific sectors or activities. Unfortunately, the GSDB does not identify the specific sectors and activities that are targeted by partial trade

sanctions. This is an important dimension that we are considering for possible inclusion in future releases of the GSDB.

Next, and more important for our current purposes, in column (2) of Table 2, we allow for heterogeneous effects of complete and partial trade sanctions depending on whether they are unilateral or multilateral. Our estimates reveal that, on average, the effects of complete trade sanctions are similar regardless of whether they are unilateral or multilateral. The implication is that multilateral trade sanctions bring about significantly more damage to the target country since, by definition, they are imposed by many countries at the same time. Interestingly, we find that the effects of multilateral partial sanctions are significantly stronger than the corresponding effects of unilateral partial trade sanctions. Later in this section, we explore and confirm this result over time and at the sectoral level, too.

In our next experiment, we zoom in on the impact of unilateral vs. multilateral trade sanctions by allowing their effects to vary over time. Specifically, following the classification from Morgan et al. (2022), who identify several eras in the evolution of sanctions, including the ‘sanctions decade’ starting in 1990, we allow for the presence of heterogeneous effects before and after 1990. The estimates in column (3) of Table 2 reveal that the relative effects of unilateral vs. multilateral trade sanctions are similar in the case of partial trade sanctions. Consistent with the estimates from column (2), we see that the effects of multilateral partial trade sanctions are stronger than those of unilateral trade sanctions.

Turning to the effects of complete trade sanctions, we detect a change in the estimates before and after 1990. Specifically, we find that the effects of multilateral complete trade sanctions are significantly stronger during the period before the 90s, while the effects of unilateral complete trade sanctions are stronger in recent years. A possible explanation for the smaller estimate of the post-1990 multilateral complete trade sanctions is that their effects are very heterogeneous among senders, including insignificant effects for some individual participants in multilateral sanctions. We explore this hypothesis more formally later in this section. Before that, we offer further evidence that, in recent years, the average estimates

of the effects of multilateral complete trade sanctions are indeed smaller as compared to the effects of unilateral complete trade sanctions.

The results in Figure 5 are obtained from the following sectoral gravity specification, which is based on our benchmark econometric model (1):

$$X_{ij,t}^k = \exp[\pi_{i,t}^k + \chi_{j,t}^k + \mu_{ij}^k + \beta_1^k RTA_{ij,t} + \beta_2^k WTO_{ij,t} + \beta_3^k EU_{ij,t}] \times \exp\left[\sum_t \beta_t^k BRDR_{ij,t} + SANCT_{ij,t} \alpha^k\right] \times \epsilon_{ij,t}^k. \quad (2)$$

There are two main differences between equations (2) and (1). First, consistent with gravity theory (e.g., Anderson and van Wincoop (2004)), equation (2) is specified at the sectoral/product level. This is captured by superscript k . To obtain disaggregated estimates of the effects of multilateral vs. unilateral trade sanctions, we employ the latest edition of the USITC's *International Trade and Production Database for Estimation* (ITPD-E-R02), which includes 170 industries, covering the complete economy within four broad sectors: Agriculture, Mining & Energy, Manufacturing, and Services. The complete list of industries in the ITPD-E appears in column (1) of Table 3 from the Appendix.¹⁶

An important feature of the ITPD-E for gravity estimations is that it includes both domestic and international trade flows. This leads to the introduction of the time-varying set of border dummy variables ($\sum_t \beta_t^k BRDR_{ij,t}$) in Specification (2). This is the second difference from Equation (1). These border dummies are designed to account for ‘home bias’ effects and to capture the impact of international borders and their evolution over time. Finally, we note that the time coverage of the ITPD-E (i.e., 1986-2019 for Agriculture, 1988-2019 for Mining & Energy and for Manufacturing, and 2000-2019 for Services) is shorter than the period covered by our aggregate data (1950-2019). Thus, our disaggregated estimates should be compared with the post-1990 aggregate results in column (3) of Table 2.

To obtain the results in Figure 5 we estimate equation (2) for each of the 170 ITPD-

¹⁶For additional details on the ITPD-E, we refer the reader to Borchert et al. (2022) and <https://www.usitc.gov/data/gravity/itpde.htm>.

E sectors by simultaneously allowing for differential effects of unilateral vs. multilateral complete trade sanctions and unilateral vs. multilateral partial trade sanctions. Due to the large number of estimates, for space reasons, we use graphs and focus on the effects of complete trade sanctions. The full set of estimates and a corresponding figure for the effects of partial trade sanctions appear in Table 3 and Figure 7 of the Appendix, respectively. In addition, to improve the clarity of the figures, we drop the top and bottom 5% of the estimates in each panel of Figure 5. This explains why the total number of sectors in the figure is less than 170.

The results in the top panel of Figure 5 are related to the effects of unilateral complete trade sanctions and reveal the following. First, about 80% of our estimates are negative and about 60% of them are statistically significant, indicating that complete multilateral trade sanctions have been effective in decreasing international trade. The average (across the significant sectoral estimates) effect that we obtain is -1.880, which, despite our reliance on different data, is comparable to the corresponding estimate for post-1990 unilateral complete trade sanctions from column (3) of Table 2 (-1.569, std.err. 0.399). Second, we see significant heterogeneity in the effects of complete unilateral trade sanctions. Across the four broad ITPD-E sectors, the negative effects of sanctions are largest for Mining & Energy and Agriculture and smallest for Manufacturing and Services.

The middle panel of Figure 5 reports estimates of the effects of multilateral complete trade sanctions. Once again, we see that most of the estimates are negative (about 84%) and that most of them (about 60%) are statistically significant, too. The variation across the broad ITPD-E sectors is also similar to the variation observed for unilateral complete trade sanctions. The key difference between the results in the two top panels of Figure 5 is that, on average, the impact of multilateral sanctions is smaller, as compared to the corresponding effect of unilateral complete trade sanctions (-0.860). This is captured more clearly at the bottom panel of Figure 5, where we plot the estimates of the unilateral and the multilateral effects of sanctions together. These results reinforce our finding with aggregate data that

the estimates of the direct effects of multilateral complete trade sanctions are smaller than their unilateral counterparts.

As discussed in Section 2.3, even though the recent sanctions on Russia are an important component of the GSDB-R3 we were unable to investigate their effects due to the lack of trade data. Instead, we offer a series of estimates of the 2014 sanctions on Russia due to the Crimean conflict, which deliver valuable insights on the possible effects of the current sanctions, too. Our estimates are obtained from the following specification:

$$X_{ij,t} = \exp[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \beta_1 RTA_{ij,t} + \beta_2 WTO_{ij,t} + \beta_3 EU_{ij,t} + \beta_3 COMPL_SANCT_{ij,t}] \times \exp[\beta_4 PARTL_SANCT_{ij,t} + \beta_5 OTHER_SANCT_{ij,t} + \beta_6 RUS_SANCT_{ij,t}] \times \epsilon_{ij,t}. \quad (3)$$

Equation (3) is very similar to Specification (1). The only difference between the two is that, in addition to controlling for the effects of complete and partial trade sanctions, as well as any other sanctions, we have isolated the effects of the 2014 sanctions on Russia by using the indicator variable $RUS_SANCT_{ij,t}$, which takes the value of one if Russia was sanctioned by any other country after 2014, and is equal to zero otherwise. To ease interpretation, we have subtracted $RUS_SANCT_{ij,t}$ from all other sanction dummies. Thus, the estimate(s) on β_6 can be interpreted directly, and not as deviations from the corresponding effects of the other sanction variables.

We use Specification (3) to obtain three sets of estimates of the effects of the 2014 sanctions on Russia. First, we impose a common effect of those sanctions. For brevity, we do not report our estimates in a tabular format. Instead, we note, first, that the common estimate on $RUS_SANCT_{ij,t}$ is negative and statistically significant; and, second, that it is relatively small in terms of magnitude (-0.231 std.err. 0.056). This indicates that, on average, the 2014 sanctions did not have a strong impact on Russia's aggregate trade. Specifically, our estimate suggests that the 2014 sanctions decreased Russia's trade with the coalition of sanctioning countries (as shown in Table 1) by about 21%. Total Russian foreign trade went down by less, as not all Russian trade was sanctioned and trade diversion occurred. We find this result interesting and consistent with claims that the 2014 sanctions on Russia did not have very strong effects.

The 2022 sanctions are comparatively more comprehensive (in that they cover more areas) and

the sanctioning coalition is somewhat (but not much) larger. Still, many big trade partners of Russia, most notably China and India, have not imposed any sanctions on Russia. Even the EU or the US sanctions are incomplete (in the sense that they do not cover all trade). Most importantly, energy imports have been initially excluded. So, it is quite possible that the 2022 sanctions on Russia still fall a long way short from the average effect of complete multilateral sanctions. Indeed, according to Eurostat, in the first six months of the application of sanctions (from March 2022 to August 2022), EU imports from Russia were 50 percent higher than in the six corresponding months of 2021, while EU exports to Russia stood 48 percent lower. US imports, which are much smaller to start with and significantly less dependent on fossil fuels, reacted more strongly. According to the US Census data, US imports from Russia were about 53 percent lower in the period March to August 2022, as compared to the same period in the previous year; exports were down by 85 percent. In short, the preliminary evidence for the 2022 sanctions points to a relative modest reduction of total trade with Russia so far, as the EU is by far a more important trade partner to Russia than the US. However, heterogeneity of effects between countries seems very important. This is what we explore in some detail next.

To this end, we let the coefficient on $RUS_SANCT_{ij,t}$ in (3) vary by sender. The motivation for this specification is twofold. First, from a methodological perspective, even though the 2014 sanctions on Russia were not ‘formally’ multilateral (i.e., they were not coordinated among different senders – except for the EU sanctions, which we study in detail below), they were imposed almost simultaneously by multiple senders for the same reason and with very similar objectives. Second, from a policy perspective, and similar to the 2022 sanctions, the 2014 trade sanctions on Russia were only partial and not all countries participated as senders.

Our estimates appear in the top panel of Figure 6, and they form the basis for two conclusions. First, all estimates are relatively small. Second, there is significant heterogeneity in the sanction effects—they vary from negative and statistically significant (for Canada), to negative but not statistically significant (for Montenegro and the United States), and to positive (for Japan). The heterogeneity in the effects of the sanctions on Russia is consistent with the findings of Felbermayr et al. (2022), who obtain very heterogeneous effects (across senders) of the sanctions on Iran. An important difference, however, is that the estimates of the negative effects of the sanctions on Iran

from Felbermayr et al. (2022) were significantly larger in magnitude, thus implying larger economic damage.

In the middle panel of Figure 6, we zoom in on the effects of the 2014 EU sanctions on Russia. This analysis complements our earlier investigation of the effects of multilateral sanctions. Three main findings stand out. First, consistent with our common estimate and the results in the top panel of Figure 6, the effects of the EU sanctions on Russia were relatively small. Second, these effects were fairly heterogeneous across the EU members. This result is consistent with our hypothesis about the smaller estimates of multilateral sanctions (e.g., in the case of the 2014 EU sanctions on Russia, we obtain negative but small and insignificant estimates for Denmark, the Netherlands, Italy, Luxembourg, Greece, positive but insignificant estimates for Belgium and Ireland, and a positive and significant estimate for Portugal). Third, a closer inspection of our estimates reveals that the largest negative effects were for countries that are (i) geographically closer to Russia, and (ii) relatively new members of the EU. This is shown in the bottom panel of Figure 6, where we correlate our estimates with the distance between each sender and Russia.

It is likely that the 2022 sanctions on Russia have followed similar patterns, at least during the first six months of their application (from March to August 2022). As discussed above, US transactions with Russia have contracted much more strongly than EU transactions, most likely because of their differing composition of trade flows. Moreover, preliminary evidence reveals that the response so far has been very heterogeneous among countries in the EU. Interestingly, imports from Russia have actually more than doubled for several countries, including Austria, Italy, Hungary, Greece or Slovenia – countries that have found it difficult to substitute away from Russian energy imports in the short-run and who had to pay higher prices. Imports of other countries, such as Sweden, Denmark or Malta fell by half. Imports of large importers – Netherlands, Germany, Poland – increased, but by less than the EU average. On the export side, effects are even more heterogeneous: Germany, by far the largest pre-sanctions exporter to Russia, saw export sales fall by 54 percent, slightly more than the EU average. Italy’s exports fell by about 31 percent while Austria’s imports fell by just 13 percent.

4 Conclusion

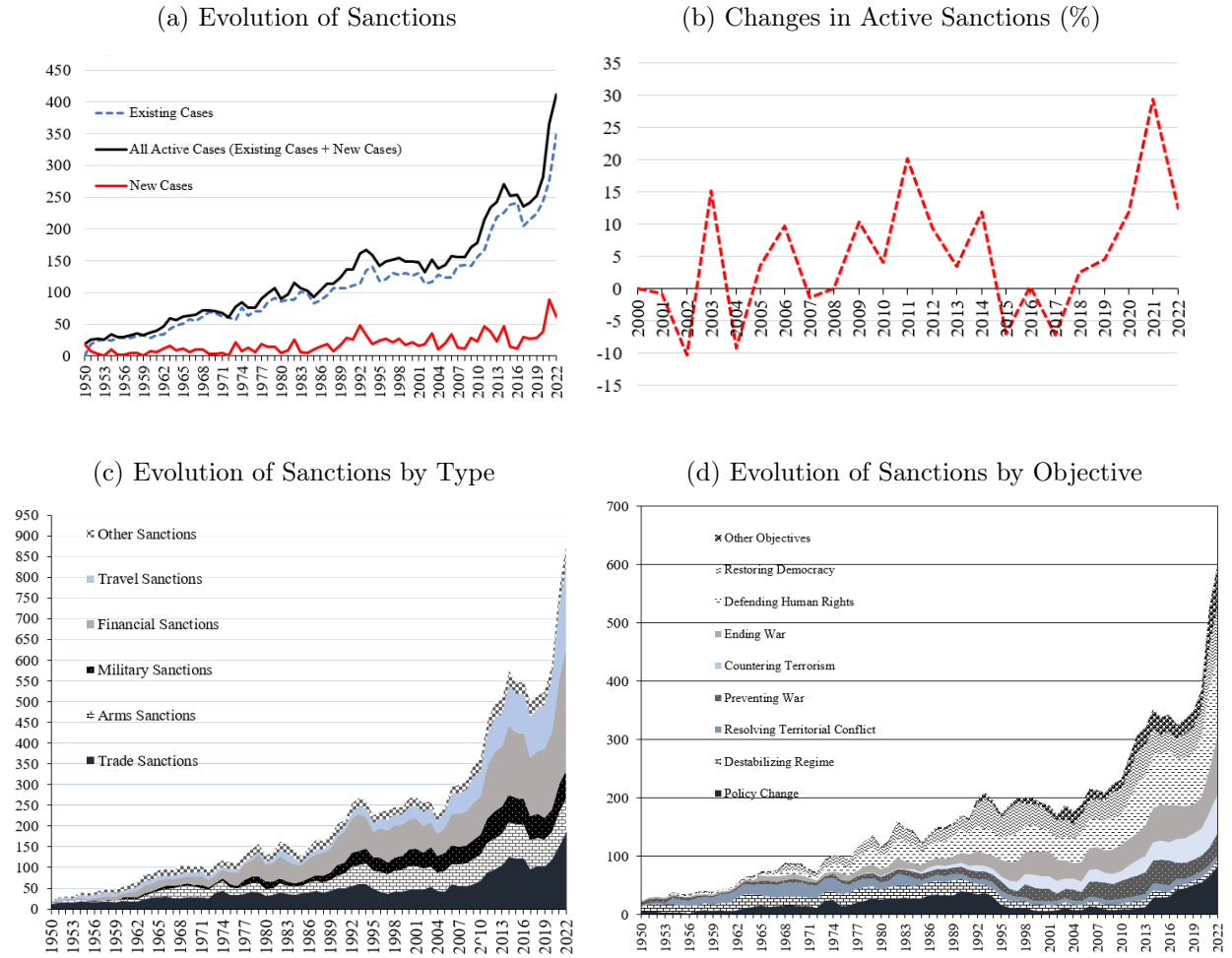
In this paper, we presented the latest update of the Global Sanctions Data Base – GSDB-V3. This collection of sanctions episodes has become an important source of information. GSDB-V3 covers the period from 1950 to 2022 and a total of 1,325 sanction cases. It also contains a new variable, which defines whether a sanction regime is unilateral or multilateral. We have shown that the GSDB helps identify several important trends, including the steady increase in the use of sanctions over time and the sharp acceleration of this use in recent years. Of course, the GSDB has been proven to be extremely useful in estimating the effects of sanctions on international transactions. Our analysis reveals that the data yield plausible and intuitive results using the standard econometric tool for the analysis of trade, the gravity equation. Interestingly, unilateral and multilateral sanctions have similar effects on bilateral trade relationships when these sanctions are complete. However, partial sanction regimes are significantly more effective when applied multilaterally. Importantly, even within multilateral sanctions, there is an important degree of heterogeneity in trade effects across sanctioning countries and products. This result hints towards an important need for further data work. In future steps, the GSDB needs to be extended to include details on the sectoral coverage of sanction regimes. This will help to shed light on the origins of heterogeneity.

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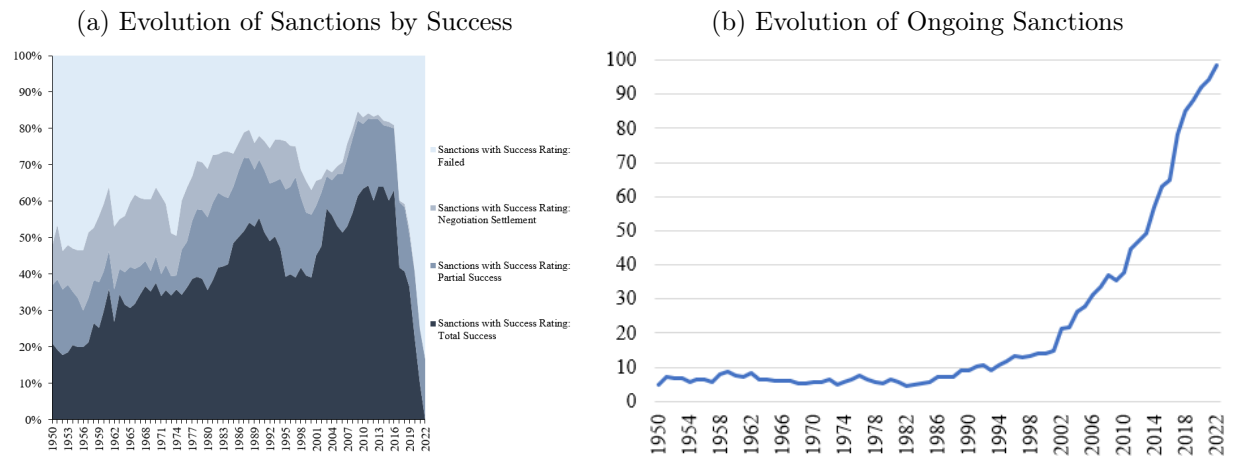
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Figure 1: Success of Sanctions - Over Time



Note: Panel (a) of this figure illustrates the number of all active sanctions (dark solid line), all pre-existing minus terminated sanctions (blue dashed line), and newly imposed sanctions (red solid line, which is equivalent to the distance between the dark solid and blue dashed lines) in each year (1950-2022). Panel (b) zooms in on the period 2000-2022 and presents the percentage changes (as compared to the previous year) in the number of sanctions active in a given year. Panels (c) and (d) show the evolution of active sanctions by type and by objective, respectively. The total number of sanctions in these panels exceeds that in panel (a) as one sanction case may include different types of sanctions and more than one objective.

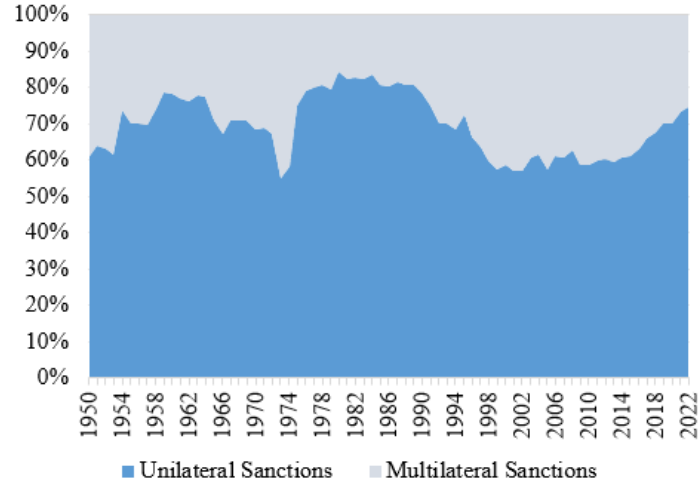
Figure 2: Success of Sanctions - Over Time



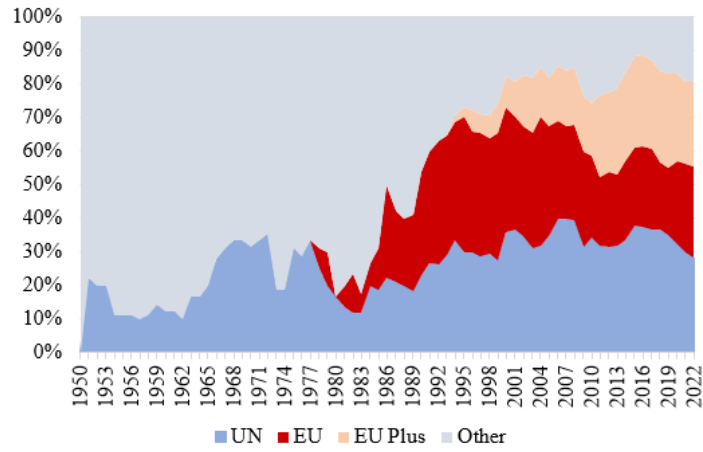
Note: Panel (a) of this figure depicts the yearly success of sanctions by objective. Panel (b) plots the evolution of ongoing sanctions, i.e., the sanctions that have not been repealed, as compared to the percentage share of repealed sanctions.

Figure 3: Unilateral vs. Multilateral Sanctions

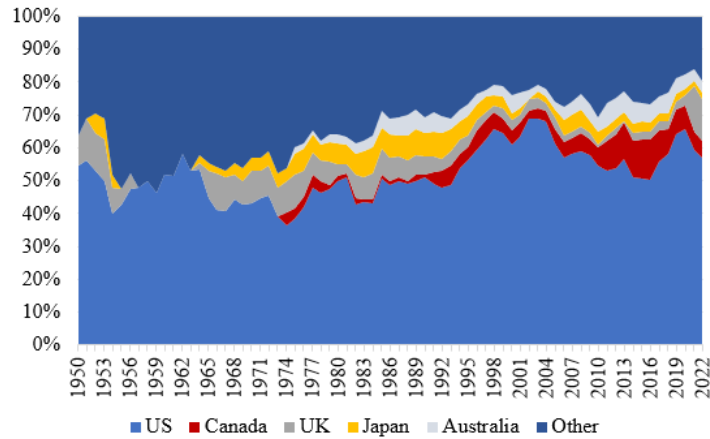
(a) Evolution of Unilateral vs. Multilateral Sanctions



(b) Evolution of Multilateral Sanctions by Sender



(c) Evolution of Unilateral Sanctions by Sender



Note: Panel (a) of this figure depicts the evolution of the shares (in percent) of unilateral vs. multilateral sanctions in the GSDB over time. Panel (b) illustrates the shares of multilateral sanctions by country groups over time. Finally, panel (c) shows the shares (in percent) of unilateral sanctions by initiating country over time. See text for further details.

Table 1: Sanctions against Russia after annexation of Ukrainian territory

(a) Sanctions against Russia - 2014

| Sanctioning States | Start | End | Extent of Trade Sanctions | trade | arms | military | financial | travel | other |
|--|-------|------|---------------------------------|-------|------|----------|-----------|--------|-------|
| | | | | | | | | | x |
| Australia | 2014 | 2022 | Partial Export | x | x | x | x | x | |
| Canada | 2014 | 2022 | Partial Export | x | | | x | | |
| EU | 2014 | 2022 | Partial Export & Partial Import | x | x | x | x | | |
| EU, Montenegro, Iceland, Albania, Liechtenstein, Norway, Ukraine | 2014 | 2022 | Partial Import | x | | | x | x | |
| Japan | 2014 | 2022 | Partial Import | x | | x | x | x | |
| New Zealand | 2014 | 2022 | | | | | x | x | x |
| Switzerland | 2014 | 2022 | Partial Export & Partial Import | x | x | x | x | | |
| United States | 2014 | 2022 | Partial Export & Partial Import | x | | | x | x | |

(b) Sanctions against Russia between 2017 and 2021

| Sanctioning States | Start | End | Extend of Trade Sanctions | trade | arms | military | financial | travel | other |
|--------------------|-------|------|---------------------------------|-------|------|----------|-----------|--------|-------|
| United States | 2017 | 2022 | Partial Export & Partial Import | x | | | x | | |
| United States | 2020 | 2022 | Partial Export & Partial Import | x | | | x | | |
| United Kingdom | 2021 | 2022 | Partial Export & Partial Import | x | x | x | x | x | |

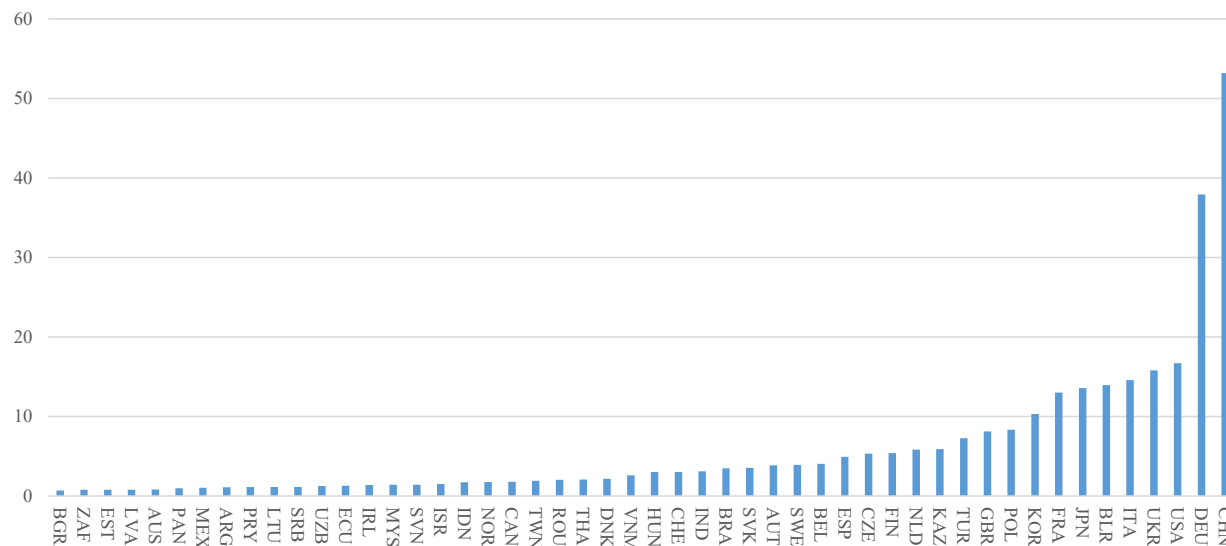
(c) Sanctions against Russia in 2022

| Sanctioning States | Start | End | Extend of Trade Sanctions | trade | arms | military | financial | travel | other |
|--|-------|------|----------------------------------|-------|------|----------|-----------|--------|-------|
| Australia | 2022 | 2022 | Partial Export & Complete Import | x | | | x | x | x |
| Canada | 2022 | 2022 | Partial Export & Complete Import | x | | | x | x | x |
| EU, Macedonia, Albania, Kosovo | 2022 | 2022 | Partial Export & Partial Import | x | | | x | x | x |
| G7, EU | 2022 | 2022 | Partial Export & Partial Import | x | | | x | | |
| Germany | 2022 | 2022 | Partial Import | x | | | | | x |
| Iceland | 2022 | 2022 | Partial Export & Partial Import | x | | | x | x | x |
| Japan | 2022 | 2022 | Partial Export & Partial Import | x | | | x | x | |
| Korea, South | 2022 | 2022 | Partial Export | x | | | x | | |
| Liechtenstein | 2022 | 2022 | | | | | x | | |
| Norway | 2022 | 2022 | Partial Export & Partial Import | x | | | x | x | x |
| Singapore | 2022 | 2022 | Partial Export | x | | | x | | |
| Switzerland | 2022 | 2022 | Partial Export & Partial Import | x | | | x | x | x |
| Taiwan | 2022 | 2022 | Partial Export | x | | | | | |
| United Kingdom | 2022 | 2022 | Partial Export & Partial Import | x | | | x | x | x |
| United States | 2022 | 2022 | Partial Export & Partial Import | x | | | x | x | x |
| United States, EU, United Kingdom, Canada, France, Germany, Italy, Japan | 2022 | 2022 | | | | | x | | x |
| United States, United Kingdom, Canada | 2022 | 2022 | | | | | x | | |

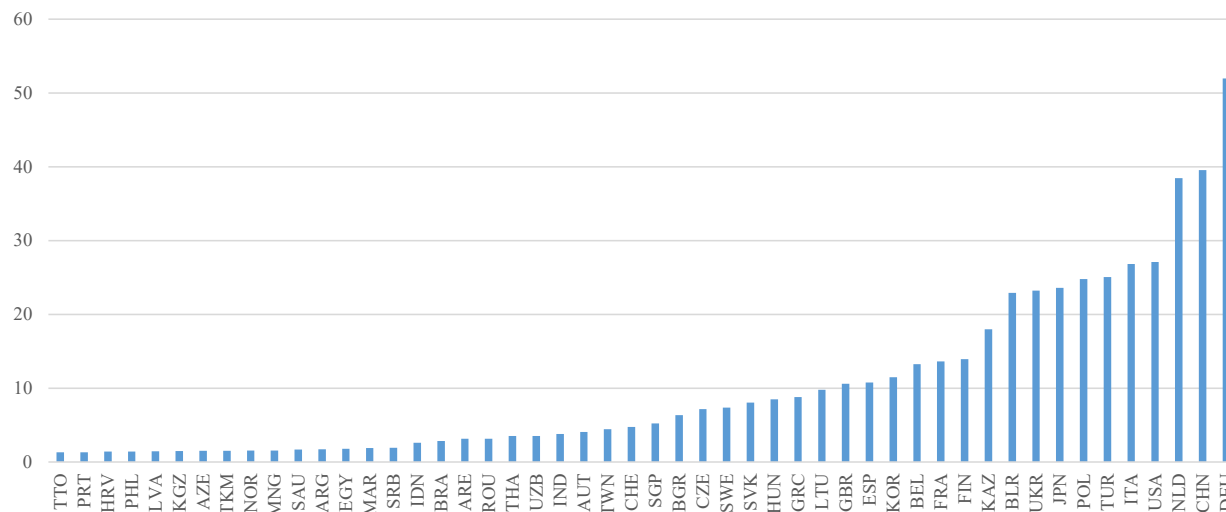
Note: This table lists all countries and their sanctions against Russia during 2014 - 2022. The sanction information is based on the GSDB. Over the considered period the EU and the US have intensified some existing sanctions, e.g., the scope of products or the list of banned people was increased. However, these changes at a more disaggregated level are not captured in the GSDB, so far. Therefore, the extensions of EU sanctions after 2014 don't appear as new sanctions in the succeeding years, unless a new type of sanction was introduced.

Figure 4: Russia's top-50 trading partners in 2013

(a) Top-50 Exporting Countries to Russia in 2013 (billion US-Dollar)



(b) Top-50 Importing Countries from Russia in 2013 (billion US-Dollar)



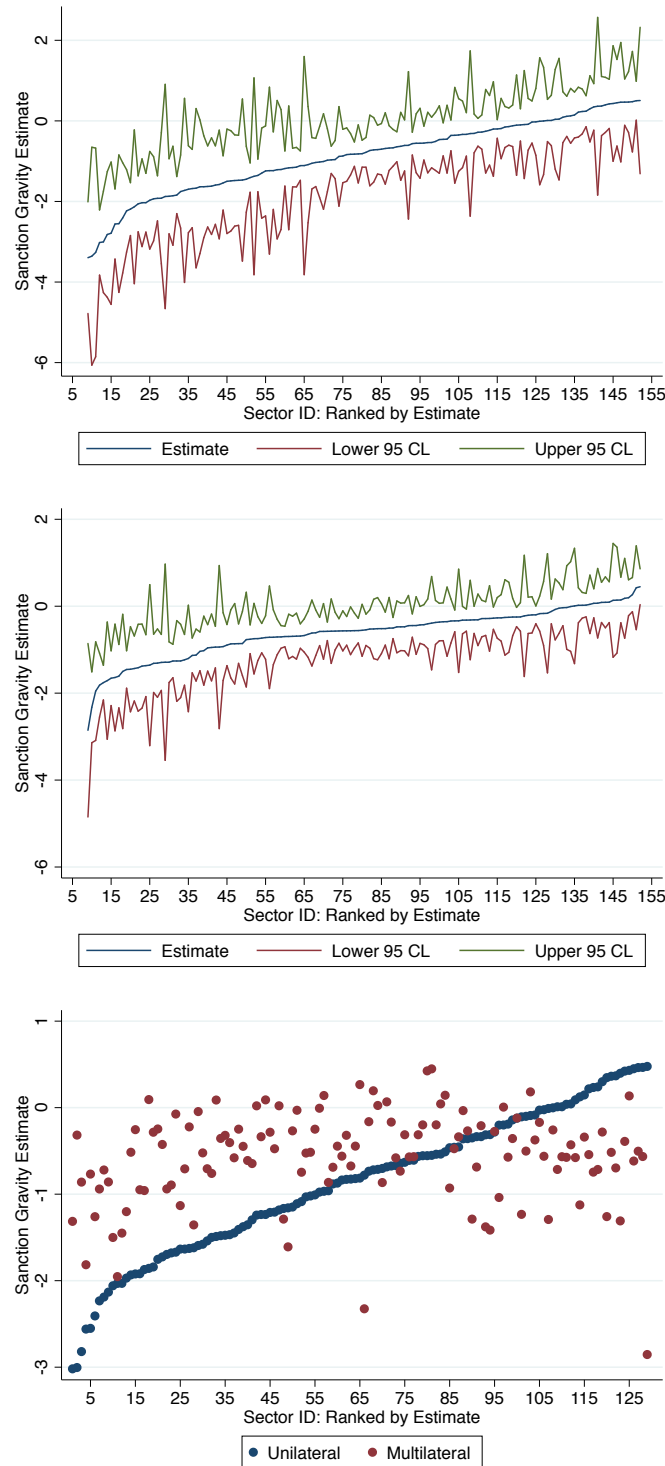
Note: This figure presents Russia's top-50 trading partners for the year 2013. Trade is measured in billion US-Dollar. Trade data is taken from the Direction of Trade Statistics (DOTS)

Table 2: Multilateral vs. Unilateral Sanction Effects.

| | (1) CMMN | (2) MULTI | (3) TIME |
|-------------------|---------------------|---------------------|---------------------|
| COMPL_SANCT | -1.305 (0.207)** | | |
| PARTL_SANCT | -0.101 (0.021)** | | |
| MULTI_COMPL | | -1.353 (0.209)** | |
| UNIL_COMPL | | -1.239 (0.289)** | |
| MULTI_PARTL | | -0.231 (0.050)** | |
| UNIL_PARTL | | -0.058 (0.022)** | |
| MULTI_COMPL_EARLY | | | -1.657 (0.288)** |
| UNIL_COMPL_EARLY | | | -0.410 (0.246)+ |
| MULTI_PARTL_EARLY | | | -0.238 (0.110)* |
| UNIL_PARTL_EARLY | | | 0.024 (0.104) |
| MULTI_COMPL_LATE | | | -1.272 (0.256)** |
| UNIL_COMPL_LATE | | | -1.569 (0.399)** |
| MULTI_PARTL_LATE | | | -0.230 (0.053)** |
| UNIL_PARTL_LATE | | | -0.060 (0.023)** |
| <i>N</i> | 2100476 | 2100476 | 2100476 |

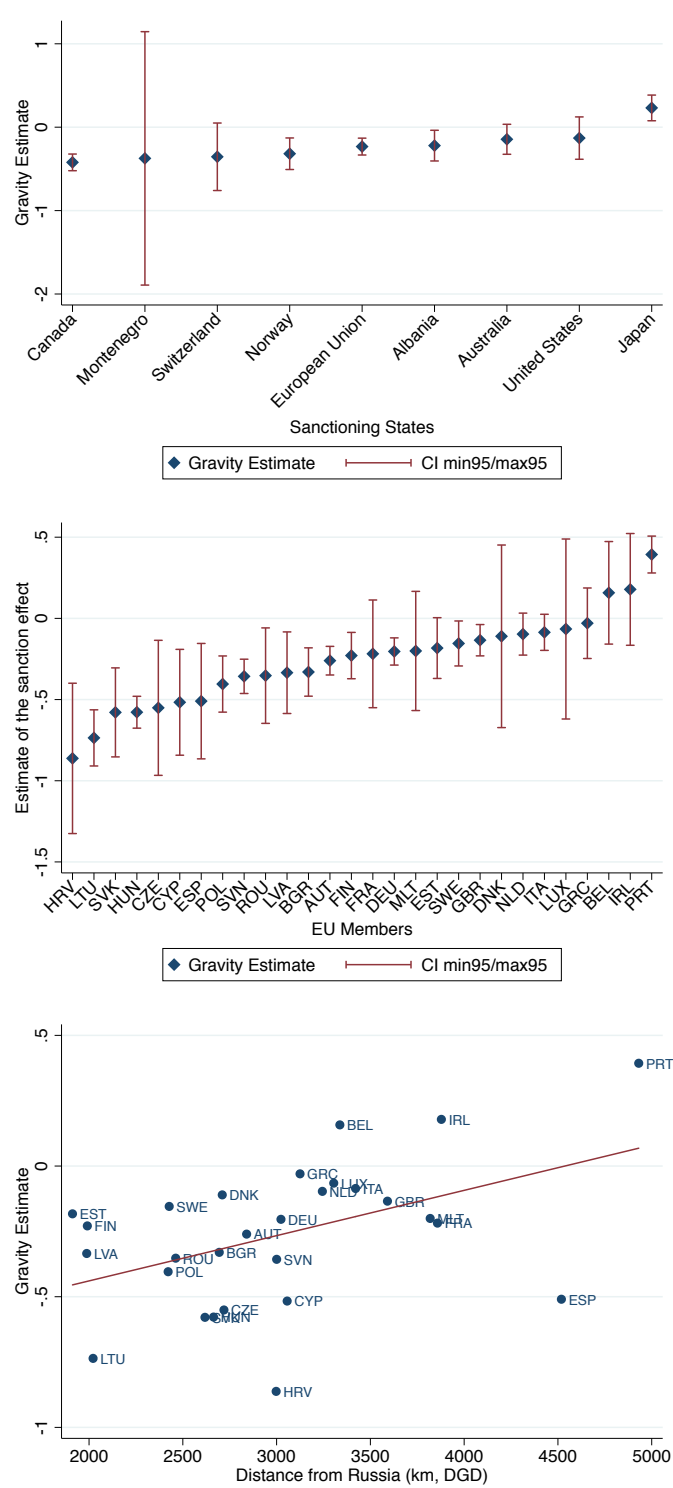
Notes: This table reports estimates of the heterogeneous effects of sanctions on trade. The dependent variable is aggregate bilateral trade in levels. All estimates are obtained with the PPML estimator and exporter-time, importer-time and directional country-pair fixed effects. In addition, we control for the presence of RTAs, WTO membership, EU membership, and non-trade sanctions. The estimates on all controls and the fixed effects are omitted for brevity. Column (1) distinguishes between the effects of partial vs. complete trade sanctions. Column (2) allows for differential effects of partial vs. complete trade sanctions depending on whether they are unilateral or multilateral. Column (3) further allows for the effects of multilateral and unilateral complete vs. partial trade sanctions to vary over time. Standard errors are clustered by country pair. + $p < 0.10$, * $p < .05$, ** $p < .01$. See text for further details.

Figure 5: Unilateral vs. Multilateral Complete Trade Sanctions. Sectoral Estimates.



Note: The three panels of this figure present sectoral estimates of the impact of unilateral and multilateral complete trade sanctions. The estimates for each industry are obtained from a single regression based on specification (2). The results in the top panel of the figure (together with the corresponding 95% confidence limits (CL)) are for the effects of complete unilateral trade sanctions. The estimates in the middle panel of the figure (together with the corresponding 95% confidence limits (CL)) are for multilateral complete trade sanctions. Finally, the results in the bottom panel combine the estimates of the effects of the unilateral vs. multilateral complete trade sanctions on the same graph. For clarity, in each case we drop the top and bottom 5% of the estimates. See text for further details.

Figure 6: The Effects of the 2014 Sanctions on Russia.



Note: The three panels of this figure present estimates of the impact of the 2014 sanctions on Russia. The estimates are obtained from specification (3). The results in the top panel of the figure (together with the corresponding 95% confidence limits (CL)) are for the effects of the sanctions on trade between Russia and the main senders. The estimates in the middle panel of the figure (together with the corresponding 95% confidence limits (CL)) zoom in on the effects of the sanctions on Russia's trade with individual EU members. Finally, the results in the bottom panel correlate the EU estimates with the distance between each EU member and Russia. See text for further details.

Appendix

Table 3: Unilateral vs. Multilateral Trade Sanctions. Sectoral Estimates.

| ID | Industry Description | Complete Trade Sanctions | | Partial Trade Sanctions | |
|----|---|--------------------------|----------------------|-------------------------|----------------------|
| | | Unilateral | Multilateral | Unilateral | Multilateral |
| 1 | Wheat | -1.697 (.551)** | -0.940 (.957) | -0.0130 (.111) | -0.292 (.191) |
| 2 | Rice (raw) | -1.235 (1.057) | -0.336 (.606) | 0.00900 (.145) | 0.323 (.214) |
| 3 | Corn | -0.555 (.443) | 0.425 (.492) | -0.173 (.206) | 0.378 (.182)* |
| 4 | Other cereals | -2.551 (.87)** | -0.768 (.556) | 0 (.141) | -0.0430 (.157) |
| 5 | Cereal products | -2.789 (.901)** | -4.301 (.976)**** | -1.516 (.391)*** | -1.112 (.36)** |
| 6 | Soybeans | -2.560 (.444)**** | -1.816 (.375)**** | -0.781 (.161)**** | -0.509 (.319) |
| 7 | Other oilseeds (excluding peanuts) | -0.107 (.635) | -1.234 (.298)**** | 0.277 (.093)** | -0.152 (.13) |
| 8 | Animal feed ingredients and pet foods | -4.494 (.927)**** | -1.260 (.474)** | 0.166 (.082)* | -0.0690 (.265) |
| 9 | Raw and refined sugar and sugar crops | 0 (0) | 0.729 (1.495) | -0.541 (.668) | -1.788 (.956) |
| 10 | Other sweeteners | -0.350 (.46) | -1.289 (1.151) | -0.401 (.316) | -0.0230 (.254) |
| 11 | Pulses and legumes, dried, preserved | -1.449 (.417)*** | -0.580 (.327) | -0.0450 (.103) | -0.213 (.117) |
| 12 | Fresh fruit | -2.408 (.697)*** | -1.260 (.196)**** | -0.436 (.11)**** | -0.420 (.129)** |
| 13 | Fresh vegetables | -1.858 (.627)** | 0.0930 (.24) | 0.103 (.063) | -0.680 (.164)**** |
| 14 | Prepared fruits and fruit juices | -0.820 (.368)* | -0.445 (.338) | 0.0770 (.146) | 0.0520 (.213) |
| 15 | Prepared vegetables | -13.61 (2.035)**** | -4.193 (1.758)* | -4.287 (.928)**** | -3.499 (1.276)** |
| 16 | Nuts | -1.620 (.612)** | -1.356 (.945) | -0.0600 (.1) | -0.0460 (.145) |
| 17 | Live Cattle | -3.359 (1.38)* | -1.640 (.626)** | -0.131 (.431) | -0.320 (.358) |
| 18 | Live Swine | -1.110 (1.381) | -4.455 (1.88)* | 0.0410 (.23) | -1.975 (.563)*** |
| 19 | Eggs | 1.644 (.761)* | 0.783 (.328)* | 0.236 (.152) | 0.449 (.226)* |
| 20 | Other meats, livestock products, and live animals | -2.031 (.372)**** | -1.450 (.499)** | -0.342 (.112)** | -0.450 (.172)** |
| 21 | Cocoa and cocoa products | -13.72 (1.915)**** | -2.993 (1.007)** | -0.665 (.417) | -0.152 (.551) |
| 22 | Beverages, nec | -4.496 (.935)**** | -1.455 (.22)**** | 0.374 (.098)*** | -0.0470 (.13) |
| 23 | Cotton | -3.396 (.707)**** | -1.367 (.363)*** | -0.00200 (.128) | -0.0780 (.19) |
| 24 | Tobacco leaves and cigarettes | -0.882 (.631) | -0.689 (.27)* | -0.110 (.097) | -0.227 (.141) |
| 25 | Spices | -0.312 (.246) | -1.416 (.51)** | 0.0380 (.075) | -0.154 (.098) |
| 26 | Other agricultural products, nec | -1.679 (.496)*** | -0.894 (.241)*** | -0.306 (.11)** | -0.303 (.133)* |
| 27 | Forestry | -1.475 (.57)** | -0.320 (.161)* | 0.0580 (.091) | 0.978 (.189)**** |
| 28 | Fishing | -1.159 (.245)**** | -1.609 (.372)**** | -0.407 (.132)** | -0.938 (.373)* |
| 29 | Mining of hard coal | -0.234 (.441) | -4.550 (.325)**** | -0.209 (.102)* | -0.205 (.175) |

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| | | | | | |
|----|--|-----------------------|-----------------------|----------------------|---------------------|
| 30 | Mining of lignite | -6.695 (211.32) | -4.184 (1.809)* | -1.808 (.362)**** | -0.890 (.602) |
| 31 | Extraction crude petroleum and natural gas | -0.358 (.606) | -0.268 (.239) | 0.148 (.154) | -0.249 (.168) |
| 32 | Mining of iron ores | -5.407 (1.004)**** | -10.74 (1.477)**** | 0.460 (.285) | 0.424 (.234) |
| 33 | Other mining and quarrying | 0.397 (.349) | -1.309 (.401)** | -0.133 (.13) | -0.158 (.273) |
| 34 | Electricity production, collection, and distribution | 0.422 (.311) | -0.390 (.548) | 0.456 (.526) | -0.118 (.264) |
| 36 | Processing/preserving of meat | -0.00200 (.679) | -0.258 (.443) | -0.356 (.116)** | -0.533 (.149)*** |
| 37 | Processing/preserving of fish | -0.781 (.188)**** | -2.325 (.416)**** | 0.0220 (.095) | -0.466 (.163)** |
| 38 | Processing/preserving of fruit and vegetables | -0.815 (.171)**** | 0.266 (.201) | -0.0150 (.042) | -0.0500 (.086) |
| 39 | Vegetable and animal oils and fats | -1.032 (.305)*** | -0.525 (.225)* | 0.139 (.099) | -0.158 (.138) |
| 40 | Dairy products | -1.208 (.759) | -0.475 (.304) | -0.206 (.074)** | -0.352 (.133)** |
| 41 | Grain mill products | -0.464 (.428) | -0.929 (.398)* | 0.0670 (.067) | -0.118 (.153) |
| 42 | Starches and starch products | -1.635 (.646)* | -0.707 (.208)*** | 0.240 (.118)* | 0.0690 (.16) |
| 43 | Prepared animal feeds | -1.671 (1.009) | -0.0740 (.357) | 0.0250 (.086) | -0.167 (.141) |
| 44 | Bakery products | 0.233 (.284) | -0.745 (.257)** | -0.0330 (.046) | 0.0210 (.141) |
| 45 | Sugar | 0.506 (.852) | -1.712 (.688)* | -0.0320 (.146) | 0.761 (.173)**** |
| 46 | Cocoa chocolate and sugar confectionery | -0.0290 (.266) | -0.171 (.206) | -0.0260 (.057) | 0.0110 (.128) |
| 47 | Macaroni noodles and similar products | -1.111 (.186)**** | -0.0310 (.49) | 0.111 (.074) | 0.227 (.252) |
| 48 | Other food products n.e.c. | -0.703 (.325)* | -0.866 (.4)* | 0.0130 (.044) | 0.0580 (.079) |
| 49 | Distilling rectifying and blending of spirits | -2.132 (.974)* | -0.859 (.376)* | -0.309 (.104)** | 0.310 (.144)* |
| 50 | Wines | -1.922 (.285)**** | -0.255 (.411) | -0.174 (.043)**** | 0.138 (.148) |
| 51 | Malt liquors and malt | -0.0850 (.327) | -0.374 (.258) | -0.227 (.108)* | 0.501 (.213)* |
| 52 | Soft drinks; mineral waters | -1.920 (.83)* | -0.949 (.392)* | 0.0500 (.095) | -0.383 (.13)** |
| 53 | Tobacco products | 0.0390 (.631) | -0.575 (.378) | 0.455 (.21)* | 0.184 (.194) |
| 54 | Textile fibre preparation; textile weaving | -1.297 (.571)* | -0.646 (.27)* | -0.0700 (.063) | -0.155 (.088) |
| 55 | Made-up textile articles except apparel | -1.242 (.57)* | 0.0210 (.205) | -0.00100 (.069) | -0.0390 (.084) |
| 56 | Carpets and rugs | -0.537 (.32) | 0.0430 (.343) | -0.115 (.097) | 0.193 (.14) |
| 57 | Cordage rope twine and netting | -0.0100 (.804) | -1.293 (.329)**** | -0.134 (.052)** | 0.289 (.141)* |
| 58 | Other textiles n.e.c. | -0.608 (.933) | -0.567 (.168)*** | 0.0530 (.087) | 0.0100 (.087) |
| 59 | Knitted and crocheted fabrics and articles | 1.689 (.292)**** | -0.474 (.282) | 0.136 (.099) | -0.197 (.085)* |
| 60 | Wearing apparel except fur apparel | 0.347 (.295) | -1.259 (.43)** | 0.276 (.082)*** | -0.381 (.13)** |
| 61 | Dressing and dyeing of fur; processing of fur | -3.265 (1.321)* | -1.433 (.381)*** | -0.0440 (.127) | -0.619 (.268)* |
| 62 | Tanning and dressing of leather | -3.398 (.654)**** | -0.554 (.305) | -0.0800 (.109) | -0.357 (.14)* |
| 63 | Luggage handbags etc.; saddlery and harness | 0.240 (.196) | -0.715 (.602) | -0.133 (.055)* | -0.165 (.093) |
| 64 | Footwear | -1.021 | -0.516 | -0.236 | 0.139 |

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| | | | | | |
|----|--|------------|------------|----------|-----------|
| | | (.45)* | (.294) | (.095)* | (.084) |
| 65 | Sawmilling and planing of wood | -2.234 | -0.941 | -0.0370 | -0.0610 |
| | | (.522)**** | (.244)*** | (.117) | (.119) |
| 66 | Veneer sheets plywood particle board etc. | -0.872 | -0.445 | -0.137 | -0.109 |
| | | (.338)** | (.137)** | (.124) | (.127) |
| 67 | Builders' carpentry and joinery | -1.489 | 0.0880 | -0.234 | -0.188 |
| | | (.636)* | (.236) | (.089)** | (.089)* |
| 68 | Wooden containers | -3.941 | -1.758 | 0.0280 | 0.0340 |
| | | (1.391)** | (.204)**** | (.084) | (.109) |
| 69 | Other wood products; articles of cork/straw | -0.632 | -0.313 | -0.0650 | -0.108 |
| | | (.43) | (.302) | (.12) | (.096) |
| 70 | Pulp paper and paperboard | -1.754 | -0.247 | 0.0410 | -0.0250 |
| | | (.463)*** | (.167) | (.084) | (.064) |
| 71 | Corrugated paper and paperboard | 0.217 | -0.543 | -0.0890 | -0.145 |
| | | (.316) | (.184)** | (.071) | (.105) |
| 72 | Other articles of paper and paperboard | 0.0900 | -0.577 | -0.114 | -0.100 |
| | | (.321) | (.109)**** | (.051)* | (.168) |
| 73 | Publishing of books and other publications | -0.829 | -0.320 | 0.0100 | -0.238 |
| | | (.262)** | (.13)* | (.041) | (.101)* |
| 74 | Publishing of newspapers journals etc. | -0.976 | -0.00700 | 0.0280 | -0.438 |
| | | (.399)* | (.526) | (.096) | (.167)** |
| 75 | Publishing of recorded media | -0.719 | 0.195 | -0.0540 | -0.367 |
| | | (.409) | (.211) | (.118) | (.181)* |
| 76 | Other publishing | -2.820 | -0.861 | -0.228 | 0.280 |
| | | (.796)*** | (.231)*** | (.13) | (.229) |
| 77 | Printing | -0.202 | -1.039 | -0.0580 | -0.225 |
| | | (.598) | (.227)**** | (.092) | (.115) |
| 78 | Service activities related to printing | 0.363 | -0.517 | 0.173 | 0.00600 |
| | | (1.125) | (.365) | (.163) | (.329) |
| 79 | Coke oven products | -2.059 | -1.501 | -0.288 | 0.522 |
| | | (.354)**** | (.671)* | (.204) | (.242)* |
| 80 | Refined petroleum products | -0.967 | 0.140 | -0.208 | -0.290 |
| | | (.173)**** | (.621) | (.096)* | (.153) |
| 81 | Processing of nuclear fuel | 0.476 | -2.854 | 0.104 | -0.392 |
| | | (.636) | (1.018)** | (.141) | (.278) |
| 82 | Basic chemicals except fertilizers | -0.190 | -0.572 | 0.0720 | -0.0370 |
| | | (.382) | (.221)** | (.065) | (.1) |
| 83 | Fertilizers and nitrogen compounds | -0.960 | -0.864 | 0.115 | 0.0500 |
| | | (.241)**** | (.472) | (.063) | (.077) |
| 84 | Plastics in primary forms; synthetic rubber | -1.842 | -0.284 | -0.0300 | 0.129 |
| | | (.235)**** | (.214) | (.033) | (.076) |
| 85 | Pesticides and other agro-chemical products | 0.0430 | -0.430 | -0.0950 | -0.00100 |
| | | (.77) | (.217)* | (.058) | (.089) |
| 86 | Paints varnishes printing ink and mastics | -0.361 | -0.0340 | -0.00600 | -0.120 |
| | | (.195) | (.211) | (.063) | (.07) |
| 87 | Pharmaceuticals medicinal chemicals etc. | -0.564 | -0.314 | -0.115 | -0.0660 |
| | | (.144)**** | (.159)* | (.088) | (.092) |
| 88 | Soap cleaning and cosmetic preparations | -0.643 | -0.734 | -0.0430 | -0.202 |
| | | (.19)** | (.172)**** | (.036) | (.067)** |
| 89 | Other chemical products n.e.c. | -0.609 | -0.570 | -0.0570 | -0.145 |
| | | (.323) | (.144)**** | (.039) | (.061)* |
| 90 | Man-made fibres | -1.876 | 0.868 | -0.136 | -0.273 |
| | | (1.42) | (.562) | (.081) | (.131)* |
| 91 | Rubber tyres and tubes | 0.782 | -0.693 | -0.0110 | -0.102 |
| | | (.337)* | (.236)** | (.164) | (.102) |
| 92 | Other rubber products | 0.125 | -1.124 | 0.0130 | -0.222 |
| | | (.347) | (.305)** | (.051) | (.062)*** |
| 93 | Plastic products | -0.454 | -0.337 | -0.0330 | -0.121 |
| | | (.429) | (.127)** | (.043) | (.056)* |
| 94 | Glass and glass products | -1.408 | -0.249 | -0.0640 | 0.0870 |
| | | (.186)**** | (.113)* | (.073) | (.066) |
| 95 | Pottery china and earthenware | -1.872 | -0.959 | -0.0730 | 0.0100 |
| | | (.475)**** | (.273)*** | (.05) | (.097) |
| 96 | Refractory ceramic products | 0.300 | -0.282 | -0.0740 | -0.0240 |
| | | (.419) | (.384) | (.115) | (.079) |
| 97 | Struct.non-refractory clay; ceramic products | 0.0100 | -0.567 | 0.146 | 0.178 |
| | | (.319) | (.235)* | (.156) | (.074)* |

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| | | | | | |
|-----|--|----------------------|----------------------|----------------------|----------------------|
| 98 | Cement lime and plaster | -0.314 (1.046) | -1.378 (.493)** | -0.239 (.151) | -0.369 (.135)** |
| 99 | Articles of concrete cement and plaster | 0.146 (.291) | -0.340 (.258) | -0.404 (.141)** | -0.0610 (.129) |
| 100 | Cutting shaping and finishing of stone | 0.500 (.247)* | -1.023 (.405)* | 0.0330 (.067) | 0.0110 (.119) |
| 101 | Other non-metallic mineral products n.e.c. | -0.122 (.263) | -0.121 (.145) | -0.190 (.055)*** | -0.246 (.08)** |
| 102 | Basic iron and steel | -1.540 (.344)**** | -0.706 (.133)**** | -0.0290 (.102) | -0.0580 (.08) |
| 103 | Basic precious and non-ferrous metals | -1.594 (.497)** | -0.0460 (.296) | -0.164 (.083)* | -0.0260 (.127) |
| 104 | Structural metal products | -0.713 (.309)* | 0.0250 (.138) | -0.0690 (.084) | -0.0550 (.076) |
| 105 | Tanks reservoirs and containers of metal | -1.934 (.533)*** | -0.516 (.193)** | 0.0660 (.085) | -0.0440 (.118) |
| 106 | Steam generators | -3.019 (.413)**** | -1.314 (.342)*** | -0.260 (.17) | -0.366 (.215) |
| 107 | Cutlery hand tools and general hardware | 0.368 (.374) | -0.697 (.121)**** | -0.113 (.087) | -0.248 (.072)*** |
| 108 | Other fabricated metal products n.e.c. | -0.539 (.384) | -0.199 (.104) | 0.0690 (.085) | 0.0490 (.055) |
| 109 | Engines and turbines (not for transport equipment) | -1.971 (.618)** | -1.202 (.625) | 0.0930 (.077) | 0.0300 (.128) |
| 110 | Pumps compressors taps and valves | 0.0100 (.267) | -0.714 (.322)* | -0.250 (.061)**** | -0.235 (.062)*** |
| 111 | Bearings gears gearing and driving elements | 0.465 (.293) | -0.565 (.28)* | 0.0810 (.066) | 0.0730 (.079) |
| 112 | Ovens furnaces and furnace burners | 0.691 (.434) | -0.365 (.22) | -0.110 (.091) | -0.249 (.141) |
| 113 | Lifting and handling equipment | -0.675 (.283)* | -0.167 (.375) | -0.0290 (.068) | 0.00200 (.085) |
| 114 | Other general purpose machinery | -0.826 (.154)**** | -0.675 (.194)*** | -0.143 (.035)**** | -0.385 (.131)** |
| 115 | Agricultural and forestry machinery | -0.685 (.452) | 0.0670 (.17) | 0.0120 (.042) | 0.0980 (.087) |
| 116 | Machine tools | -1.183 (.222)**** | 0.0210 (.151) | -0.0880 (.072) | -0.260 (.062)**** |
| 117 | Machinery for metallurgy | -1.086 (.736) | -0.747 (.414) | 0.103 (.228) | 0.0840 (.178) |
| 118 | Machinery for mining and construction | -2.032 (.555)*** | -1.953 (.579)*** | -0.158 (.048)** | -0.0890 (.067) |
| 119 | Food/beverage/tobacco processing machinery | -1.235 (.491)* | 0.0890 (.299) | -0.0490 (.067) | -0.0850 (.082) |
| 120 | Machinery for textile apparel and leather | -2.190 (.335)**** | -0.721 (.255)** | -0.226 (.141) | -0.162 (.085) |
| 121 | Weapons and ammunition | -1.628 (.513)** | -0.223 (.711) | -0.111 (.124) | 0.00100 (.223) |
| 122 | Other special purpose machinery | -1.354 (.206)**** | -0.611 (.267)* | 0.0460 (.1) | -0.140 (.072) |
| 123 | Domestic appliances n.e.c. | -0.837 (.338)* | -0.561 (.145)** | -0.212 (.079)** | 0.112 (.084) |
| 124 | Office accounting and computing machinery | -0.669 (.233)** | -0.580 (.166)*** | -0.0680 (.086) | -0.00100 (.103) |
| 125 | Electric motors generators and transformers | -1.635 (.846) | -1.132 (.204)**** | -0.193 (.062)** | 0.0780 (.095) |
| 126 | Electricity distribution and control apparatus | -0.336 (.422) | -0.687 (.143)**** | -0.0860 (.039)* | -0.238 (.08)** |
| 127 | Insulated wire and cable | 0.450 (.548) | -0.617 (.387) | 0.0350 (.073) | 0.264 (.102)** |
| 128 | Accumulators primary cells and batteries | -0.142 (.235) | -0.357 (.222) | -0.369 (.111)*** | -0.323 (.113)** |
| 129 | Lighting equipment and electric lamps | -0.552 (.214)* | 0.448 (.21)* | -0.320 (.092)*** | -0.0920 (.078) |
| 130 | Other electrical equipment n.e.c. | -0.101 (.205) | -0.502 (.124)**** | 0.130 (.103) | -0.277 (.138)* |
| 131 | Electronic valves tubes etc. | -0.0240 | -0.562 | -0.0230 | -0.569 |

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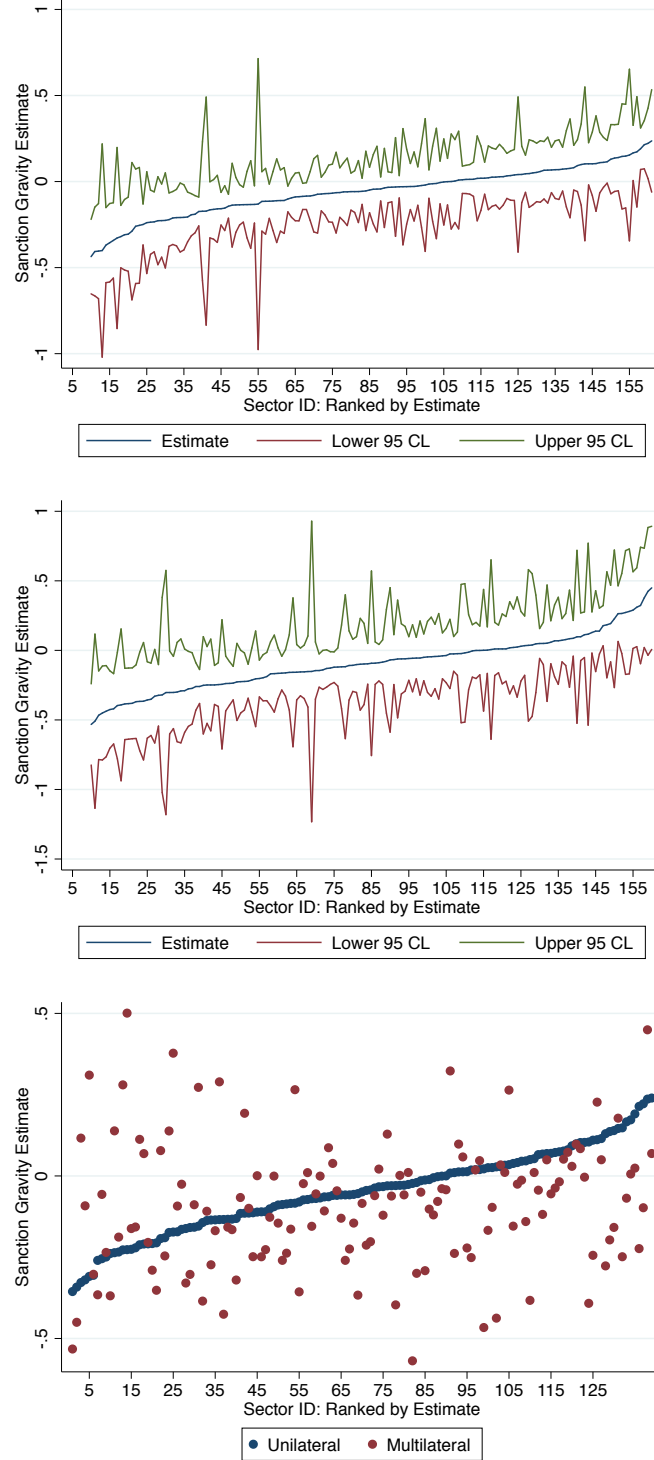
| | | | | | |
|-----|--|------------|------------|------------|------------|
| | | (.424) | (.206)** | (.124) | (.128)**** |
| 132 | TV/radio transmitters; line comm. apparatus | -1.211 | -0.284 | -0.162 | -0.330 |
| | | (.877) | (.198) | (.088) | (.172) |
| 133 | TV and radio receivers and associated goods | -1.726 | -0.426 | -0.135 | -0.168 |
| | | (1.166) | (.235) | (.06)* | (.117) |
| 134 | Medical surgical and orthopaedic equipment | -0.283 | -0.275 | -0.0850 | -0.164 |
| | | (.176) | (.131)* | (.04)* | (.062)** |
| 135 | Measuring/testing/navigating appliances etc. | -0.556 | -0.199 | -0.101 | -0.127 |
| | | (.373) | (.212) | (.038)** | (.06)* |
| 136 | Optical instruments and photographic equipment | -1.149 | -0.268 | 0.0450 | -0.0130 |
| | | (.25)**** | (.273) | (.055) | (.138) |
| 137 | Watches and clocks | -1.053 | 0.747 | -0.134 | -0.425 |
| | | (.325)** | (.234)** | (.099) | (.142)** |
| 138 | Motor vehicles | -1.009 | -0.249 | 0.103 | -0.00400 |
| | | (.605) | (.219) | (.094) | (.096) |
| 139 | Automobile bodies trailers and semi-trailers | -0.258 | 0.560 | 0.0190 | 0.0180 |
| | | (.529) | (.188)** | (.095) | (.169) |
| 140 | Parts/accessories for automobiles | -0.511 | 0.143 | 0.214 | -0.224 |
| | | (.367) | (.267) | (.071)** | (.105)* |
| 141 | Building and repairing of ships | 0.431 | 0.135 | -0.0200 | -0.300 |
| | | (.731) | (.668) | (.197) | (.182) |
| 142 | Building/repairing of pleasure/sport. boats | -1.376 | -0.447 | -0.0840 | 0.265 |
| | | (1.246) | (.354) | (.072) | (.147) |
| 143 | Railway/tramway locomotives and rolling stock | -1.166 | -1.288 | 0.222 | -0.0980 |
| | | (.783) | (.239)**** | (.104)* | (.149) |
| 144 | Aircraft and spacecraft | -0.0910 | 0.182 | 0.191 | 0.0240 |
| | | (.684) | (.468) | (.062)** | (.184) |
| 145 | Motorcycles | 0.505 | -0.697 | 0.110 | -0.244 |
| | | (.927) | (.262)** | (.09) | (.237) |
| 146 | Bicycles and invalid carriages | -1.469 | -0.404 | 0.0690 | -0.0550 |
| | | (1.027) | (.291) | (.088) | (.136) |
| 147 | Other transport equipment n.e.c. | -1.579 | -0.523 | -0.221 | -0.157 |
| | | (.688)* | (.348) | (.079)** | (.101) |
| 148 | Furniture | -0.335 | -0.209 | -0.0580 | -0.260 |
| | | (.275) | (.213) | (.062) | (.087)** |
| 149 | Jewellery and related articles | -3.004 | -0.317 | -0.0600 | 0.0390 |
| | | (.642)**** | (.466) | (.086) | (.262) |
| 150 | Musical instruments | 0.463 | -0.504 | 0.0190 | 0.0470 |
| | | (.756) | (.36) | (.047) | (.179) |
| 151 | Sports goods | -1.500 | -0.760 | 0.0260 | -0.0970 |
| | | (.661)* | (.169)**** | (.083) | (.075) |
| 152 | Games and toys | 1.161 | 0.0690 | 0.0180 | -0.251 |
| | | (.641) | (.408) | (.126) | (.178) |
| 153 | Other manufacturing n.e.c. | -0.459 | -0.474 | -0.0580 | -0.130 |
| | | (.209)* | (.279) | (.055) | (.068) |
| 154 | Manufacturing services on physical inputs | 0 | 0 | -0.659 | 2.040 |
| | | (0) | (0) | (.406) | (.691)** |
| 155 | Maintenance and repair services n.i.e. | 0 | 0 | -0.0300 | -0.0620 |
| | | (0) | (0) | (.172) | (.216) |
| 156 | Transport | -0.153 | 2.192 | -0.159 | -0.303 |
| | | (.259) | (.381)**** | (.099) | (.152)* |
| 157 | Travel | -0.278 | 0 | -0.154 | 0.272 |
| | | (.216) | (0) | (.066)* | (.227) |
| 158 | Construction | 1.061 | 0 | -0.328 | 0.116 |
| | | (1.185) | (0) | (.268) | (.334) |
| 159 | Insurance and pension services | 0.113 | 1.662 | 0.154 | 0.632 |
| | | (.254) | (.22)**** | (.254) | (.258)* |
| 160 | Financial services | -1.480 | -0.356 | -0.0300 | -0.397 |
| | | (.578)* | (.406) | (.111) | (.195)* |
| 161 | Charges for use of intellectual property | 0.467 | -11.13 | 0.0990 | 0.0980 |
| | | (.385) | (.543)**** | (.12) | (.317) |
| 162 | Telecom, computer, information services | -0.201 | 0.00600 | -0.255 | -0.0570 |
| | | (.118) | (.677) | (.172) | (.123) |
| 163 | Other business services | -0.735 | -0.162 | -0.209 | 0.0690 |
| | | (.447) | (.699) | (.084)* | (.132) |
| 164 | Heritage and recreational services | 0 | 0 | -1.619 | -0.303 |
| | | (0) | (0) | (.213)**** | (.448) |

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| | | | | | |
|-----|--------------------------------------|-------------------|----------------------|----------------------|-------------------|
| 165 | Health services | 0 (0) | 0 (0) | 0.00300 (.123) | 0.752 (.66) |
| 166 | Education services | 0 (0) | -1.656 (.321)**** | 0.0740 (.113) | -0.0180 (.254) |
| 167 | Government goods and services n.i.e. | 1.120 (.345)** | 2.045 (.504)**** | 0.0660 (.098) | 0.698 (.274)* |
| 168 | Services not allocated | 0 (0) | 0 (0) | -0.172 (.338) | -0.0930 (.339) |
| 169 | Trade-related services | 0 (0) | 0 (0) | 0.606 (.163)*** | 0.0360 (.278) |
| 170 | Other personal services | 0 (0) | 0 (0) | -1.312 (.279)**** | 3.269 (2.133) |

Notes: This table reports sectoral estimates of the effects of complete and partial trade sanctions depending on whether they are multilateral or unilateral. Each row of the table reports estimates for a given industry, which are obtained from a single regression based on specification (2). Columns (1) and (2) list the ID and the description for the ITPD-E industries. Columns (3) and (4) report the estimates of the effects of unilateral and multilateral complete trade sanctions, respectively. Finally, columns (5) and (6) present the estimates for unilateral and multilateral partial trade sanctions, respectively. See text for further details.

Figure 7: Unilateral vs. Multilateral Partial Trade Sanctions. Sectoral Estimates.



Note: The three panels of this figure present sectoral estimates of the impact of unilateral and multilateral partial trade sanctions. The estimates for each industry are obtained from a single regression based on specification (2). The results in the top panel of the figure (together with the corresponding 95% confidence limits (CL)) are for the effects of partial unilateral trade sanctions. The estimates in the middle panel of the figure (together with the corresponding 95% confidence limits (CL)) are for multilateral partial trade sanctions. Finally, the results in the bottom panel combine the estimates of the effects of the unilateral vs. multilateral partial trade sanctions on the same graph. For clarity, in each case we drop the top and bottom 5% of the estimates. See text for further details.