



Full length articles

Reducing trade with Russia: Sanctions vs. firms' voluntary suspension of activities[☆]

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ARTICLE INFO

Dataset link: [Replication package paper reducing trade with Russia \(Original data\)](#)

JEL classification:

F10
F14

Keywords:

Russia
Sanctions
Voluntary suspension of activities
Reputation
Russian invasion of Ukraine
Firm-level exports and imports
Spain

ABSTRACT

The invasion of Ukraine in February 2022 led to large and unprecedented sanctions against Russia. In parallel, many multinational firms voluntarily decided to suspend their activities in Russia. Using Spanish firm-level data, this paper quantifies the impact of trade sanctions and firms' voluntary decisions to suspend activities on exports and imports with Russia. We find that firms' voluntary decisions to suspend activities in Russia contributed to the reduction in exports and imports by 20% and 24%, respectively, while sanctions contributed by 10% and 34%, respectively. The results show that the combination of sanctions and firms' voluntary suspension of activities caused a much greater reduction in trade with Russia than sanctions alone would have achieved.

1. Introduction

The Russian invasion of Ukraine in February 2022 led many countries to impose large and unprecedented trade sanctions against Russia. On the export side, the main objective of sanctions was to reduce Russia's access to technologies and goods that could enhance its military and industrial capacity. On the import side, the aim was to reduce Russia's foreign revenue so that it had fewer resources to fund its war effort. The scope of affected products and the stringency of sanctions justify the interest in quantifying

[☆] We thank the Department of Customs and Excise of the Spanish Tax Agency (AEAT) for providing Customs data and Aitor Garmendia for giving us the information about Spanish firms' subsidiaries in Russia. We thank the editor, Eduardo Morales, as well as two anonymous referees, whose comments improved the article substantially. We also thank Nuria Gallego and participants at Deusto Business School Brown Bag and ICEI research seminars, CITP 2024 Annual Conference, VII Jornada de Investigación en Internacionalización, XXVI Applied Economics Meeting, ETSG 2024, Drexel Trade Workshop 2024, Fall 2024 Midwest Economic Theory and International Trade Meeting, and SAEe2024 for comments and suggestions. This research was conducted as part of the Project PID2021-122133NB-I00 financed by MCIN/AEI/10.13039/501100011033/FEDER, EU. We also gratefully acknowledge the financial support from the Department of Science, Universities and Innovation of the Basque Government (IT1429-22 and IT1793-26), Comunidad de Madrid and UAH (EPU-INV/2020/006), and the Conselleria de Educación, Universidades y Empleo (Generalitat Valenciana), Programa Prometeu 2023 (CIPROM/2022/50)

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<https://doi.org/10.1016/j.jinteco.2026.104284>

Received 30 May 2024; Received in revised form 19 May 2026; Accepted 20 May 2026

Available online 6 June 2026

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the impact of sanctions on trade flows with Russia.¹ This interest is further heightened by the fact that previous sanctions against Russia, motivated by the annexation of Crimea in 2014, had a relatively small impact on Russian trade and heterogeneous effects on sanctioning countries (Syropoulos et al., 2024).

A few days after the Russian invasion of Ukraine, some multinational firms announced that they suspended their activities in Russia. According to the list developed by Yale's School of Management Chief Executive Leadership Institute (Yale-CELI list), by December 2023, 1028 companies decided to suspend their activities in Russia.² These firm-level decisions can also lead to a reduction in trade with Russia. For example, multinational firms may stop exporting goods that were previously distributed by their subsidiaries in Russia or provide intermediate inputs to their factories in Russia. They may also decide to stop importing intermediate inputs or final goods from Russia. Since multinationals account for a large share of a country's trade, their decision to suspend activities in Russia is likely to have a sizable detrimental effect on trade.

Using Spanish firm-level transaction data, this paper quantifies the effect of EU trade sanctions and firms' voluntary decisions to suspend activities on trade with Russia. First, we use the Yale-CELI and Leave-Russia lists to identify companies that decided to withdraw or suspend activities in Russia after the invasion of Ukraine.³ Second, we identify products, at the 8-digit Combined Nomenclature level (CN8), that were affected by a European Union (EU) trade sanction against Russia after the invasion of Ukraine. Third, we identify trade transactions in unsanctioned and sanctioned products from firms that voluntarily suspended activities in Russia and from those that did not, before and after the invasion of Ukraine. Finally, we use a difference-in-differences methodology to estimate the impact of trade sanctions and firms' voluntary suspension of activities on Spanish exports to and imports from Russia.

Although some governments, such as the US, anticipated Russia's invasion of Ukraine,⁴ it seems safe to assume that Spanish firms not related to the military industry could not anticipate the products that would be affected by EU sanctions after a potential invasion.⁵ Furthermore, the fact that Spanish firms incurred large economic costs due to their voluntary suspension of activities in Russia suggests that they did not anticipate a suspension decision before the Russian invasion of Ukraine.⁶ These facts allow us to consider the Russian invasion of Ukraine as a quasi-natural experiment and to interpret our estimates as causal.

Our econometric estimates show that Spanish firms' exports to Russia of products affected by trade sanctions decreased by 64% after the invasion of Ukraine, relative to unsanctioned products. Sanctions on aviation, firearms, jet fuel, maritime, military, and products that could improve Russia's industrial capacity had a significant negative impact on exports. However, sanctions on dual-use, luxury, and oil refining goods did not reduce exports of these products. As expected, exports to Russia from firms that voluntarily suspended activities in Russia almost disappeared after the invasion of Ukraine. In the case of unsanctioned products, exports from firms that voluntarily decided to suspend activities decreased by 98% relative to firms that did not. In the case of sanctioned products, exports decreased by 100%.

Imports of sanctioned products from Russia decreased by 92% after the invasion of Ukraine, compared to unsanctioned products. Sanctions on crude oil, products that generate significant revenues for Russia, coal, and steel had a significant negative effect on imports. The export ban imposed by Russia on some products also had a negative effect on imports. However, sanctions on jewelry had no significant impact on imports. Imports of unsanctioned products by firms that voluntarily decided to suspend activities in Russia decreased by 89% after the invasion of Ukraine, relative to imports by firms that did not. Imports decreased by 100% for firms that voluntarily decided to suspend activities and imported sanctioned products from Russia.

We also explore the entry and exit of Spanish firms from Russia after the invasion of Ukraine. We find that sanctions and voluntary suspension of activities had a negative effect on the probability that a firm starts exporting to Russia and a positive effect on exiting the Russian market. Sanctions also significantly reduced the probability of starting to import from Russia and increased the probability of stopping importing from Russia. We show that our baseline results are robust to the use of alternative samples and estimation strategies.

Finally, we find no evidence that Spanish firms that exported or imported sanctioned products rerouted their trade flows to Russia through neighboring countries to circumvent sanctions. However, there is evidence consistent with export rerouting for firms that voluntarily decided to suspend activities in Russia. In any case, this rerouting only represents 5% of the exports that these firms lost in Russia after the invasion of Ukraine. We find no evidence of import rerouting for firms that voluntarily decided to suspend activities in Russia.

A primary contribution of the paper is to show that firms' voluntary decisions to suspend activities in Russia amplify the number of products affected by the conflict and lead to a substantially larger reduction in trade than sanctions alone would have generated. Importantly, this amplification effect arises regardless of whether reputational, ethical, or economic considerations motivated firms' decisions to suspend activities.

¹ For example, at the end of 2023, 2795 export and 3151 import products out of 9758 were affected by European Union (EU) sanctions against Russia. They represented 40% and 50% of the average annual pre-invasion (2019–2021) EU exports to and imports from Russia, respectively.

² The list can be accessed at <https://www.yalerussianbusinessretreat.com/>.

³ The latter list can be accessed at <https://leave-russia.org/>.

⁴ For example, see “Biden Predicts Putin Will Order Ukraine Invasion, but ‘Will Regret Having Done It’” by David E. Sanger, *nytimes.com*, 19 January 2022 at <https://www.nytimes.com/2022/01/19/us/politics/biden-putin-russia-ukraine.html>. However, other governments, such as those of France and Germany, and the President of Ukraine, did not expect Russia to invade Ukraine (Shuster, 2024).

⁵ For example, EU sanctions affected products as diverse as dormant narcissi bulbs, plain woven fabrics of cotton, or seats for motor vehicles.

⁶ For example, see “La guerra en Ucrania acaba con más de 2.000 millones de negocio para empresas españolas” by Javier García Roper, *cinco-dias.elpais.com*, 22 February 2023 at <https://cinco-dias.elpais.com/companias/2023-02-22/la-guerra-en-ucrania-acaba-con-mas-de-2000-millones-de-negocio-para-empresas-espanolas.html>.

First, we document that firms that voluntarily suspended activities in Russia discontinued the exports of 855 products, of which 221 were sanctioned and 634 were not. Because the number of sanctioned products in exports was 896, voluntary suspensions increased the number of products negatively affected by the conflict by 71% (634/896). Moreover, these firms accounted for 65% of pre-conflict total exports in the unsanctioned products that they discontinued.

Regarding imports, firms that voluntarily suspended activities stopped importing 102 sanctioned products and 69 unsanctioned products. Since the number of sanctioned products in imports was 577, voluntary suspensions increased the number of products negatively affected by the conflict by 12% (69/577). Firms that voluntarily suspended activities accounted for 27% of the pre-conflict total value of imports of the unsanctioned products that they terminated.

Second, the combination of sanctions and firms' voluntary decisions to suspend activities caused a much larger reduction in trade with Russia than sanctions alone would have achieved. For exports, the combination of voluntary suspensions and sanctions reduced trade by 30%, compared to a 10% reduction under sanctions alone. In other words, the combined effect of sanctions and voluntary suspensions was three times as large as the effect of sanctions alone. For imports, the combination of voluntary suspensions and sanctions led to a 58% reduction in trade, compared to a 34% reduction under sanctions alone. In this case, voluntary suspensions amplified the negative effect of the conflict by a factor of 1.74.

These findings highlight that firms' voluntary suspension of activities can substantially increase the economic harm borne by the sanctioned country and, therefore, raise the likelihood that the target country will cease the actions that motivated the dispute (Drezner, 2024). Moreover, greater economic pain may deter other countries from taking actions that could trigger a conflict.⁷ At the same time, our results underscore that conflicts can also induce firms to voluntarily suspend activities in the targeted country, generating economic losses for the sanctioning country that can be as large as those created by sanctions.

Firms' voluntary decisions to suspend activities in Russia further amplify the welfare losses from the trade conflict for both the sanctioning and the sanctioned country. Using the Arkolakis et al. (2012) framework, we show that, under plausible assumptions, the implied magnification in welfare loss is quantitatively equal to the magnification observed in trade flows. Consequently, analyses of sanctions that abstract from firms' voluntary suspensions in the targeted country are likely to mismeasure the welfare costs of sanctions.

Finally, the amplification effect of firms' voluntary decisions to suspend activities in the target country also matters for the design of sanctions. In the theory of trade sanctions, optimal measures target goods for which the sanctioned country's supply or demand is relatively inelastic (Becko, 2024). In addition, the optimal intensity reflects both an optimal-tariff component and the sanctioning country's willingness to bear domestic costs to inflict harm abroad. If that willingness is constrained by a domestic-loss threshold, then voluntary firm exits, by magnifying the domestic costs of the conflict, can push the economy closer to the threshold and thereby imply weaker optimal sanctions than in a setting without such a constraint.

From the EU perspective, sanctions were meant to restrict access to critical technologies and inputs on the export side and to cut foreign-currency revenues on the import side. As noted above, voluntary suspensions substantially widen the set of products and activities disrupted beyond those explicitly covered by EU measures. This broadening can undermine the logic of targeted ("smart") sanctions by increasing collateral damage and diluting the intended focus of economic pressure.

We advance several strands of research. First, we contribute to the literature on the impact of sanctions. The large increase in the use of sanctions as foreign policy instruments has led scholars to explore the economic impact of sanctions on sanctioning and sanctioned countries (Felbermayr et al., 2021; Drezner, 2024; Morgan et al., 2023), and to examine how firms respond to them (Meyer et al., 2023). In particular, our paper speaks to the literature that analyzes the impact of EU sanctions against Russia on firm-level trade. Previous studies have focused on the sanctions that the EU imposed on Russia in the aftermath of the annexation of Crimea. Using French firm-level data, Crozet and Hinz (2020) concluded that the 2014 EU sanctions against Russia had no significant effect on exports of well-known brands. However, they had a strong negative effect on products that relied on trade finance instruments. In a later paper, Crozet et al. (2021) found that the 2014 EU sanctions against Russia reduced the probability that French firms exported to that country. Using Swedish firm-level data, Gullstrand (2020) found that Russia's retaliatory measures against EU products after the 2014 EU sanctions had a strong negative effect on Swedish exports to Russia on intensive and extensive margins. Looking from Russia's angle and using the same sanction episode, Miromanova (2023) concluded that Russian firms reduced the imports of embargoed products on intensive and extensive margins. Ahn and Ludema (2020) showed that Russian firms targeted by sanctions lost operating revenue, asset value, and employees relative to non-targeted firms. However, focusing only on Russia-based sanctioned firms, Nigmatulina (2023) found that sanctioned firms performed better than unsanctioned ones due to Russian government support. Finally, using Dutch firm-level data, Kohl et al. (2024) showed that EU export restrictions on oil refining products and arms led to a reduction in the exports of these products to Russia by Dutch firms after the annexation of Crimea. They also found that Russia's retaliatory measures had a strong negative effect on Dutch exports to that country. We contribute to this literature by estimating the impact of the trade sanctions imposed by the EU on Russia after the invasion of Ukraine. This episode is interesting because the range of products and the value of trade affected by sanctions were much larger than in previous conflicts. Furthermore, in contrast to previous firm-level studies that focused on a single trade flow, we analyze the impact of trade sanctions on a country's exports and imports. We show that sanctions had a strong negative effect on Spanish firm-level exports to and imports from Russia.

Second, the severe sanctions imposed on Russia after the invasion of Ukraine also motivated new investigations on the design of sanctions. Based on international trade theory, Becko (2024) showed that to maximize economic harm to the target while minimizing the cost to the sender country, sanctions should be imposed on goods that the target country exports or imports inelastically. This

⁷ See Daniel Drezner in Klein (2024).

finding is similar to that found in the literature on optimal tariffs (Humphrey, 1987). Our paper estimates the response of firm-level exports and imports to the sanctions imposed by the EU against Russia after the invasion of Ukraine. We find that sanctions have a large negative effect on firms' trade flows and, hence, on firms' performance. However, our estimates are not informative for the design of sanctions because, as mentioned above, optimal sanctions should be determined by goods that Russia exports or imports inelastically.

Third, we add to the literature that analyzes whether firms use intermediary countries to circumvent trade sanctions. Chupilkin et al. (2023) found that the increase in EU and UK exports to countries neighboring Russia after the invasion of Ukraine was 30% higher for sanctioned products than for unsanctioned ones. However, the increase in sanctioned exports to countries neighboring Russia only represented 5% of the direct reduction in the exports of sanctioned products to Russia. Borin et al. (2023) raised this fraction to 10%. In contrast to these studies, we use firm-level data and find that Spanish firms did not use countries neighboring Russia to circumvent sanctions. However, we show evidence consistent with rerouting in the exports of firms that voluntarily suspended activities in Russia. In any case, this rerouting represents a very small share of the exports that these firms lost in Russia after the invasion of Ukraine.

Fourth, we contribute to the corporate social responsibility literature. Motivated by the seminal work of Bowen (2013), many scholars have argued that firms have a social responsibility toward different stakeholders, such as customers, suppliers, shareholders, or community members, that goes beyond the maximization of profits. These stakeholders can pressure firms to meet their demands, and firms can face reputational damage if they do not (Easley and Lenox, 2006). There is literature showing that reputational damage can explain firms' trade decisions. For example, Koenig and Poncet (2022) concluded that French firms that had outsourced their production to manufacturers located in the Rana Plaza building, which collapsed in April 2013, shifted their imports to producers closer to France in geographical and regulatory terms. Korovkin and Makarin (2023) presented anecdotal and indirect evidence supporting the hypothesis that reputational pressure led Ukrainian firms to reduce trade with Russia after the annexation of Crimea. Balyuk and Fedyk (2023) concluded that reputational pressure was the main explanation for the withdrawal of US companies from Russia after the invasion of Ukraine. Using various data sources and empirical analyses, we also provide suggestive evidence consistent with the argument that reputational and ethical reasons were important motivations behind firms' voluntary decisions to suspend activities in Russia.

The remainder of the paper is organized as follows. The next section explains how we combine information on firms that voluntarily decided to suspend activities in Russia, EU trade sanctions, and Spanish firm-level data to build our data set. It also describes the evolution of Spanish trade flows with Russia by sanction and voluntary suspension categories. This analysis provides initial evidence on the impact of sanctions and voluntary suspension of activities on Spanish trade flows with Russia after the invasion of Ukraine. The section ends by providing suggestive evidence that ethical and reputational concerns were important drivers of firms' voluntary decisions to suspend activities in Russia. Section 3 introduces the difference-in-differences regressions and reports estimates of the impact of sanctions and voluntary suspension of activities on Spanish exports to and imports from Russia. This section also examines how sanctions and voluntary suspension affect firms' decision to enter or exit the Russian market and performs several robustness tests. The section ends by quantifying how firms' voluntary decisions to suspend activities in Russia expanded the number of products and the amount of trade adversely affected by the conflict. Section 4 explores whether firms rerouted their trade with Russia through neighboring countries to circumvent sanctions or smooth out the negative effects of voluntary suspension. The last section concludes.

2. Data, stylized facts, and firms' motivations to suspend activities in Russia

2.1. Data

Our data set combines three pieces of information. First, we use the Yale-CELI and the KSE Institute's Leave-Russia lists to identify the Spanish firms that voluntarily decided to stop their activities in Russia. At first, the Yale-CELI list focused on large US firms. However, after the first version of the list was released the week starting February 28, 2022, and the founder of the project wrote a commentary about the list in Fortune.com, many volunteers offered their help to the Yale-CELI team to uncover the connections of firms, headquartered in many different countries, with Russia. This enabled Yale-CELI to become a global list of companies.⁸ The KSE Institute uses four criteria to decide which firms to track (Mylovanov et al., 2023): (i) Official company statements and press releases covered by reputable news agencies; (ii) Register of legal entities in Russia; (iii) Large and public multinational companies; and (iv) Strategic information received from the Ukrainian government. The Leave-Russia list covers more companies and countries than the Yale-CELI list.

We consider a firm to have voluntarily curtailed operations in Russia if it is included in the Yale-CELI list with the "Withdrawal" or "Suspension" status or in the KSE Institute's Leave-Russia list with the "Exited" or "Leave" status. As explained in Sonnenfeld et al. (2022), withdrawal is defined as "making a clean break/permanent exit from Russia and/or leaving behind no operational footprint" and suspension as "temporarily suspending all or almost all Russian operations without permanently exiting or divesting".⁹ If there

⁸ See "The Viral List That Turned a Yale Professor Into an Enemy of the Russian State" by Robb Mandelbaum, bloomberg.com, 6 December 2022 at <https://www.bloomberg.com/news/articles/2022-12-06/list-of-companies-doing-business-in-russia-made-by-yale-professor?embedded-checkout=true>.

⁹ As explained in Mylovanov et al. (2023), the KSE Institute's Leave-Russia list defines Exited as "companies that sold their business/assets or its part of the business to a local partner/terminated relations and left the market. Also, for companies that are being liquidated, this status is being assigned". Leave is defined as "companies that have published on the company's official website (or their release has appeared in a foreign publication such as FT, NYT, etc.) that are completely shutting down in Russia or companies that have officially announced that they are temporarily reducing operations in Russia."

was a discrepancy between the two lists on the suspension status of a firm, following a conservative criterion, we classified the firm as continuing its operations in Russia. Table A.1 in Appendix A presents the list of the 104 firms that operated in Spain and were included on the Yale-CELI and/or Leave-Russia lists. The table includes the firm name, industry, Yale-CELI status, Yale-CELI action, and Leave-Russia status. We should note that the Yale-CELI and Leave-Russia lists mostly include firms that had production or distribution-oriented affiliates in Russia.¹⁰

Second, we use the timeline on EU restrictive measures against Russia over Ukraine developed by the EU Council to trace the trade sanctions imposed by the EU against Russia since the invasion of Ukraine in February 2022.¹¹ Table A.2 in Appendix A reports the date when each trade sanction package was introduced, the affected trade flow (exports or imports), and the products targeted by the trade sanction. The EU imposed 11 rounds of sanctions against Russia between February 2022 and December 2023. Export bans or restrictions were imposed on aviation, dual use, firearms, luxury, maritime navigation, military, and oil refining goods, and on products that could enhance Russia's industrial capacity. Products affected by import bans and restrictions were, among others, coal, crude oil and petroleum products, gold, iron and steel, and jewelry. Using information published in different editions of the EU Official Journal and the list of dual-use goods available at the EU Communication and Information Resource Center for Administrations, Businesses, and Citizens (CIRCABC),¹² we built a data set of products affected by a trade sanction, identifying the product's CN8 code, the sanction regime (e.g., luxury goods), the affected trade flow (exports or imports), and the date the sanction entered into force. In March 2022, Russia imposed an export ban on different products.¹³ We consider these bans as an additional sanction category for Spanish imports from Russia.

Third, quarterly data on the universe of Spanish firms' export and import transactions in goods were obtained from the Customs and Excise Department of the Spanish Tax Agency (AEAT-Customs). Each record reports the value (in euros) of exports or imports for each firm, by CN8 product, country of destination or origin, year, and quarter. Our data set includes all Spanish firms that traded with Russia in at least one quarter during the period 2019q1–2023q4. Following the procedure explained in de Lucio et al. (2018), we identified by name 64% and 41% of the Spanish firms that exported and imported from Russia during that period, respectively: 2876 exporters and 1025 importers. These firms represented 94% and 93% of Spanish exports to and imports from Russia during the pre-invasion period (2019–2021), respectively. Among them, we identified 67 firms that voluntarily suspended their activities in Russia after the invasion of Ukraine: 29 firms exported and imported from Russia, 20 only exported to Russia, and 18 only imported from Russia. These firms had their headquarters in Spain or belonged to foreign companies that voluntarily suspended activities in Russia. We also identified 63 companies operating in Spain that stayed in Russia according to the Yale-CELI or Leave-Russia lists: 14 firms exported and imported from Russia, 34 only exported to Russia, and 15 only imported from Russia. Among the remaining 3477 firms that are not included in the Yale-CELI or Leave-Russia lists, 251 were two-way traders, 2528 only exporters, and 698 only importers. As explained below, these firms were smaller than those that voluntarily suspended activities in Russia, and most of them exported intermediate inputs or industrial goods. As explained by Korovkin and Makarin (2023), these two characteristics reduce the probability that a firm will be subject to reputational pressure. Therefore, we assume that these firms did not voluntarily cease their export or import operations with Russia after the invasion of Ukraine. In any case, we test the robustness of our results to excluding these firms from the sample.

2.2. Stylized facts

Table A.3 in Appendix A provides descriptive statistics for firms that voluntarily suspended their activities in Russia after the invasion of Ukraine and firms that did not. This latter group is subdivided into two further categories: firms that were included in the Yale-CELI and/or Leave-Russia lists and those that were not. We define three categories of traders: (i) firms that export and import, or two-way traders; (ii) firms that only export; and (iii) firms that only import. Two-way traders are defined as firms that exported and imported from Russia in the same year. Note that the figures reported in Table A.3 refer to firms that were actively trading in 2021. They may therefore differ from those reported above, which correspond to firms that traded at any point between 2019q1 and 2023q4.

Firms that voluntarily suspended activities in Russia were larger in terms of trade value, number of products traded, and number of destinations/origins than other Spanish traders with Russia before the invasion of Ukraine.¹⁴ Among suspension firms, only importers had larger trade values than only exporters. This is explained by the presence of oil and gas importers, which tend to have higher value trade flows than other traders.

¹⁰ It is important to stress that the information included in Table A.1 in Appendix A corresponds to that published in the lists at the end of 2023, when the information for this project was gathered. The firms included in the Yale-CELI and Leave-Russia lists and their status may have changed since then. We should also note that Table A.1 may include business groups that include several companies. As explained below, each of these companies has a unique identifier in the AEAT-Customs database. Therefore, the number of firms in our dataset is higher than the number of firms in Table A.1.

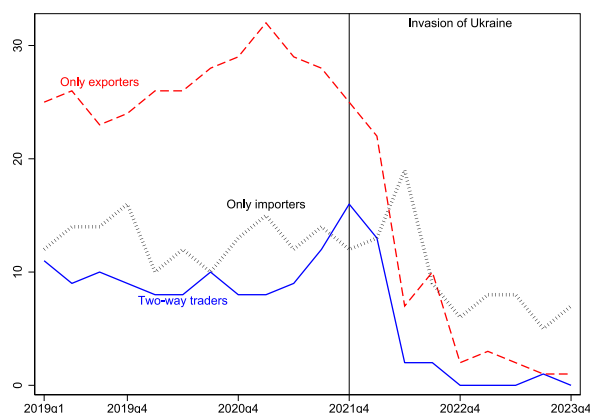
¹¹ This timeline can be accessed at <https://www.consilium.europa.eu/en/policies/sanctions/restrictive-measures-against-russia-over-ukraine/history-restrictive-measures-against-russia-over-ukraine/>.

¹² This list, which is updated every year, can be accessed at <https://circabc.europa.eu/ui/group/0e5f18c2-4b2f-42e9-aed4-dfe50ae1263b/library/c3d06bd7-6ef0-4771-bbd7-f92b976ae9a0>.

¹³ The Russian government decision can be accessed at <http://government.ru/en/docs/44762/>. We were unable to find a list that specifies the CN8 products affected by the Russian export ban. Therefore, we created a list based on the description of the products included in the Russian government decision.

¹⁴ There are two exceptions. First, among two-way traders, non-suspension firms included in the lists had a larger number of destinations and origins than suspension firms. Second, for only importers, the number of products imported from Russia was the same for the three categories of firms.

A. Firms that voluntarily suspended activities in Russia



B. Firms that did not voluntarily suspend activities in Russia

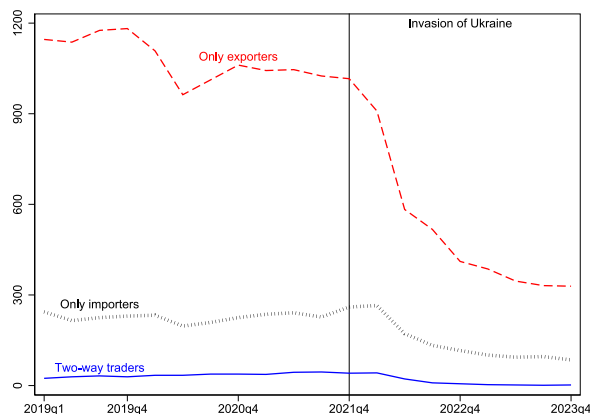


Fig. 1. Number of Spanish two-way traders, only exporters and only importers from Russia, 2019q1–2023q4.

Source: Authors' own elaboration using data from AEAT-Customs.

Firms that did not voluntarily suspend activities in Russia and were included in the Yale-CELI and/or Leave-Russia lists were also larger than firms not included in the lists.¹⁵ As mentioned above, most of the firms included in the lists had distribution or production facilities in Russia. As shown in [Helpman et al. \(2004\)](#), firms that invest in foreign markets are more productive and larger than those that only trade.

The average annual Spanish exports to and imports from Russia during the pre-invasion period (2019–2021) were equal to 1689 and 3757 million euros, respectively (0.6% of total Spanish exports and 1.3% of total Spanish imports). During the pre-invasion period, Russia occupied the 26th and 17th positions in the ranking of Spanish export and import partners, respectively.¹⁶ Table A.4 in Appendix A shows that machinery, motor vehicles, and tanning extracts were the most exported sanctioned products from Spain to Russia during the pre-invasion period, while mineral fuel was the most imported sanctioned product.

Table A.5 in Appendix A shows trade with Russia as a percentage of total trade during the period 2019–2021 for suspension and non-suspension firms. As in previous analyses, we have defined three types of traders: two-way traders, only exporters, and only importers. For all types of traders, the average share of Russia before the invasion was higher for non-suspension firms than for suspension firms: 4.1% versus 2.4% for two-way traders; 5.6% versus 3.0% for only exporters; and 9.5% versus 9.4% for only importers.

[Fig. 1](#) shows the evolution of the number of Spanish firms that were trading with Russia in each year-quarter. Panel A shows the evolution of firms that voluntarily decided to suspend activities in Russia. There is a marked reduction in the number of two-way traders and only exporters after the invasion of Ukraine. The largest drop for these categories occurred in the second quarter of

¹⁵ There are two exceptions. First, among two-way traders, the number of products exported and imported from Russia is the same for both types of non-suspension firms. Second, among only importers, the value of imports from Russia is higher for non-suspension firms not included in the lists than for non-suspension firms included in the lists.

¹⁶ The 12th and 9th positions in the ranking of Spanish extra-EU export and import partners, respectively.



Fig. 2. Quarterly Spanish trade with Russia by firm-product groups, 2019q1–2023q4 (million euros). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Source: Authors' own elaboration using data from AEAT-Customs.

2022. The number of only importers increases in the quarter after the invasion of Ukraine. This surprising result is explained by the fact that some two-way traders became only importers in that quarter. The number of only importers decreases after the second quarter of 2022.

At the end of 2023, among the 67 firms that voluntarily suspended activities in Russia, 59 had ceased their trade relationships with Russia, one firm was still exporting to Russia, and seven firms were still importing from Russia. Of the 59 firms that had terminated their trade relationships with Russia by the end of 2023, 51 had ceased these flows by the second quarter of 2022. This highlights that most firms that voluntarily decided to suspend their activities in Russia terminated their trade relationships with Russia a few months after the invasion.

Panel B shows the evolution of two-way traders, only exporters, and only importers that did not voluntarily suspend activities in Russia. There was a slight downward trend in the number of only exporters before the invasion. This downward trend was magnified after the invasion, particularly in the second quarter of 2022, when the number of only exporters decreased by 36%. The downward trend continued, although with a lower intensity, until the last quarter of 2023. The invasion of Ukraine reduced the number of only exporters by 64%. The number of two-way traders decreased from 41 at the end of 2021 to 2 at the end of 2023. There was a slight upward trend in the number of only importers before the invasion. This number continued to rise in the quarter when the invasion occurred (2022q1) and then decreased. The relative decline in the number of importers after the invasion, 68%, is similar to that of only exporters. These figures highlight that many firms not classified as voluntary suspension firms also stopped trading with Russia after the invasion of Ukraine.

Panel A of Fig. 2 shows the evolution of quarterly Spanish exports to Russia by firm-product groups between 2019 and 2023. The first group (green area; Only Suspension) is exports of products unaffected by sanctions from firms that voluntarily suspended activities in Russia after the invasion of Ukraine. The second group (orange area; Sanction and Suspension) is exports of products affected by sanctions from firms that voluntarily suspended activities in Russia after the invasion of Ukraine. The third group (blue area; Only Sanction) is exports of products affected by trade sanctions from firms that did not voluntarily suspend activities in Russia. The fourth group (red area; No Sanction and No Suspension) is exports of products unaffected by sanctions from firms that did not voluntarily suspend activities in Russia.

During the pre-invasion period (2019q1–2021q4), on average, annual exports from firms that voluntarily suspended activities in Russia after the invasion of Ukraine represented 26% of total exports to Russia. Twenty-one percentage points corresponded to products unaffected by sanctions and five percentage points to products affected by them. Therefore, more than three-quarters of the exports of firms that voluntarily suspended activities in Russia after the invasion of Ukraine were unaffected by sanctions. Sanctioned products exported by firms that did not voluntarily suspend activities represented 24% of total Spanish exports to Russia in the pre-invasion period. Finally, exports of products unaffected by sanctions and exported by firms that did not voluntarily suspend activities in Russia represented 50% of total Spanish exports to Russia during the pre-invasion period.

After reaching a maximum in 2021q2, total exports from Spain to Russia decreased during the last two quarters of 2021 and throughout the invasion period. Exports decreased by 44% between the post-invasion period (2022q1–2023q4) and a pre-invasion period of the same duration (2020q1–2021q4). As expected, there is a large decrease in exports from firms that voluntarily suspended activities in Russia after the invasion of Ukraine. These exports disappeared almost completely in the last quarter of 2023. There is also a large reduction in exports of sanctioned products from firms that did not voluntarily suspend activities in Russia. Between the pre-invasion and the above-defined post-invasion period, exports of these goods decreased by 61%. There is also a decrease in exports of unsanctioned goods from firms that did not voluntarily suspend activities in Russia. This decrease can be explained by the negative effect on exports of sanctions that were not targeted at specific products, such as financial sanctions. Furthermore, the conflict itself could have increased the risk of trading with Russia, leading to a reduction in exports to this country. In any case, the decrease in exports in this last group was less pronounced than in the previous groups: 13%. This latter result suggests that both trade sanctions and firms' voluntary decisions to suspend activities in Russia had a particularly negative effect on Spanish exports to Russia after the invasion of Ukraine.

Panel B of Fig. 2 shows the evolution of Spanish imports from Russia. The graph shows a sharp increase in imports between the last quarter of 2020 and the last quarter of 2021. This increase is explained by the rise in the price of oil, a product that represented almost two-thirds of Spanish imports from Russia in the pre-invasion period (see Table A.4 in Appendix A). Imports from firms that voluntarily suspended activities in Russia represented 56% of all Spanish imports from Russia in the pre-invasion period, of which 5 percentage points corresponded to unsanctioned products (green area) and 51 percentage points to sanctioned products (orange area). Therefore, in the case of imports, most of the products traded by firms that voluntarily suspended activities were affected by sanctions. Imports of sanctioned products from firms that did not voluntarily suspend activities in Russia represented 20% of Spanish imports during the pre-invasion period (blue area). Finally, imports of unsanctioned products from firms that did not voluntarily suspend activities in Russia represented 24% of total Spanish imports from Russia during the pre-invasion period.

Between the pre-invasion (2020q1–2021q4) and the post-invasion period (2022q1–2023q4) defined above, imports decreased by 17%. Imports from firms that voluntarily suspended activities (green and orange areas) and imports of sanctioned products from firms that did not voluntarily suspend activities in Russia (blue area) almost disappeared by the last quarter of 2023. In contrast, imports of unsanctioned products from firms that did not voluntarily suspend activities in Russia *increased* by almost 100% between the pre-invasion and post-invasion periods. This increase is explained by imports of liquefied natural gas, a product that represented half of all Spanish imports from Russia in the post-invasion period and whose average price increased after the invasion of Ukraine, especially during 2022.

Import trends also suggest that trade sanctions and firms' voluntary decisions to suspend activities in Russia had a negative impact on Spanish trade with Russia. To confirm this visual perception, Section 3 uses econometric techniques to estimate the impact of sanctions and firms' voluntary decisions to suspend activities on Spanish firms' trade with Russia after the invasion of Ukraine.

To end this section, we focus on firms that voluntarily suspended activities in Russia and analyze the percentage of trade in sanctioned products that was suspended before sanctions were announced. Table A.6 in Appendix A distinguishes three categories of firms: (i) all firms that voluntarily suspended activities in Russia (all suspension firms); (ii) suspension firms that only traded unsanctioned products; and (iii) suspension firms that traded sanctioned products. As before, we define three types of traders: two-way traders, only exporters, and only importers. We define two-way traders as firms that exported and imported from Russia in 2021.

There were 19 two-way traders who voluntarily suspended activities in Russia after the invasion of Ukraine, of which 2 only traded unsanctioned products and 17 traded sanctioned products. This latter category accounted for almost all total trade (exports + imports) of two-way traders with Russia in 2021. Sanctioned products represented 36% of two-way traders' trade. 98.3% of the trade by two-way traders was suspended before the sanctions were announced. This finding suggests that sanctions were not the primary driver of the suspension decision. The last row of Panel A shows that the average two-way trader firm suspended 99.1% of its trade before the sanctions were announced. This result indicates that the aggregate percentage was not driven by some outlier firms.

Panel B presents the data for only exporters. Sanctioned products represented 13% of the exports of these firms before the invasion of Ukraine. More than 97% of exports were halted before the sanctions were announced. Panel C presents the data for only importers. For these traders, the sanctioned products represented 88% of their imports before the invasion of Ukraine. Almost all imports were also halted before the sanctions were announced, suggesting that sanctions do not appear to be the main factor behind firms' voluntary suspension decisions.

2.3. Firms' ethical and reputational concerns

Our working hypothesis is that ethical and reputational concerns were important drivers of firms' decisions to voluntarily suspend activities in Russia. In this subsection, we provide suggestive and anecdotal evidence consistent with this interpretation. In any case, we emphasize that this evidence is supportive rather than definitive.

We begin with ethical concerns. According to Professor Jeffrey Sonnenfeld, one of the creators of the Yale-CELI list, workers in professional and tech companies demanded that their firms take an ethical position on the Russian invasion of Ukraine.¹⁷ In fact, as a result of workers' pressure or intrinsic corporate values, many companies that voluntarily suspended activities in Russia in our sample cited ethical arguments to justify their decision. Table A.7 in Appendix A presents extracts of press releases in which firms that voluntarily suspended their activities in Russia included an ethical argument. The statements include sentences such as "continuing to do business under these circumstances is incompatible with our purpose and values", "[the firm] stands unreservedly by the side of Ukraine"; "our decisions and actions reflect our steadfast values and our commitment to doing what is right"; or "we in the Executive Board are horrified by this development and condemn Russia's attack on Ukraine in the strongest terms. Russia's war is not only an attack on a free country, but also an attack on our free democracy and our values in Europe".

The extracts recorded in Table A.7 suggest that moral concerns may have motivated some firms' voluntary decisions to suspend activities in Russia. However, we must also note that several press releases from firms that voluntarily suspended activities in Russia include no reference to moral concerns. In some cases, firms did not explicitly condemn the invasion of Ukraine because of fears that workers and the management of Russian affiliates would be punished or that the government would take control of their assets.¹⁸

To test the role of reputational concerns, we rely on Balyuk and Fedyk (2023). These authors argue that if investors were concerned about reputation, they would have sold the shares of companies that continued operating in Russia. This selling trend would have ended when the firm announced the suspension of its activities in Russia because, at that moment, the reputational concern would have disappeared. To test this argument, Balyuk and Fedyk (2023) analyze the excess returns of a stock before and after the suspension announcement. Using a sample of firms that traded on US stock exchanges and voluntarily suspended activities in Russia, they found that, in line with the reputational argument, excess returns were negative until the suspension announcement, and this negative trend stopped afterward.

We replicate the Balyuk and Fedyk's (2023) analysis on our sample of firms that voluntarily suspended activities in Russia. We focus on the firms that voluntarily suspended activities in Russia and were listed on a stock exchange: 35. We calculate the cumulative excess returns (CER) of a stock relative to five days before the suspension announcement:

$$CER_{i,t} = \frac{SharePrice_{i,t} - SharePrice_{i,a-5}}{SharePrice_{i,a-5}} - \frac{Index_{i,t} - Index_{i,a-5}}{Index_{i,a-5}} \quad (1)$$

where $SharePrice_{i,t}$ is firm i 's share price on day t and $SharePrice_{i,a-5}$ is the price of the share five days before firm i announced the suspension of its activities in Russia. $Index_{i,t}$ is the reference index of the stock exchange in which the stock of firm i is listed (e.g., IBEX35 or S&P 500). Therefore, we calculate the CER relative to each firm's reference index to control for the variables that may affect all firms listed on a given stock exchange. For Spanish subsidiaries of foreign firms, we analyze the stock of the parent firm because the parent made the decision to voluntarily suspend activities in Russia.

Figure A.1 in Appendix A plots the average CER and the 90% confidence interval, between five days before the suspension announcement and five days after the suspension announcement. There is a downward trend in CER between five days before the suspension announcement and the day the announcement was made. Note that on the day the announcement was made, cumulative excess returns continued to fall. On average, cumulative returns fell by 2.4% between five days before the announcement and the day the announcement was made. However, the day after the announcement, the downward trend ends. This finding is similar to that reported by Balyuk and Fedyk (2023) for US firms and is consistent with the reputational argument for the decision to voluntarily suspend activities in Russia.¹⁹

Appendix B provides additional suggestive evidence that ethical and reputational concerns played an important role in motivating firms' voluntary decisions to suspend activities in Russia.

3. Trade impact of sanctions and firms' voluntary decisions to suspend activities in Russia

This section is divided into three parts. First, we explain the difference-in-differences strategy used to identify the impact of sanctions and voluntary suspension of activities on Spanish trade with Russia after the invasion of Ukraine. Second, we present the baseline estimations of the impact of sanctions and firms' voluntary decisions to suspend activities in Russia on the Spanish trade with Russia. Finally, we analyze the robustness of our estimates.

¹⁷ "The Viral List That Turned a Yale Professor Into an Enemy of the Russian State" by Robb Mandelbaum, bloomberg.com, 6 December 2022 at <https://www.bloomberg.com/news/articles/2022-12-06/list-of-companies-doing-business-in-russia-made-by-yale-professor?embedded-checkout=true>.

¹⁸ "Companies face ethical and logistical challenges to stay in Russia", Financial Times, 4 April 2022.

¹⁹ The figure is similar if we extend the period to 15 days after the suspension announcement.

3.1. Methodology

We estimate the effect of EU trade sanctions and firms' voluntary decisions to suspend activities on the trade flows of Spanish firms with Russia using the following specification:

$$y_{fkt} = \exp \left[\alpha(OnlySuspension_{fk} \times Post_{ft}) + \beta(SanctionAndSuspension_{fk} \times Post_{fkt}) + \delta(OnlySanction_{fk} \times Post_{kt}) + \gamma_{fk} + \gamma_t \right] \times \epsilon_{fkt} \quad (2)$$

where y_{fkt} is the value of firm f 's trade flow (exports or imports) of product k with Russia in time t . Time is defined at the year-quarter level (e.g., 2022q1). In line with Fig. 2, Eq. (2) captures the three alternative treatments a trade relationship can experience after the Russian invasion of Ukraine. First, $OnlySuspension_{fk}$ is an indicator variable that turns one if the trade flow involves a product unaffected by sanctions, which is traded by a firm that voluntarily suspends activities in Russia after the invasion of Ukraine. $Post_{ft}$ turns 1 if the trade flow occurs in the year-quarter when firm f announces the suspension of activities in Russia or later.²⁰ We obtain the voluntary suspension data from firms' press releases, different media sources, and the Leave-Russia list. Second, $SanctionAndSuspension_{fk}$ is an indicator variable that turns one if the trade flow involves a product affected by sanctions, which is traded by a firm that voluntarily suspends activities in Russia after the invasion of Ukraine. $Post_{fkt}$ turns one from the later of the two relevant dates: the quarter in which firm f announces the suspension of activities in Russia and the quarter in which the sanction on product k enters into force. Third, $OnlySanction_{fk}$ is an indicator variable that turns one if the trade flow involves a product affected by sanctions, which is traded by a firm that does not voluntarily suspend activities in Russia after the invasion of Ukraine. $Post_{kt}$ turns 1 if the trade flow occurs in the year-quarter when the sanction is imposed or later.²¹ Trade flows that do not experience any treatment, denoted as No sanction and No Suspension in Fig. 2, constitute the excluded category.

Eq. (2) includes two fixed effects. γ_{fk} is a firm $\times$ product fixed effect that absorbs all the time-invariant factors that can affect firm f exports or imports of product k from Russia. Since this fixed effect includes the product dimension, it absorbs the impact of the trade sanctions that the EU imposed against Russia and the counter-sanctions that Russia introduced against the EU after the annexation of Crimea in 2014, and which remained in force during our analysis period. γ_t is a time fixed effect, which captures all time-varying factors, such as the Covid-19 pandemic, the euro-ruble exchange rate, or Russia's GDP, that affect trade flows between Spain and Russia. ϵ_{fkt} is the disturbance term.

Eq. (2) uses a difference-in-differences strategy to identify the effect of each treatment on Spanish firms' exports to Russia. α captures whether the difference between exports of unsanctioned product k from a firm that voluntarily suspended activities in Russia and unsanctioned product k' from a firm that did not voluntarily suspend activities (first difference) changed between the post-invasion and the pre-invasion period (second difference). β captures whether the difference between exports of sanctioned product k from firm f that voluntarily suspended activities and unsanctioned product k' from firm f' that did not voluntarily suspend activities (first difference) changed between the post-invasion and the pre-invasion period (second difference). δ captures whether the difference between exports of sanctioned product k and unsanctioned product k' by a firm that did not voluntarily suspend activities in Russia (first difference) changed between the post-invasion and the pre-invasion period (second difference). The interpretation of these coefficients is similar if the analyzed trade flow is imports.

A potential concern with the $OnlySanction_{fk}$ coefficient is that it is estimated by analyzing only the trade flows of firms that did not voluntarily suspend activities in Russia after the invasion of Ukraine. It can be argued that this coefficient may not properly capture the effect that sanctions would have had on firms that voluntarily suspended activities had this choice not been available to firms. For example, while a firm that did not voluntarily suspend activities could use schemes to make the identification of sanctioned products more difficult for customs authorities, a firm that voluntarily suspended activities would have been more diligent in complying with sanctions. In this scenario, the $OnlySanction_{fk}$ coefficient would underestimate the negative effect of sanctions on trade. To address this concern, in the robustness subsection, we explore whether the impact of sanctions was similar on suspension and non-suspension firms in an episode in which firms did not voluntarily suspend activities in Russia: the annexation of Crimea in 2014. We show that the impact of sanctions on trade was similar in both types of firms.

The difference-in-differences methodology is based on the assumption that the control group provides a good approximation of what would have occurred to the treated group if the EU had not imposed sanctions on Russia and firms had not voluntarily suspended activities in Russia. This assumption seems reasonable if the treated and control groups followed similar trends before the invasion. Panels A and B of Fig. 2 suggest that this was the case. Furthermore, as explained later, the quarterly pre-invasion coefficients confirm the parallel-trends assumption.

Eq. (2) allows us to estimate the average effect of a trade sanction, a firm's decision to suspend activities in Russia, or the combination of these treatments on trade. To explore whether the impact of these treatments changes over the period in which they are in force, we estimate a specification that includes interaction terms for each quarter included in the sample period (2019q1–2023q4):

$$y_{fkt} = \exp \left[\sum_t \alpha_t(OnlySuspension_{fk} \times D_t) + \sum_t \beta_t(SanctionAndSuspension_{fk} \times D_t) + \sum_t \delta_t(OnlySanction_{fk} \times D_t) + \gamma_{fk} + \gamma_t \right] \times \epsilon_{fkt} \quad (3)$$

²⁰ More precisely, $Post_{ft}$ turns one if the voluntary suspension decision was taken before the middle of the quarter was reached. For example, for firms that voluntarily suspended their activities in Russia in March 2022, $Post_{ft}$ is zero for the first quarter of 2022 and becomes one from the second quarter of 2022 onward.

²¹ As for suspension, $Post_{kt}$ turns one if the sanction entered into force before the middle of the quarter was reached.

Table 1
Impact of sanctions and voluntary suspension on Spanish firms' trade with Russia.

	Value		Entry		Exit	
	(1) Exports	(2) Imports	(3) Exports	(4) Imports	(5) Exports	(6) Imports
Only Sanction $_{fk} \times \text{Post}_{kt}$	-1.025 ^b (0.423)	-2.557 ^a (0.344)	-0.050 ^a (0.007)	-0.042 ^a (0.010)	0.239 ^a (0.034)	0.227 ^a (0.048)
Only Suspension $_{fk} \times \text{Post}_{ft}$	-4.149 ^a (0.609)	-2.181 ^a (0.449)	-0.126 ^a (0.014)	-0.005 (0.028)	0.511 ^a (0.042)	0.237 ^a (0.073)
Sanction and Suspension $_{fk} \times \text{Post}_{fkt}$	-5.378 ^a (0.972)	-8.065 ^a (0.965)	-0.085 ^a (0.018)	-0.053 ^b (0.021)	0.474 ^a (0.055)	0.545 ^a (0.069)
Observations	237 880	42 020	177 597	33 366	43 390	5508
Pseudo-R2	0.751	0.865				
Adjusted R2			0.081	0.042	0.324	0.263

Note: In columns 1 and 2 the dependent variable is the value of exports and imports, respectively. In column 3 (4) the dependent variable turns one if firm f did not export (import) product k at time $t-1$ and exported (imported) product k at time t . In column 5 (6) the dependent variable turns one if firm f exported (imported) product k at time $t-1$ and did not export (import) product k at time t . All estimations include firm $\times$ product and time fixed effects. Standard errors clustered at the firm and product level are in parentheses. a, b, and c: statistically significant at 1%, 5%, and 10%, respectively.

where D_t is an indicator variable that turns one if the analyzed year-quarter is t . We select 2021q4, the quarter just before the Russian invasion of Ukraine, as the excluded category.

Since we use high-frequency trade data, there are many observations in which the value of the trade flow is zero. Furthermore, due to firms' voluntary or involuntary decisions to suspend operations in Russia after the invasion, the number of zero trade flows increases in the last quarters of our data set. To incorporate zero-valued trade flows into our empirical analysis, we estimate the value regressions in Eqs. (2) and (3) using a Poisson pseudo-maximum likelihood estimator (Santos-Silva and Tenreyro, 2010).²² For the entry and exit outcomes, which are binary variables, we estimate linear probability models with the same fixed-effect structure. We cluster standard errors at the firm and product level.

3.2. Econometric results

Table 1 reports the results of the econometric analysis on the impact of EU sanctions and the voluntary suspension of firms' activities on Spanish trade with Russia. Columns 1 and 2 report the estimates when the dependent variable is the value of exports and imports, respectively. Columns 3 and 4, denoted as entry, report the estimates of the probability of starting to export and import from Russia, respectively. Finally, columns 5 and 6, denoted as exit, report the estimates of the probability of stopping exporting and importing from Russia, respectively.

Column 1 of Table 1 shows that the Only Sanction $_{fk} \times \text{Post}_{kt}$ coefficient (Only Sanction for short) is negative and statistically significant, indicating that trade sanctions had a negative effect on Spanish firm-level exports to Russia after the invasion of Ukraine. Specifically, exports of products affected by sanctions decreased by 64% [$1-\exp(-1.025)$] relative to products unaffected by sanctions after the invasion of Ukraine.²³ As expected, the Only Suspension $_{fk} \times \text{Post}_{ft}$ coefficient (Only Suspension for short) is also negative and statistically significant, indicating that a firm's voluntary decision to suspend activities in Russia led to a reduction in exports of unsanctioned products to this country after the invasion of Ukraine. According to our estimation, exports from a firm that voluntarily suspended activities in Russia decreased by 98% [$1-\exp(-4.149)$] compared to firms that did not voluntarily suspend activities in Russia after the invasion of Ukraine.²⁴ Finally, the Sanction and Suspension $_{fk} \times \text{Post}_{fkt}$ coefficient (Sanction and Suspension for short) is also negative and statistically significant. According to our estimation, exports from a firm that voluntarily suspended activities in Russia decreased by almost 100% [$1-\exp(-5.378)$] compared to firms that did not voluntarily suspend activities in Russia after the invasion of Ukraine.

Column 2 of Table 1 presents the estimates when the value of imports is the dependent variable. The Only Sanction coefficient is negative and statistically significant, indicating that EU sanctions decreased Spanish imports from Russia after the invasion of Ukraine. Specifically, imports of products affected by sanctions decreased by 92% [$1-\exp(-2.557)$] compared to unsanctioned products after the invasion of Ukraine. The Only Suspension coefficient is negative and statistically significant, indicating that firms that voluntarily suspended activities in Russia reduced imports of unsanctioned products from that country after the invasion

²² We use Stata's `ppmlhdfc` command (Correia et al., 2020).

²³ Sanctions were introduced at different moments throughout the post-invasion period. Therefore, the Only Sanction coefficient is an average of the effect of sanctions in each quarter, with weights based on the share of sanctions in each quarter (Goodman-Bacon, 2021; Athey and Imbens, 2022). To address the staggered imposition of sanctions, as shown below, we estimate quarter-specific sanction coefficients (Fig. 3) and sanction-specific coefficients (Table 2).

²⁴ Why does the suspension of activities not lead to a 100% reduction in exports? First, the decision to suspend activities may have occurred once the quarter had begun. Therefore, firms may export in a quarter despite taking the decision to suspend activities in that quarter. Second, some firms might have needed some time to end their activities in Russia. For example, due to obligations related to contracts signed before the invasion, firms had to supply their Russian customers after the invasion. Therefore, we can observe export operations by firms that voluntarily suspended activities in later stages of the invasion period.

of Ukraine. Specifically, imports from firms that voluntarily suspended activities in Russia decreased by 89% [$1 - \exp(-2.181)$] compared to other importers of unsanctioned products after the invasion of Ukraine. The point estimate for Sanction and Suspension is higher (in absolute terms) than the one for Only Sanction. Specifically, firms that voluntarily suspended activities and imported sanctioned products reduced their imports by virtually 100% relative to firms that did not voluntarily suspend activities and imported unsanctioned products [$1 - \exp(-8.065)$].

In columns 3 to 6 we analyze whether EU sanctions against Russia and firms' voluntary decisions to suspend activities in that country had an impact on firms' entry or exit from the Russian market. We use an equation similar to (2), where now the dependent variable is an indicator variable that turns one if a firm begins exporting a product to Russia (entry) or if a firm stops exporting to Russia (exit). We define that a firm begins to export to Russia if it does not export product k at time $t - 1$ and exports product k at time t . We define that a firm as stopping exporting to Russia if it exports product k at time $t - 1$ and does not export product k at time t . The same definitions applies to imports. We estimate a linear probability model.

Column 3 of Table 1 shows that sanctions reduced the probability of starting to export to Russia by 5 percentage points after the invasion of Ukraine. Voluntary suspension of activities decreased the probability of starting to export by 13 percentage points. The reduction in the probability of entering the Russian market by firms that voluntarily suspended activities and exported sanctioned products was smaller than for firms that voluntarily suspended activities and exported unsanctioned products. Sanctions reduced the probability of starting to import from Russia by 4 percentage points (column 4). Firms' voluntary decisions to suspend activities had no significant effect on the probability of starting to import from Russia. In contrast, sanctions, combined with the voluntary decision to suspend activities in Russia, reduced the probability of starting to import from Russia by 5 percentage points.

Sanctions increased the probability of stopping exporting to Russia by 24 percentage points, while voluntary suspension of activities increased the probability of exit by 51 percentage points (column 5). The combined effect of sanctions and suspension is slightly smaller than that of Only Suspension. Sanctions increased the probability of stopping importing from Russia by 23 percentage points. The voluntary suspension of activities increased the probability of stopping imports from Russia by 24 percentage points. The combined effect of sanctions and suspension increased the probability of stopping imports from Russia by 55 percentage points.

In summary, we find that sanctions and voluntary suspension of activities had a strong negative effect on Spanish firms' trade with Russia after the invasion of Ukraine. Regarding exports, the impact of voluntary suspension of activities on the reduction of trade was not significantly enhanced by the existence of sanctions. However, with respect to imports, import bans augmented the detrimental effect that the voluntary suspension of activities had on trade.

Panels A, B, and C of Fig. 3 show the evolution of the quarterly Only Sanction, Only Suspension, and Sanction and Suspension coefficients estimated with Eq. (3) for the value of Spanish exports and imports, respectively. In addition to the point estimate, we draw the 90% confidence interval for each coefficient. The reference quarter is 2021q4. Analyses for entry and exit are reported in Figures A.2 and A.3 in Appendix A. We observe no pretrend in the pre-invasion quarterly coefficients in any panel, which validates the difference-in-differences identification strategy followed in our study. In line with the estimates reported in columns 1 and 2 of Table 1, in all panels, the quarterly coefficients become negative after the invasion of Ukraine. Furthermore, the quarterly coefficients become more negative as we progress in the post-invasion period, except for the last quarters.²⁵

Next, we analyze the impact of each sanction category on the Spanish trade with Russia. We substitute the Only Sanction _{f,k} variable in Eq. (2) by a set of variables which includes all categories of export and import sanctions (see Table A.2 in Appendix A). Columns 1 to 3 of Table 2 report the results of export-related sanctions and columns 4 to 6 report the import-related ones. The regressions also include the Only Suspension, and the Sanction and Suspension variables, although their coefficients are not reported in the table. The coefficients for aviation and for goods that can enhance Russia's industrial capacity are negative and statistically significant in column 1. We could not estimate the coefficients of export value for firearms, jet fuel, maritime, and military products, because there were no exports of these products after the invasion of Ukraine. In these cases, the sanctions were fully effective because they eliminated exports of these products. Sanctions did not have a significant effect on Spanish exports of dual-use goods, luxury goods, and oil refining equipment. Exports of dual-use goods were concentrated in two products after the invasion of Ukraine: polyethers and iron and steel tubes and pipes. It is likely that the EU did not restrict the exports of these products because it considered that the varieties shipped from Spain could not be used in the Russian military industry. In the case of luxury goods, the export ban was only imposed if a unit price threshold was exceeded, so sanctions were not binding for many products. In the case of oil refining, some varieties within a sanctioned 8-digit product line could be exempted from sanctions. This could explain the statistically insignificant coefficient estimated for this sanction category.

Sanctions on industrial and luxury goods had a significant negative effect on the probability of entering the Russian market. Sanctions had no significant effect on the probability of starting to export aviation and oil refining goods. Sanctions on dual-use goods increased the probability of entering the Russian market after the invasion of Ukraine. Sanctions significantly increased the probability of stopping exports of aviation, industrial goods, and oil refining equipment after the invasion of Ukraine. However, we find an insignificant effect for dual use and luxury goods.

Sanctions had a significant negative effect on the import of crude oil and petroleum products (crude oil, for short), the main product imported by Spain from Russia before the invasion of Ukraine. In fact, crude oil imports were zero from the second quarter of 2023 onward, when the import ban was fully implemented.²⁶ There was also a significant decrease in imports of goods that generated significant revenue for Russia (e.g., caviar), coal, and steel. Russia's export ban also had a negative impact on imports.

²⁵ Note that in Panel C1 we cannot estimate the Sanction and Suspension coefficients from 2022q4 onward because there were no exports in this category.

²⁶ The ban on crude oil imports entered into force on December 5, 2022, and the ban on petroleum products on February 5, 2023.

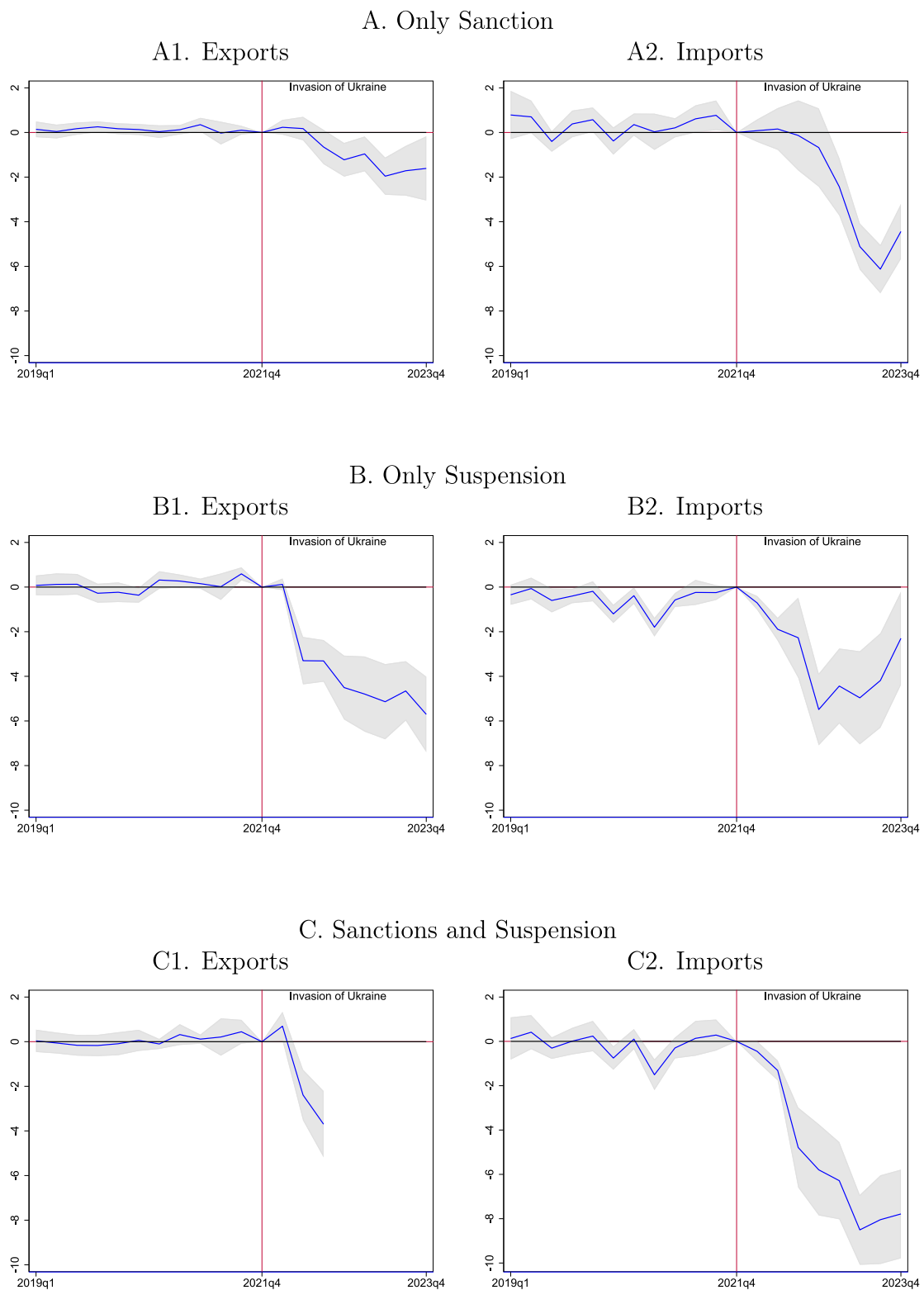


Fig. 3. Quarterly coefficients on the impact of sanctions and the suspension of activities on Spanish exports to and imports from Russia, 2019q1–2023q4.

Note: The figures report the point estimate and the 90% confidence interval of the quarter coefficients estimated in Eq. (3). The excluded category is 2021q4.

Table 2

Impact of export-related and import-related sanctions on Spanish firms' trade with Russia.

	Exports			Imports		
	(1) Value	(2) Entry	(3) Exit	(4) Value	(5) Entry	(6) Exit
Dual use _k × Post _{t,k}	−0.021 (0.604)	0.037 ^c (0.021)	−0.133 (0.092)			
Oil refining _k × Post _{t,k}	−1.495 (1.094)	−0.002 (0.010)	0.355 ^a (0.052)			
Aviation _k × Post _{t,k}	−4.451 ^a (1.018)	−0.015 (0.017)	0.315 ^a (0.076)			
Luxury _k × Post _{t,k}	0.360 (0.227)	−0.020 ^c (0.011)	0.004 (0.050)			
Industrial _k × Post _{t,k}	−2.023 ^a (0.237)	−0.060 ^a (0.007)	0.324 ^a (0.027)			
Russia's export ban _k × Post _t				−2.485 ^a (0.580)	−0.009 (0.025)	0.300 ^b (0.121)
Coal _k × Post _{t,k}				−1.923 ^a (0.349)	−0.116 ^a (0.038)	0.262 ^a (0.046)
Crude oil _k × Post _{t,k}				−3.587 ^a (0.699)	−0.093 ^a (0.029)	0.364 ^a (0.062)
Jewelry _k × Post _{t,k}				0.233 (0.198)	0.131 ^a (0.009)	
Revenue _k × Post _{t,k}				−2.040 ^a (0.344)	−0.040 ^a (0.011)	0.223 ^a (0.051)
Steel _k × Post _{t,k}				−5.423 ^a (0.866)	−0.051 ^a (0.016)	0.530 ^a (0.170)
Observations	237 221	177 597	43 390	42 020	33 366	5508
Pseudo-R2	0.754			0.865		
Adjusted R2		0.081	0.326		0.042	0.263

Note: In columns 1 and 4 the dependent variable is the value of exports and imports, respectively. In column 2 (5) the dependent variable turns one if firm f did not export (import) product k at time $t-1$ and exported (imported) product k at time t . In column 3 (6) the dependent variable turns one if firm f exported (imported) product k at time $t-1$ and did not export (import) product k at time t . All estimations include the Only Suspension and the Sanction and Suspension variables, and firm $\times$ product and time fixed effects. Standard errors clustered at the firm and product level are in parentheses. a, b, and c: statistically significant at 1%, 5%, and 10%, respectively.

Sanctions had no significant impact on jewelry imports.²⁷ Sanctions had a significant negative effect on import entry for coal, crude oil, revenue-generating goods, and steel. The effect was insignificant for products affected by Russia's export ban, while the coefficient for jewelry was positive and statistically significant, although this result is based on very few observations. Sanctions increased the probability of stopping imports for all affected products.²⁸

3.3. Robustness

This subsection tests the robustness of our estimates. First, we have assumed that all firms not included in the Yale-CELI and Leave-Russia lists did not voluntarily suspend activities in Russia. We tested the robustness of our results to removing these firms from the sample and keeping only the multinationals that are included in the Yale-CELI and Leave-Russia lists. The limitation of the new sample is that the number of observations is severely reduced, especially in the case of imports. Table A.8 in Appendix A reports the results. We find that Only Sanction has no effect on the value of exports. This unexpected result can be explained by the fact that most of the sanctioned products exported by firms that decided to stay in Russia were luxury goods. As explained above, the export ban on luxury goods was only imposed if a unit price threshold was exceeded, so sanctions were not binding for many products. The Only Suspension and Sanction and Suspension coefficients are negative and statistically significant. The point estimates of these two latter coefficients are very similar to those reported in the baseline analysis (Table 1).

Regarding imports, the Only Sanction coefficient is negative and statistically significant. The Only Suspension and the Sanction and Suspension coefficients are also negative and statistically significant. Both point estimates are smaller, in absolute terms, than those reported in the baseline analysis. Only Sanction, Only Suspension, and Sanction and Suspension have a negative effect on

²⁷ Our dataset only records two jewelry import operations, one before the invasion and another after the invasion. In both operations, the imported value was very small. Gold is excluded because no firm in our sample imported gold from Russia during the post-invasion period.

²⁸ The coefficient for jewelry could not be estimated.

export entry, but no effect on import entry. Finally, we find that Only Suspension and Sanction and Suspension increase the probability of stopping exporting to Russia after the invasion of Ukraine. Unexpectedly, Only Sanction reduces the probability of stopping importing from Russia. Only Suspension has no effect, and Sanction and Suspension has a significant positive effect.

Second, we investigate the robustness of our results to constructing a sample that classifies as suspension firms only those that included an ethical argument to justify their decision (i.e., the firms included in Table A.7 in Appendix A). As shown in Table A.9 in Appendix A, results are qualitatively similar to those obtained in the baseline analysis.

Third, the baseline estimation assumes that the decrease in trade in sanctioned products after the invasion of Ukraine is only explained by sanctions. Similarly, it assumes that the decrease in trade from firms that voluntarily suspended activities in Russia was fully explained by that decision. However, if the invasion of Ukraine coincided with a global decrease in demand for sanctioned products or with poor performance from firms that voluntarily decided to suspend activities in Russia, the three coefficients would also capture these effects. To rule out this possibility, we enlarge our sample with a set of control countries and estimate a triple-difference regression:

$$y_{fkd,t} = \exp[(\alpha(\text{OnlySuspension}_{fk} \times \text{Post}_{f,t} \times \text{Russia}_d) + \beta(\text{SanctionsAndSuspension}_{fk} \times \text{Post}_{fkt} \times \text{Russia}_d) + \delta(\text{OnlySanction}_{fk} \times \text{Post}_{kt} \times \text{Russia}_d) + \gamma_{fkt} + \gamma_{fkd})] * \epsilon_{fkd,t} \quad (4)$$

Now, the dependent variable, $y_{fkd,t}$, is the value of exports of product k from firm f to destination d at time t . The interaction terms include a new indicator variable, Russia_d , which takes the value of one if exports are destined for Russia. The new equation includes two new fixed effects. γ_{fkt} captures all the effects that affect the value of exports of a given product, by a given firm, at a particular time. γ_{fkd} captures all the time-invariant factors that affect exports of a particular product by a given firm in a given market. $\epsilon_{fkd,t}$ is the disturbance term. A similar interpretation applies to imports.

The α coefficient now captures a triple difference. The first compares the exports of unsanctioned product k to Russia from a firm that voluntarily decided to suspend its activities in Russia and the exports of unsanctioned product k' from a firm that did not. The second compares exports of the same firms and products to a control destination. The third compares the difference between the previous two comparisons before and after the invasion of Ukraine. Regarding the β coefficient, the first difference compares the exports of sanctioned product k to Russia from a firm that voluntarily decided to suspend its activities in Russia and the exports of unsanctioned product k' from a firm that did not voluntarily suspend activities. The second compares the value of exports for the same firms and products but to a control destination. The third compares the difference between the previous two comparisons before and after the invasion of Ukraine. Finally, regarding δ , the first difference compares the exports of a firm that did not voluntarily suspend activities of a sanctioned product and an unsanctioned product to Russia. The second compares the exports of the same firm and products to a control country. The third compares the difference between the previous two comparisons before and after the invasion of Ukraine. The same interpretation of the three coefficients applies to imports.

Note that the estimation of these coefficients is more demanding than that in the baseline estimation, since it requires a firm to export the same product(s) to more than one destination at two different points in time.

Since the very large number of zero-valued observations makes estimation computationally demanding, we collapse Spanish firms' trade with all non-Russian countries into a rest-of-the-world partner. Table A.10 in the appendix presents the results. Only Sanction, Only Suspension, and Sanction and Suspension have a large negative impact on the value of exports and imports after the invasion of Ukraine. Comparing the point estimates reported in columns 1 and 2 with those reported in the same columns of the baseline table (Table 1), we observe an increase in the absolute value for all coefficients. The remaining entry and exit coefficients are qualitatively similar to those reported in Table 1.

Fourth, we explore whether the Only Sanction coefficient underestimates the impact that sanctions would have had on firms that voluntarily suspended activities had this option not been available to firms. To address this concern, we estimate the impact of sanctions in an episode in which Spanish firms did not voluntarily suspend activities: the annexation of Crimea. In July 2014 the EU imposed restrictions on exports to Russia on dual-use goods and technologies intended for military use, prior authorization for the export of technologies related to oil exploration and production, and an export and import ban of items included in the EU common military list. In August 2014, Russia took retaliatory measures, banning the import of some EU food products. We built a sample including firms that exported to Russia before the annexation of Crimea and before the invasion of Ukraine: 45 out of 49 exporters that voluntarily suspended activities after the invasion of Ukraine also exported to Russia before the annexation of Crimea, and 1953 out of 2827 firms that did not voluntarily suspend activities before the invasion of Ukraine also exported to Russia before the annexation of Crimea. Firms that voluntarily suspended activities after the invasion of Ukraine were only affected by sanctions in the export of dual-use goods and technologies after the annexation of Crimea. To test whether the impact of these sanctions was similar for voluntary suspension and non-suspension firms, we estimate the following regression:

$$y_{fkt} = \exp[\beta_1(\text{DualUse}_k \times \text{Post}_t) + \beta_2(\text{DualUse}_k \times \text{Post}_t \times \text{Suspension}_f) + \beta_3(\text{DualUse}_k \times \text{Suspension}_f) + \beta_4(\text{Post}_t \times \text{Suspension}_f) + \gamma_k + \gamma_t + \gamma_f] * \epsilon_{k,t,f} \quad (5)$$

where y_{fkt} is Spanish firm f product k exports to Russia in year-quarter t . DualUse_k is an indicator variable that takes the value of one if product k was included in the list of dual-use goods and technologies. Post_t is an indicator variable that takes the value of one if the year quarter is 2014q3 or later. Suspension_f is an indicator variable that takes the value of one if firm f voluntarily suspended activities after the invasion of Ukraine.

Our key coefficients are β_1 and β_2 . The first captures the impact of sanctions on dual-use goods exports to Russia after the annexation of Crimea of firms that did not voluntarily suspend activities after the invasion of Ukraine. β_2 captures whether the

impact of sanctions on exports from firms that voluntarily suspended activities was significantly different from those that did not. The remaining double interactions, β_3 and β_4 , absorb the impact on exports generated by differences in the dual-use goods exported by suspension and non-suspension firms and in the overall export performance after the annexation of Crimea between suspension and non-suspension firms, respectively. Our sample covers the 2012q1–2016q4 period. We excluded from the sample the products that were not included in the dual-use list and which were affected by the EU arms embargo, or restrictions on oil refining goods, or Russia's retaliation.

Table A.11 in Appendix A presents the estimates. Sanctions on dual-use goods had an insignificant effect on exports from firms that did not suspend activities after the invasion of Ukraine. The effect of sanctions on dual-use goods exports was also insignificant for firms that voluntarily suspended activities after the invasion of Ukraine.²⁹ Therefore, we conclude that the impact of sanctions was similar on both suspension and non-suspension firms. We find no differences in the impact of sanctions on export entry and exit between non-suspension and suspension firms. These results suggest that the Only Sanction coefficient reported in the baseline analysis provides a good estimate of the impact of sanctions on firms that voluntarily suspended activities had this option not been available to firms.

A concern with the previous analysis is that the sanctions imposed by the EU against Russia after the annexation of Crimea were less stringent and affected fewer products than those imposed after the invasion of Ukraine, compromising the external validity of the results. As an additional robustness analysis, we estimate the effect of sanctions on the sample of firms that did not voluntarily suspend activities in Russia after the invasion of Ukraine. Table A.12 in Appendix A reports the results. The estimates of the $\text{Sanction}_{it} \times \text{Post}_{it}$ coefficient are qualitatively and quantitatively similar to those reported in the baseline analysis (Table 1).

Fifth, there is a risk that the export (import) flows of the control group (the firms that did not voluntarily suspend activities in Russia after the invasion of Ukraine and exported unsanctioned products) could be positively affected by the treated groups. In the case of exports, control firms could increase their revenues by serving the Russian customers that had been left unattended by the firms that voluntarily decided to leave Russia after the invasion of Ukraine. In the case of imports, the control group could increase their purchases in Russia by tapping suppliers that had previously served the firms that voluntarily decided to suspend activities in Russia.

If there were spillovers from the treated to the control group, the Stable Unit Treatment Value Assumption (SUTVA) of the difference-in-differences causal inference model would be violated, and the difference-in-differences estimators would overestimate the negative impact of voluntary suspension on trade flows.

To address this concern, we draw on the literature studying spatial spillovers (Butts, 2024). In a spatial setting, difference-in-differences estimators may be biased because control units can be affected by treated units that are geographically close. However, this literature shows that if the control group is far enough from the treated group, it will not be affected by spatial spillovers. Therefore, the faraway control group provides an unbiased counterfactual for the treated group.

Following an analogous argument, we argue that there is a spillover risk if the product exported by a control firm is the same as the product exported by a treated firm. In contrast, if the treated and control firms export different products, there is no spillover risk. We define a treated firm and a control firm exporting the same product if they have the same 8-digit Combined Nomenclature classification code. To mitigate concern about SUTVA violation, we remove from the control group the observations of firms that did not voluntarily suspend activities in Russia and traded in the same unsanctioned products as those traded by firms that voluntarily suspended activities in Russia.

We estimate the baseline regression equation (Eq. (2)) with the new control group.³⁰ The estimates are reported in Table A.13 in Appendix A. The coefficients are very similar to those reported in the baseline analysis (Table 1). That is, this exercise suggests that our estimates are not affected by potential SUTVA violations.

3.4. The effect of voluntary suspension of activities on trade, welfare, and the design of sanctions

In this subsection, we analyze the impact of firms' voluntary decisions to suspend activities in Russia on the set of traded products, trade values, welfare, and the design of sanctions.

First, a central contribution of the paper is to show that firms' voluntary suspensions of activities in Russia broaden the set of products affected by the conflict and generate a substantially larger contraction in trade than sanctions alone would have implied. Importantly, this amplification occurs regardless of whether firms' suspension decisions were driven by reputational, ethical, or economic considerations.

To begin with, we quantify the amplification effect in terms of the number of products affected by the conflict. Table 3 shows that sanctions covered 896 exported products. Firms that voluntarily suspended activities in Russia discontinued exports of 855 products, of which 221 were sanctioned and 634 were not. Thus, voluntary suspensions expanded the set of adversely affected products by 71% relative to sanctions alone (634/896). Moreover, these firms accounted for 65% of total pre-conflict exports in the unsanctioned products they discontinued.

²⁹ Our estimates are in line with Kohl et al. (2024), who also found that sanctions on dual-use goods had no significant effect on Dutch exports to Russia after the annexation of Crimea.

³⁰ We kept natural gas in the control group, because the increase in the value of imports in this product after the invasion of Ukraine was due to an increase in prices generated by the conflict rather than by non-suspending firms tapping suppliers that had previously served firms that voluntarily decided to suspend activities in Russia.

Table 3
Amplification effect on products.

Number of products	Exports	Imports
Sanctioned	896	577
Discontinued by suspension firms	855	171
Of which:		
Sanctioned	221	102
Unsanctioned	634	69
% of suspension firms in total trade of discontinued unsanctioned products	65	27

Table 4

Amplification effect on trade values (average quarterly; million euros).

Source: We use Eq. (2) as estimated in columns 1 and 2 of Table 1 to predict the value of quarterly exports (imports) in three different scenarios: (1) No Sanction and No Suspension [benchmark]; (2) Only Sanction; and (3) Sanction and Suspension.

A. Exports			
Scenario	Post-invasion	Difference to No Sanction and No Suspension	% of No sanction and No Suspension
(1) No Sanction and No Suspension	335		
(2) Only Sanction	301	34	10
(3) Sanction and Suspension	236	99	30
B. Imports			
Scenario	Post-invasion	Difference to No Sanction and No Suspension	% of No Sanction and No Suspension
(1) No Sanction and No Suspension	1993		
(2) Only Sanction	1325	668	34
(3) Sanction and Suspension	828	1165	58

The amplification effect is smaller for imports. Table 3 indicates that sanctions covered 577 imported products. Firms that voluntarily suspended activities in Russia discontinued imports of 171 products, of which 102 were sanctioned and 69 were not. Hence, voluntary suspensions increased the set of adversely affected imported products by 12% relative to sanctions alone (69/577). These firms accounted for 27% of total imports in the unsanctioned products that they stopped importing.

Next, we analyze the amplification effect in the value of trade. We use the coefficients reported in columns 1 and 2 of Table 1, and the set of unreported fixed effects, to quantify the contribution of sanctions and voluntary suspension of activities to the decrease in trade with Russia after the invasion of Ukraine. These calculations are presented in Table 4. We predict the average value of quarterly exports in the post-invasion period if the EU had not imposed product-specific sanctions and firms had not voluntarily suspended activities in Russia (Scenario (1): No Sanction and No Suspension): 335 million euros. It is worth noting that this figure already captures the effect that non-trade sanctions (e.g., financial sanctions), the deterioration of the economic environment in Russia, and the higher risk of operating with Russia had on Spanish exports to Russia after the invasion of Ukraine. Then, we predict the quarterly exports in the post-invasion period if the EU had imposed trade sanctions but firms did not voluntarily suspend activities. For this calculation, the Only Suspension coefficient turns zero and the Sanction and Suspension coefficient takes the value of the Only Sanction coefficient estimated in column 1 of Table 1. The predicted value of exports in the Only Sanction scenario decreases to 301 million euros. We calculate the difference between the prediction for the No Sanction and No Suspension scenario and the one for the Only Sanction scenario: 335 million euros-301 million euros=34 million euros. Dividing the latter figure by the prediction for the No Sanction and No Suspension scenario, we see that sanctions reduced the predicted post-invasion No Sanction and No Suspension exports by 10% (34/335; column 4). Next, we predict the value of exports when sanctions are imposed and firms voluntarily suspend activities in Russia. In this new scenario, denoted Sanction and Suspension, the value of exports decreases to 236 million euros. Applying the procedure described above, we find that sanctions and suspension reduced benchmark exports by 30% (99/335). If we subtract the impact of sanctions from this latter percentage, we find that the voluntary suspension of activities contributed by 20 percentage points to the reduction of exports. That is, the combination of trade sanctions and the voluntary suspension of activities generated a negative effect on exports that was almost three times as large as that achieved by trade sanctions alone.

Panel B of Table 4 shows that if the EU had not imposed any product-specific sanctions and firms had not voluntarily suspended activities in Russia after the invasion (No Sanction and No Suspension scenario), the predicted value of quarterly imports would have been 1993 million euros. In the Only Sanction scenario, quarterly imports would have decreased to 1325 million euros. Therefore, sanctions would have reduced the amount of imports by 668 million euros, which represents a 34% decrease relative to the benchmark import value (668/1993). If sanctions had been imposed and firms had voluntarily suspended activities, imports would have decreased to 828 million euros (Sanction and Suspension scenario). Therefore, sanctions and voluntary suspension of activities would have reduced the amount of imports by 1165 million euros, which represents a 58% decrease relative to the benchmark scenario (1165/1993). If we subtract the impact of sanctions from this latter percentage, we find that the voluntary suspension of activities contributed 24 percentage points to the reduction in imports. That is, the combination of trade sanctions and the voluntary suspension of activities generated a negative effect on imports which was 74% larger than that achieved by trade sanctions alone.

Second, analyses of sanctions that abstract from firms' voluntary suspension of activities in the targeted country are likely to mismeasure the welfare costs of sanctions. The reason is that, as shown above, these exit decisions amplify the welfare losses generated by a trade conflict.

Following [Itskhoki and Ribakova \(2024\)](#), we use the framework developed by [Arkolakis et al. \(2012\)](#) to measure the welfare change in country i induced by trade sanctions under balanced trade:

$$\Delta \ln W_i = -\frac{1}{\varepsilon} \Delta \ln \lambda_i \quad (6)$$

where ε is the elasticity of substitution between imported and domestic goods, and λ_i denotes country i 's expenditure share on domestically produced goods.

Using a first-order approximation, Eq. (6) can be written as

$$\frac{\Delta W_i}{W_i} = -\frac{1}{\varepsilon} \frac{\Delta \lambda_i}{\lambda_i} \quad (7)$$

We aim to quantify how the welfare losses from sanctions are amplified once we account for firms' voluntary suspension of activities in Russia. To this end, we adapt Eq. (7) as follows:

$$\frac{\Delta W_i^{VS}/W_i}{\Delta W_i^S/W_i} = \frac{\Delta \lambda_i^{VS}/\lambda_i}{\Delta \lambda_i^S/\lambda_i} = \frac{\Delta M_i^{VS} C_i/Y_i}{\Delta M_i^S C_i/Y_i} = \frac{\Delta M_i^{VS}}{\Delta M_i^S} \quad (8)$$

where ΔW_i^{VS} denotes the welfare loss in country i in the scenario with both sanctions and firms' voluntary suspensions, while ΔW_i^S denotes the welfare loss when only sanctions are imposed. Likewise, ΔM_i^{VS} is the reduction in country i 's imports induced by the combination of sanctions and voluntary suspensions, whereas ΔM_i^S is the reduction attributable to sanctions alone. The parameter C_i converts the decline in imports from the sanctioned (or sanctioning) country into an effective reduction in domestic absorption, capturing the extent to which targeted imports can be substituted by alternative foreign suppliers or by domestic production. Finally, Y_i denotes total expenditure in country i .

Under the assumption that the conversion parameter is identical across the two scenarios, the welfare magnification effect of voluntary suspensions mirrors the magnification effect in trade values reported in [Table 4](#). For Spain, the welfare-loss magnification effect is given by the ratio between the reduction in imports from Russia under the Sanction and Suspension scenario and the reduction under the Only Sanction scenario: $1165/668 = 1.74$. Hence, welfare losses are 74% larger than under sanctions alone. For Russia, the corresponding ratio is about 2.9, meaning that welfare losses are roughly 190% larger than under sanctions alone. These magnitudes highlight that abstracting from firms' voluntary suspension of activities can substantially understate the welfare consequences of trade conflicts.

Finally, firms' voluntary suspension of activities in the targeted country also has implications for the design of trade sanctions. Relying on the theory of trade sanctions, [Becko \(2024\)](#) shows that, to maximize economic harm to the target while minimizing costs to the sanctioning country, sanctions should be levied on goods for which the target's supply or demand is relatively inelastic. The optimal size of sanctions depends on two components: (i) the tariff that would maximize the sanctioning country's welfare (as in the optimal-tariff literature) and (ii) the sanctioning country's willingness to incur domestic losses in exchange for raising the target's economic cost. [Becko \(2024\)](#) further argues that this willingness may depend on a domestic loss threshold: the sanctioning country is more willing to self-harm when it has not yet reached the threshold, and less willing once it has. Because firms' voluntary suspensions magnify the economic costs of sanctions, they move the domestic economic losses closer to this threshold, potentially implying smaller optimal sanctions than in a setting without a threshold.

We also study the design of sanctions through the lens of the objectives the EU sought to achieve with its trade measures against Russia. As discussed in the introduction, on the export side, a central goal was to curb Russia's access to technologies and inputs that could strengthen its military and industrial capabilities. On the import side, the objective was to reduce Russia's foreign-currency revenues, thereby limiting the available resources to finance the war effort. Our analysis shows that firms' voluntary suspensions of activities in Russia broaden the scope of disruption well beyond the products explicitly targeted by EU measures, increasing both the number and the range of goods affected by the trade conflict. As a result, voluntary suspensions may dilute the logic of "targeted" or "smart" sanctions, which are intended to concentrate economic pressure while limiting collateral harm to the general population.

4. Did firms reroute trade with Russia via neighboring countries?

This section examines the phenomenon of trade rerouting, that is, whether firms used third countries close to Russia to circumvent sanctions or continued trading with Russia despite announcing a voluntary suspension of activities. Using product-level data, [Chupilkin et al. \(2023\)](#) observed a simultaneous drop in exports of sanctioned products from the EU to Russia and an increase in exports of sanctioned goods to Armenia, Kazakhstan, and the Kyrgyz Republic (CCA3). These three countries are members of the Eurasian Customs Union alongside Belarus and Russia. Therefore, trade flows involving these economies could potentially be redirected to or from Russia with minimal checks.

We adopt a triple difference strategy to investigate whether the increase in trade flows of Spanish firms in sanctioned products, compared to unsanctioned ones, was larger with CCA3 than with a set of control countries after the invasion of Ukraine. We also explore whether the increase in trade flows of firms that voluntarily suspended activities in Russia increased more with CCA3 than with a set of control countries after the invasion of Ukraine, compared to firms that did not voluntarily suspend activities in Russia.

Table 5
Rerouting trade with Russia.

Panel A (CCA3: Armenia, Kazakhstan and the Kyrgyz Republic)						
	Value		Entry		Exit	
	(1) Exports	(2) Imports	(3) Exports	(4) Imports	(5) Exports	(6) Imports
Only $\text{Sanction}_k \times \text{Post}_t^i \times \text{CCA3}_d$	0.369 (0.483)	-2.491 ^a (0.941)	-0.010 ^a (0.004)	-0.036 ^a (0.004)	-0.028 (0.055)	-0.207 ^a (0.000)
Only $\text{Suspension}_f \times \text{Post}_{f,t} \times \text{CCA3}_d$	1.521 ^a (0.165)	-0.509 ^a (0.011)	0.036 ^a (0.007)	-0.017 (0.011)	-0.166 ^a (0.036)	0.304 ^c (0.163)
Sanc and $\text{Susp}_{f,k} \times \text{Post}_{f,k,t} \times \text{CCA3}_d$	0.697 (0.471)	-0.596 ^a (0.057)	0.004 (0.011)	-0.027 ^b (0.013)	-0.046 (0.146)	0.362 ^a (0.041)
Observations	69 616	17 68	1 220 852	688 610	16 190	280
Pseudo-R2	0.971	0.976				
Adjusted R2			0.118	0.125	0.343	0.125
Panel B (CCA3+Azerbaijan+Georgia+Turkey)						
	Value		Entry		Exit	
	(1) Exports	(2) Imports	(3) Exports	(4) Imports	(5) Exports	(6) Imports
Only $\text{Sanction}_k \times \text{Post}_t^i \times \text{CCA3plus3}_d$	0.354 (0.414)	-0.417 ^a (0.002)	-0.010 ^b (0.004)	-0.036 ^a (0.004)	-0.081 ^c (0.049)	0.024 (0.197)
Only $\text{Suspension}_f \times \text{Post}_{f,t} \times \text{CCA3plus3}_d$	1.475 ^a (0.155)	-0.437 ^a (0.005)	0.037 ^a (0.007)	-0.017 (0.011)	-0.170 ^a (0.037)	0.204 (0.227)
Sanc and $\text{Susp}_{f,k} \times \text{Post}_{f,k,t} \times \text{CCA3plus3}_d$	-0.854 (0.756)	-0.453 ^a (0.004)	0.005 (0.011)	-0.027 ^b (0.013)	-0.073 (0.151)	0.370 ^a (0.071)
Observations	78 076	1866	1 220 852	688 610	18 438	304
Pseudo-R2	0.971	0.967				
Adjusted R2			0.117	0.125	0.343	0.063

Note: In columns 1 and 2 the dependent variable is the value of exports and imports, respectively. In column 3 (4) the dependent variable turns one if firm f did not export (import) product k at time $t-1$ and exported (imported) product k at time t . In column 5 (6) the dependent variable turns one if firm f exported (imported) product k at time $t-1$ and did not export (import) product k at time t . All estimations include firm $\times$ product $\times$ time fixed effects and firm $\times$ product $\times$ country fixed effects. Standard errors clustered at the firm and product level are in parentheses. a, b, and c: statistically significant at 1%, 5%, and 10%, respectively.

We estimate Eq. (4), substituting Spanish firms' trade flows with Russia by those with CCA3 and a set of control countries, and substituting the indicator variable Russia_d by the indicator variable CCA3_d , which turns one if Spanish firms are trading with CCA3. To minimize the risk that trade rerouting also captures firms' efforts to allocate exports no longer dedicated to Russia in other markets (i.e., trade diversion), our control group is made up of countries that, like CCA3, did not impose sanctions on Russia after the invasion of Ukraine.³¹ Those countries were not affected by a reduction in exports to Russia and, therefore, did not need to divert exports to other markets. This made them a more demanding comparison group. Therefore, it was easier for Spanish firms to divert their exports to this set of countries than to countries that imposed sanctions on Russia. This is because the competitive pressure in the latter had also increased due to their need to divert their former exports to Russia to their domestic and foreign markets. We argue that if Spanish trade flows with CCA3 increased more than with other potential "trade diversion" countries, this result would be consistent with trade rerouting.

Panel A of Table 5 presents the results. It is important to note that the sample only includes Spanish firms that traded with Russia in the period 2019–2023. First, for Spanish firms that did not voluntarily suspend activities in Russia, the Only Sanction coefficient in column 1 is positive but statistically insignificant. Thus, these firms did not increase their exports of sanctioned products to CCA3 after the invasion of Ukraine, compared to unsanctioned products, and relative to the exports to the remaining countries that did not impose sanctions against Russia. This result is reinforced by the negative and statistically significant Only Sanction coefficients in column 3 (entry), and the statistically insignificant Only Sanction coefficient in column 5 (exit). We find no evidence that Spanish exporters used CCA3 to circumvent EU sanctions against Russia.

Second, for Spanish firms that voluntarily suspended activities in Russia and did not trade sanctioned products, the Only Suspension coefficient is positive and statistically significant. This finding is consistent with trade rerouting. This result is reinforced by an increase in export entry into CCA3 (column 3) and a decrease in export exit (column 5). The export value to CCA3 of unsanctioned products from firms that voluntarily suspended activities in Russia was 4.6 times as large as that of the control countries after the invasion of Ukraine [$\exp(1.521)$], equivalent to an increase of about 358%. However, in absolute terms, the increase in the export value to CCA3 represents a very small percentage of the drop in exports to Russia: 5%.³²

³¹ Countries that did not vote "Yes" in the Resolution ES-11/1 of the General Assembly of the United Nations "Aggression against Ukraine" (2 March 2022).

Third, for Spanish firms that voluntarily suspended their activities in Russia and traded sanctioned products, the Sanction and Suspension coefficients for value, entry, and exit are not statistically different from zero. We find no evidence that these Spanish exporters used CCA3 to circumvent EU sanctions against Russia.

Next, we analyze the import activity of Spanish firms in CCA3. The three coefficients for the value of imports are negative and statistically significant. All Spanish firms imported less from CCA3 compared to the rest of the countries that did not impose sanctions against Russia after the invasion of Ukraine. For firms that did not voluntarily suspend their activities in Russia, the value of imports of sanctioned products from CCA3 fell by 92% relative to (i) their imports of unsanctioned products and (ii) imports from countries that did not impose sanctions against Russia [$\exp(-2.491)-1$]. For firms that voluntarily suspended their activities with Russia, the value of imports of unsanctioned products from CCA3 was 40% lower than for firms that did not voluntarily suspend, again relative to imports from countries that did not impose sanctions against Russia [$\exp(-0.509)-1$]. Finally, for firms that voluntarily suspended their activities with Russia, the value of imports of sanctioned products from CCA3 was 45% lower than the value of imports of unsanctioned products by firms that did not voluntarily suspend their activities with Russia, and relative to imports from countries that did not impose sanctions against Russia [$\exp(-0.596)-1$].

For Spanish firms that voluntarily suspended their activities in Russia, the coefficients for import entry are negative, although only the Sanction and Suspension coefficient is statistically significant, and those for import exit are positive. These results suggest that these firms did not reroute trade to CCA3. For Spanish firms that did not voluntarily suspend activities in Russia, the Only Sanction coefficient for entry is negative (supporting no rerouting), although the one for exit is negative as well (supporting rerouting).

Overall, we find no clear evidence of rerouting by firms trading sanctioned products, especially in export values. The import results are more mixed but do not point to economically meaningful rerouting. By contrast, we find some evidence of export rerouting among firms that voluntarily suspended activities in Russia and traded unsanctioned products. Quantitatively, however, this rerouting represents only a very small fraction of the exports that these firms lost in Russia after the invasion of Ukraine.

As a robustness check, Panel B of Table 5 expands the number of potential trade intermediaries to include Azerbaijan and Georgia, two former Soviet republics outside the EU that share a land border with Russia, and Turkey, a neighboring country that did not impose sanctions against Russia and has preferential access to the EU market. For example, Borin et al. (2023) found that Turkey was the most important intermediary for EU exports of sanctioned products to Russia in 2022. The results are qualitatively and quantitatively very similar: there is no rerouting among firms trading sanctioned products, and there is some rerouting in the export activity of firms that voluntarily suspended activities in Russia and traded unsanctioned products. We find no evidence of import rerouting by Spanish firms.

5. Conclusion

In the last two decades, there has been an increase in the use of trade sanctions to punish trading partners' hostile actions. In the same period, due to the expansion of social media, multinational companies have become more exposed to the rapid and global spread of any criticism of their actions. The Russian invasion of Ukraine in February 2022 is an example in which these trends coincide. First, the invasion of Ukraine led many countries to impose trade sanctions against Russia. Second, many multinational firms, presumably due to ethical concerns or fear that maintaining their activities in Russia could affect their reputation in the EU, the United States, and other developed countries, voluntarily suspended their activities in Russia after the invasion of Ukraine. The goal of this paper has been to quantify the contribution of these actions to reducing trade with Russia.

Using a representative sample of Spanish firms, we find that sanctions had a strong negative effect on trade with Russia. As expected, we also find that firms that voluntarily suspended activities in Russia reduced both their exports to and imports from Russia after the invasion of Ukraine. We find that the contribution of voluntary suspensions to the reduction in exports to Russia was twice as large as that of sanctions. For imports, the contribution of voluntary suspension of activities was around 70% of the contribution of sanctions. These findings indicate that firms' voluntary suspension of activities can act as a powerful complement to sanctions in reducing trade with a target country. By raising the economic costs borne by the sanctioned country, voluntary suspensions may increase the likelihood that the target reverses the actions that triggered the dispute. In addition, the prospect of heightened economic losses may deter other countries from undertaking actions that could precipitate similar conflicts. However, voluntary suspensions can also substantially amplify the economic costs borne by the sanctioning country.

The amplification of the adverse effects of a trade conflict driven by firms' voluntary suspension of activities in the target country has important implications both for welfare assessments of trade conflicts and for the optimal design of sanctions policy.

Declaration of competing interest

None

Appendices A and B

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.jinteco.2026.104284>.

³² Spanish firms that voluntarily suspended activities in Russia exported unsanctioned goods for a value of 1442 million euros over the period 2019–2021 and 7.2 million euros over the period 2022–2023. These firms exported unsanctioned products to CCA3 for a value of 47.6 million euros during the period 2019–2021 and 121.3 million euros during the period 2022–2023.

Data availability

Replication package paper reducing trade with Russia (Original data) (Mendeley Data)

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