Dodging Trade Sanctions? Evidence from Military Goods

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The Russian invasion of Ukraine in February 2022 marked the beginning of the largest military conflict in Europe since World War II. In response, Western allies, led by the United States and the European Union (EU), imposed extensive economic sanctions, including broad export bans. A central objective was to deny Russia access to critical technologies vital for producing and maintaining military equipment such as semiconductors, ball bearings, and computers.

However, the effectiveness of sanctions hinges on enforcement, which has proven to be challenging. Although direct exports of sanctioned products from Western countries to Russia have largely stopped, reports from major news outlets reveal that Russian missiles still contain Western technologies, including chips from US companies such as AMD, Intel, and Texas Instruments, highlighting the circumvention of sanctions.[1]

This paper systematically investigates whether sanctions on military goods have been successfully evaded using granular trade data from UN Comtrade. Employing a triple difference-in-differences (DiD) framework, we compare exports from Russia-friendly countries to those from neutral countries before and after the war, both to Russia and to other destinations. We also examine whether exports from allies to Russia-friendly countries show a similar increase. Our findings provide strong evidence of sanctions evasion; the relative likelihood of Russia-friendly countries exporting military goods to Russia increases by 20 percentage points (pp) compared to neutral countries. Our results highlight the need for stricter measures, such as secondary sanctions, to close loopholes through third countries.

There are two empirical challenges to identifying sanction evasion. First, it is an illegal activity and, therefore, inherently difficult to detect. Anecdotal evidence suggests that logistics companies in Russia-friendly countries facilitated the flow of Western goods to Russia after the war began.[2] If sanctions are evaded, we expect increases in exports from Western allies to Russia-friendly countries and from these countries to Russia. Our analysis examines both flows to detect such patterns.

The second challenge is distinguishing sanction evasion from trade diversion, a core concept in trade theory. Trade diversion occurs when trade shifts toward countries with unchanged trade costs as trade with higher-cost partners declines. As a result, increased trade between third countries and Russia could reflect trade diversion rather than deliberate sanction evasion. To separate the two, we compare exports from Russia-friendly and neutral countries, both of which face unchanged trade costs with Russia. A disproportionate rise in exports from Russia-friendly countries to Russia, combined with higher exports from Western allies to Russia-friendly countries, indicates sanction evasion.

Our results show that, after the start of the war, Russia-friendly countries were 20 pp more likely to export military goods to Russia compared to neutral countries. Western sanctioning countries were 4 pp more likely to export to Russia-friendly countries than to other neutral destinations. We also find suggestive evidence that sanction evasion for military goods was more prevalent in 2022 than in 2023, suggesting that policy measures to curb evasion may have been effective.

To provide more direct evidence, we analyze a subsample of countries that report re-exports in UN Comtrade. Re-exports, defined as goods imported and then directly exported without substantial transformation, serve as a direct measure of sanction evasion if their volume increases.[3] Due to data limitations, this analysis focuses only on three Russia-friendly countries: Georgia, Moldova, and Uzbekistan. For these countries, the probability of re-exporting military goods to Russia after the start of the war is 8 pp higher than for neutral countries, further supporting our findings of sanction evasion for military goods.

We contribute to two strands of the literature: the

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[1] For example, see the New York Times: https://www.nytimes.com/2024/07/25/technology/russia-sanctions-chips.html.

[2] For example, see Reuters: https://www.reuters.com/investigates/special-report/ukraine-crisis-russia-tech-middlemen/.

[3] This approach follows Fisman, Moustakerski and Wei (2008).

circumvention of trade barriers (e.g., Fisman and Wei, 2004; Fisman, Moustakerski and Wei, 2008) and sanctions specifically (e.g., Crozet et al., 2021; Chupilkin, Javorcik and Plekhanov, 2023; Tyazhelnikov and Romalis, 2024), as well as the broader sanctions literature (e.g., Morgan, Syropoulos and Yotov, 2023) and its application to Russia (e.g., Crozet and Hinz, 2020; Hinz and Monastyrenko, 2022).

To our knowledge, this paper is the first to focus on military goods, a critical component of war, providing insights with direct policy relevance. Methodologically, our key contribution lies in integrating multiple elements to identify sanction evasion while accounting for trade diversion. We address trade diversion by including extensive fixed effects that capture multilateral resistance, as is standard in the gravity framework (Tyazhelnikov and Romalis, 2024). We identify Russia-aligned countries as key evasion channels and analyze trade flows along the full evasion path: from sanctioning countries to entrepôts and from entrepôts to Russia (Chupilkin, Javorcik and Plekhanov, 2023; Tyazhelnikov and Romalis, 2024). Finally, we use re-exports as a direct measure of evasion to reinforce our findings (Fisman, Moustakerski and Wei, 2008).

The paper is structured as follows: Section I covers identification, Section II describes the data, Section III presents results, and Section IV concludes.

I. Sanction Evasion or Trade Diversion?

Exports from third countries to Russia surged dramatically after the war began. For example, Astrov et al. (2024) document that seven active or former members of the Commonwealth of Independent States increased their export volumes to Russia by over 400% in 2022 compared to 2021. At least qualitatively, however, such patterns may arise even without sanction evasion, as a fully *innocent* general equilibrium response to sanctions diverts trade to other partners: Western producers, losing access to one market, reallocate exports to other destinations, while Russia turns to new suppliers, increasing third countries' exports to Russia. In technical terms, sanctions increase Western outward and Russian inward multilateral resistance, shifting Western export and Russian import shares toward alternative trading partners.

Key to identifying sanction evasion is therefore to assess whether trade changes were *stronger* than expected from endogenous trade diversion. To address this, we estimate two triple DiD specifications. First, to detect a *suspicious* export increase from Russia-friendly countries to Russia, we compare exports (i) before versus after sanctions, (ii) from Russia-friendly versus neutral countries, and (iii) to Russia versus other destinations:

$$\mathbf{1}(X_{ijkt} > 0) = \beta_1 \cdot \text{after}_t \cdot \text{friends}_i \cdot \text{RUS}_j + \mu_{ijk} + \mu_{ikt} + \mu_{jkt} + \epsilon_{ijkt}, \tag{1}$$

where i, j, k, and t denote exporter, importer, product, and year, respectively. The left-hand side variable $\mathbf{1}(X_{ijkt} > 0)$ is an indicator for whether any sales occur, focusing on the product-level extensive margin of trade.[4] μ_{ijk}, μ_{ikt}, and μ_{jkt} are country pair–product, exporter–product–year, and importer–product–year fixed effects that capture a wide range of observable and unobservable trade determinants (e.g., economic size, geographic and political proximity) and, importantly, product-level, time-varying in- and outward multilateral resistance terms.

A positive and significant estimate of β_1 indicates that the probability of Russia-friendly countries exporting to Russia exceeded what would be expected from mere equilibrium adjustments to the sanctions, pointing toward sanction evasion.

However, while this finding points toward sanction evasion, it is insufficient on its own; conclusive evidence requires a mirrored, suspicious increase in flows from Western allies to Russia-friendly countries. To test this, we estimate a second DiD model, comparing exports (i) before versus after sanctions, (ii) from Western allies versus neutral countries, and (iii) to Russia-friendly countries versus other destinations.

$$\mathbf{1}(X_{ijkt} > 0) = \beta_2 \cdot \text{after}_t \cdot \text{allies}_i \cdot \text{friends}_j + \mu_{ijk} + \mu_{ikt} + \mu_{jkt} + \epsilon_{ijkt}. \tag{2}$$

As in (1), a positive and significant β_2 points to a response beyond what trade diversion alone would predict, with allies more likely to export to Russia-friendly countries. If both (1) and (2) yield positive estimates, this would provide strong evidence that sanctioned products are flowing conspicuously from allies to friends and from friends to Russia—clear signs of illegal sanction evasion. To further validate these findings, we re-estimate specification (1) using re-exports, which capture sanction evasion more directly than gross exports.

[4] This choice is motivated by the high prevalence of zero trade flows at the finely disaggregated level that we use in the analysis.

II. Data

We use publicly available annual trade data from UN Comtrade for 2021–2023.[5] The year 2021 serves as the pre-war period, while 2022 and 2023 represent the war (and sanction) years. Our sample includes 122 countries that report exports to all their destinations for all three years, grouped into allies, Russian-friendly, and neutral countries.[6] Only 19 neutral or Russian-friendly countries report re-exports, with Russian-friendly data available only for Georgia, Moldova, and Uzbekistan. All 6-digit products were converted to the 2017 HS-nomenclature.

Military goods are defined using the Common High-Priority (CHP) list circulated by the allies in fall 2023.[7] The list includes dual-use goods and advanced technology items that are prohibited from export to Russia, directly or indirectly, and are used in Russian military systems found on the battlefield in Ukraine. The 6-digit product codes were converted to the HS2017 nomenclature, yielding 44 products referred to as military goods.[8]

III. Results

Table 1 presents the main results of our analysis. Panel (a) reports how the likelihood of exporting product k from country i to destination j in year t changes after the onset of the war, based on the triple DiD described in Equation (1). Column (1) shows that, after the start of the war, the likelihood of Russia-friendly countries exporting military goods to Russia relative to other destinations is 19.8 pp higher than for neutral countries, compared to 12.3 pp for non-military goods (column (4)). The larger increase for military goods reflects their strategic importance and the stronger incentives for evasion due to wartime demand and sanctions. The positive effect for non-military goods likely arises because many are also sanctioned, and even non-sanctioned items might be rerouted as Western firms reduce direct exports to Russia, potentially to avoid reputational risks.

The remaining columns explore heterogeneous effects between 2022 and 2023, motivated by policymakers' intensified efforts in 2023 to close loopholes and curb sanction evasion. Columns (2) and (5) focus on 2022, while columns (3) and (6) focus on 2023. For military goods, we find suggestive evidence that Russia-friendly countries were more likely to export to Russia relative to other destinations in 2022 than in 2023, compared to neutral countries. This pattern is not observed for non-military goods, indicating that policy efforts may have been more effective for military goods.

Panel (b) presents the results from estimating Equation (2), showing that Western allies are 4 pp more likely to export to Russia-friendly countries relative to neutral destinations since the start of the war, with smaller increases for non-military goods.[9] Combined with the earlier finding of increased exports from Russia-friendly countries to Russia, this provides strong evidence of sanction evasion for military goods, as both links in the evasion pathway—exports from allies to Russia-friendly countries and from Russia-friendly countries to Russia—show significant increases.

Lastly, Panel (c) presents the results from estimating Equation (1) using re-exports instead of gross exports. Since the beginning of the war, Russia-friendly countries were 7.6 pp more likely to re-export military goods to Russia compared to other destinations, with smaller increases for non-military goods. As re-exports provide a more direct and precise measure of sanction evasion than gross exports, this evidence adds further support to the hypothesis that we are observing sanction evasion. However, these results should be interpreted with caution, as the analysis relies on data from only three relatively small Russia-friendly countries, limiting their generalizability to all Russia-friendly countries.

IV. Conclusion

In response to Russia's full-scale invasion of Ukraine, Western allies banned exports of military goods to Russia. Yet, concerns persist that these goods reach Russia indirectly through exports to Russia-friendly countries that re-export them. Using a triple difference-in-differences framework to account for trade diversion, we find strong evidence of

[5] Data available at https://comtradeplus.un.org/.

[6] Allies include the G7 countries, EU member states, Iceland, Norway, Switzerland, Australia, New Zealand, and South Korea. Russian-friendly countries include EAEU members Armenia, Kazakhstan, and Kyrgyzstan (excluding Belarus due to missing data), as well as Azerbaijan, China, Georgia, Moldova, Serbia, Turkey, and Uzbekistan. Neutral countries consist of 38 African, 20 American, 20 Asian, 6 European, and 2 Oceanian countries.

[7] The list is available at https://finance.ec.europa.eu/system/files/2023-09/list-common-high-priority-items_en.pdf. We used the October 2023 version.

[8] See the Supplementary Material for a list of these goods.

[9] A potential explanation for the smaller magnitude of the coefficient of interest compared to panel (a) may be that Western countries already exported more of the military products to Russia-friendly countries and hence additional adjustment happened on the intensive margin of trade.

Table 1—: Results: Sanction Evasion

	Military Goods			Non-Military Goods		
	(1)	(2)	(3)	(4)	(5)	(6)
(a) Friends exporting to Russia:						
after · friends · RUS	0.198***	0.219***	0.178***	0.123***	0.116***	0.131***
	(0.051)	(0.053)	(0.056)	(0.031)	(0.029)	(0.035)
Obs. (in Mio.)	0.83	0.55	0.55	73.66	49.11	49.11
Avg. $\mathbf{1}(X > 0)$	0.123	0.121	0.123	0.075	0.073	0.075
(b) Allies exporting to Friends:						
after · allies · friends	0.045***	0.037***	0.052***	0.024***	0.018***	0.030***
	(0.006)	(0.006)	(0.007)	(0.002)	(0.002)	(0.003)
Obs. (in Mio.)	1.28	0.85	0.85	124.86	83.24	83.24
Avg. $\mathbf{1}(X > 0)$	0.179	0.177	0.178	0.086	0.085	0.085
(c) Friends re-exporting to Russia						
after · friends · RUS	0.076**	0.135*	0.017	0.035***	0.036**	0.033*
	(0.014)	(0.013)	(0.013)	(0.002)	(0.003)	(0.004)
Obs. (in Mio.)	0.14	0.09	0.09	7.03	4.69	4.69
Avg. $\mathbf{1}(X > 0)$	0.032	0.030	0.033	0.018	0.017	0.018
War Years	2022, 23	2022	2023	2022, 23	2022	2023

Note: All regressions include importer–exporter–product, importer–product–year, and exporter–product–year fixed effects. Columns (1)–(3) focus on military goods, while columns (4)–(6) cover all other goods. Standard errors are clustered at the country-pair level. Statistical significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

increased military goods exported from the West to Russia-friendly countries and from those countries to Russia. These findings confirm concerns about sanction evasion and highlight the need for stricter measures, such as secondary sanctions, to close loopholes through third countries.

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