Trading Around Geopolitics *

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Abstract

Geopolitical fragmentation triggers complex dynamics in international trade. Sanctions, forcing existing exporters to discontinue or reduce their sales, create profit opportunities in targeted countries. But firms responding to these opportunities face (i) risk of nonpayment, (ii) reputational risks and the threat of punitive measures, if their trading with unfriendly countries is exposed, and (iii) higher costs of established trading practice, such as making payments in international currencies through international circuits. This paper examines the trade-offs involved through the lens of a stylized model and empirical analysis of Türkiye's exports in the aftermath of Western sanctions imposed on Russia after its invasion of Ukraine. The results show that Turkish exports to Russia have risen sharply, with Turkish firms charging higher markups and prices, increasing their reliance on cash-in-advance transactions and increasing invoicing in Turkish liras instead of dollars. Trade diversion appears to have been particularly strong for sanctioned products and products where the pre-war market share of European exporters was high. However, affiliates of Western MNCs showed a significantly lower growth in exports to Russia, which is in line with their desire to avoid reputational costs. A back-of-the-envelope calculation points to annualized foregone revenues of $2.8 million for Turkish affiliates of Western MNCs, with the reputational risk effect equivalent to tariffs of 11.4%.

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1 Introduction

Rising geopolitical tensions and the proliferation of sanctions have far-reaching and complex implications for international trade flows. It is well known that, as sanctions prompt many existing exporters to reduce or discontinue sales in the target country, this goes to the advantage of firms that operate in geopolitical regions not imposing restrictive measures, or are able and willing to work around them. But there are countervailing forces, pertaining to the risks and costs of trading. First, firms with ties to the countries imposing the sanctions may be concerned with reputational risk, i.e., the risk of being named and shamed in the international community, and the risk of becoming subject to secondary sanctions.[1] Second, the extension of restrictive measures to the financial and payment systems raises the financial costs of cross-border transactions and may even disrupt established financial and payment practices. Finally, uncertainty about the evolution of a conflict weighs on the risk of non-payment.

In this paper, we conduct a comprehensive analysis of the impact of geopolitical tensions on trade flows, prices, invoicing currency choice, and payment contracts, considering both costs and perceived risks associated to the direct and indirect effects of sanctions. While some of these different implications of sanctions have been extensively discussed in the literature, studies typically treat them distinct objects of analysis. Leading contributions have focused either on trade flows (e.g., Crozet and Hinz (2020); Ahn and Ludema (2020); Crozet, Hinz, Stammann, and Wanner (2021); Draca, Garred, Stickland, and Warrinnier (2022); Chupilkin, Javorcik, and Plekhanov (2023); Babina, Hilgenstock, Itskhoki, Mironov, and Ribakova (2023)), or on the choice of invoicing currency (e.g., Berthou (2023); Chupilkin, Javorcik, Peeva, and Plekhanov (2023)). In our work, we integrate these different aspects into a unified theoretical and empirical framework, extending the analysis to include the choice of payment method.

[1] By way of example, these risks are relevant when firms try to elude the sanctions by reclassifying goods, or by setting strategically the size, currency and financial arrangements of transactions to make their trade less conspicuous.

The evolution of trade between Türkiye and Russia in the aftermath of Russia's full-scale invasion of Ukraine in 2022, and the subsequent imposition of Western sanctions on Russia, provide an ideal setting for our purpose—in terms of the extension and comprehensive nature of the sanctions, as well as the economic size of the sanctioned economy. Firstly, the sanctions targeted a wide range of goods exported to Russia, creating the potential for significant trade diversion. Secondly, the sanctions restricted financial services to Russian entities and disconnected Russian banks from the SWIFT system, the primary system for cross-border payments, thus increasing the relative cost of using Western currencies. Thirdly, the geopolitics of sanctions particularly affected Turkish exporters active in Western countries or those with ownership links to them, exposing them to reputational risks and the threat of secondary sanctions. Lastly, Russia is a large export market, with a GDP of US $1.8 trillion at market exchange rates in 2021, making it the $11th$ largest economy globally.

To provide theoretical foundations for our study, we specify a stylized, yet comprehensive, model of the effects of sanctions on exporters' behavior, including their choices of pricing, invoicing, and payment methods. While the model draws extensively on the literature (including Atkeson and Burstein (2007), Corsetti, Crowley, Han, and Song (2023), Crowley, Han, and Son (2023), Schmidt-Eisenlohr (2013), Antràs and Foley (2015), and Amiti, Itskhoki, and Konings (2020)), its primary contribution lies in synthesizing the multidimensional incentives that may lead firms to reconsider their trading strategies. Based on this theoretical framework, we conduct an event study of Turkish exports to Russia around the start of the war in 2022, using Turkish exports to Eastern European Countries (EEC) as a control group.

We bring the empirical model to bear on the direct and indirect effects of sanctions referred to above. Firstly, the dramatic drop in Western exports to Russia (also documented by Chupilkin, Javorcik, and Plekhanov (2023) among others) created an opportunity for Turkish producers to increase their exports to Russia. We test whether Türkiye experi-

enced a significant increase in trade with Russia, and whether this increase was particularly pronounced in sanctioned products and in markets where, prior to the sanctions, the EU accounted for a large share of Russian imports. While these represent distinct effects, they are all consistent with the trade-diversion hypothesis. Secondly, uncertainty about the outcome of the war and the impact of sanctions on the Russian economy increased the risk of payment disruption, i.e., the perceived risk of non-payment by exporters. Thus we test whether Turkish exporters relied more on cash-in-advance (CIA) transactions, to limit their exposure to such risk. Thirdly, the drop in Western exports reduced competitive pressures in the Russian markets. We test whether this translated into a rise in the market power of Turkish firms, enabling them to charge higher prices and markups. Fourthly, financial sanctions increased the cost of processing transactions denominated in Western currencies for Russian importing firms. We test whether this has motivated a switch to own (producer) or third-party currencies in invoicing. Finally, reputational risk may have deterred some firms from expanding their engagement with Russia, depending on their ownership structure and reliance on Western markets. Specifically, we test whether reputational risks predominantly affected firms exporting to the US compared to those exporting to European markets.

We test these hypotheses relying on an unusually detailed data on monthly exports from Türkiye, disaggregated by firm, product, partner country, invoicing currency, and payment method. The sample period spans from January 2021 until December 2023, thus covering the period before and after the start of the war.

Our main empirical findings can be summarized as follows. We document a significant upsurge of Turkish exports to Russia after the start of the war, with goods under Western sanctions registering a particularly large increase. For both types, we provide evidence of strong trade diversion, especially for products for which the pre-war market share of the EU exporters in Russia was high—consistent with a decline in competition in the Russian market. Concerning payment contracts, we find a statistically significant

increase in the share of cash-in-advance transactions in exports to Russia, consistent with the idea that Turkish exporters reacted to the increased risk of non-payment. We document a significant increase in unit values and markups charged by Turkish exporters, particularly in products for which the pre-war market share of the EU exporters in Russia was high — which is consistent with an increase in their overall market power in Russia. We show that the share of Turkish firms invoicing in Turkish liras when exporting to Russia rose in line with the decline of dollar invoicing—but we find little evidence of a significant variation in the share of Russian rubles or Chinese Renminbi. These findings are consistent with the increased cost of conducting transactions in Western currencies on the part of Russian firms after the imposition of sanctions.

Our results highlight the importance of reputational risks for affecting the exporting behavior of firms that are exposed to Western countries. In particular, we find that affiliates of Western MNCs showed significantly lower growth in exports to Russia due to reputational and sanction risks, with no discernible effect through export reliance. Our analysis quantifies the export revenue losses for Western-exposed Turkish firms due to reputational concerns, estimating annualized foregone revenues of $2.8 million for Turkish affiliates of Western MNCs, with a reputational risk effect equivalent to tariffs of 11.4%.

Our study is related to several strands of the literature. It directly contributes to the rich literature on the impact of wars and sanctions, with leading contributions primarily devoted to documenting the disruption of cross-border trade (Glick and Taylor (2010); Fisman, Hamao, and Wang (2014); Haidar (2017); Crozet and Hinz (2020); Ahn and Ludema (2020); Crozet, Hinz, Stammann, and Wanner (2021); Draca, Garred, Stickland, and Warrinnier (2022); Chupilkin, Javorcik, and Plekhanov (2023); Chupilkin, Javorcik, Peeva, and Plekhanov (2024)). Indirectly, it is related to recent literature on the elusive pro-competitive gains of reducing tariffs and trade costs, see, e.g., Arkolakis, Costinot, Donaldson, and Rodriguez-Clare (2018) and Crowley, Han, and Prayer (2024), whereas we consider a rise, rather than a reduction, in barriers to trade. By the same token, our

results provide new insights on the multidimensional nature of costs relevant for a firm's decision to enter into or exit from a destination market.

Our study also speaks to the literature on currencies used to invoice international trade. We make a case that the choice of invoicing and payment currency may matter independently of the incidence of nominal rigidities in export pricing. We also contribute to the core message of recent literature, calling attention to the fact that international trade is disproportionately denominated in US dollars (Gopinath, Itskhoki, and Rigobon (2010)). The prevalence of the US dollar as currency of invoicing used in trade between third countries reflects both the size of the US market and a global equilibrium where the dollar is the dominant currency—such that each exporter has an incentive to use dollar to keep its producer price in line with those of competitors; related considerations include exchange rate risk, monetary policy asymmetries across borders as well as the dominant role of the US dollar as a store of value (see, e.g., Bacchetta and van Wincoop (2005); Corsetti and Pesenti (2002); Goldberg and Tille (2008); Amiti, Itskhoki, and Konings (2020); Gopinath, Itskhoki, and Rigobon (2010)). We provide evidence of a marginal exit from the dollar, in favor of adopting "producer currency pricing", arguably resulting from the effects of real and financial sanctions.

The paper is structured as follows. The next section describes the data sources and presents descriptive evidence. Section 3 draws on the literature to provide a theoretical framework of testable hypotheses concerning the effects of sanctions. Section 4.1 outlines the empirical strategy and presents the empirical results. Section 5 concludes.

2 Turkish Exports to Russia After the Invasion of the Ukraine: Data Sources and Stylized Facts

In this section, we first describe our dataset and the various sources we use to build it; we then provide institutional information on Western sanctions, clarifying their scope and

the time line of their introduction. Finally, we highlight three stylized facts frame our theoretical and econometric analysis.

2.1 Trade data

Our analysis is based on monthly exports data from Türkiye, disaggregated by firm, 8-digit HS product, country, invoicing currency, and payment method. We augment the detailed customs data with firm census, which informs us about firm's industry of operation and ownership structure. Both confidential firm-level datasets are maintained by Turkish Statistical Institute (TUIK). The sample period covers from January 2021 until December 2023.

To understand how the war and subsequent sanctions have altered the behavior of Turkish exporters, our baseline sample focuses exclusively on firms that continued exporting to Russia. This includes only those companies that were active in the Russian market both before and after the onset of the war in Ukraine, unless otherwise specified. We intentionally exclude re-exports from the analysis, to focus on trade diversion clean of the possibility of goods produced by third (sanctioning) countries being reshipped via Türkiye.

In the period following Russia's invasion of Ukraine, the total number of Turkish firms exporting to Russia more than doubled—rising to about 15,362, from a pre-invasion level as low as 6,748. Correspondingly, the share of Turkish exports to Russia increased from 2.5 percent to 4 percent of total exports. In the post-invasion period, nonetheless, the bulk (78 percent) of the total value of Turkish exports to Russia was still accounted for by continuing exporters to this country—which constitute our baseline sample. For these firms, in the pre-invasion period, their exports to Russia accounted for 17 percent of their total exports.

2.2 Sanctions

The EU imposed its first sanction package on Russia in response to the annexation of Crimea in 2014 and the armed conflict in Eastern Ukraine that started in the same year. These sanctions predominantly targeted specific companies and individuals.

After Russia's full scale invasion of Ukraine, the EU expanded its sanctions in subsequent waves, starting on 23 February 2022. Overall, export prohibitions have been extended to arms, advanced and dual-use technology, quantum computing, advanced semiconductors, sensitive machinery, transportation and chemicals, goods for use in the oil industry and maritime navigation, goods seen to enhance Russia's industrial production capacity as well as luxury products.

Most EU export sanctions were in place by the end of March 2022, so we use a time-invariant EU sanction indicator specific to 8-digit HS product codes, based on the data collected by Chupilkin, Javorcik, and Plekhanov (2023). As explained by these authors, sanctions on luxury goods are captured less precisely, as they would apply only to product above a set price threshold (e.g., 300 euros for ski suits) or only to selected products within an 8-digit HS code. For instance, within HS8 sparkling wines, champagne is subject to sanctions but prosecco is not.

To capture the possibility of product misclassification, we also consider products similar to sanctioned products. These are defined as products in the same 4-digit HS category as a sanctioned product. For instance, x-ray apparatus for dentistry and similar medical uses (HS 902213) is not subject to the EU sanctions on Russia, while x-ray apparatus for non-medical uses (HS 902219) are under sanctions (Chupilkin, Javorcik, and Plekhanov (2023)).

In addition to exports, sanctions have also applied to investments in a number of sectors; use of public funds; imports from Russia of certain goods such as coal, iron and steel, and wood; aviation, Russian freight operators; and restrictions on financial services including transactions with Russia's Central Bank. Travel bans and financial measures

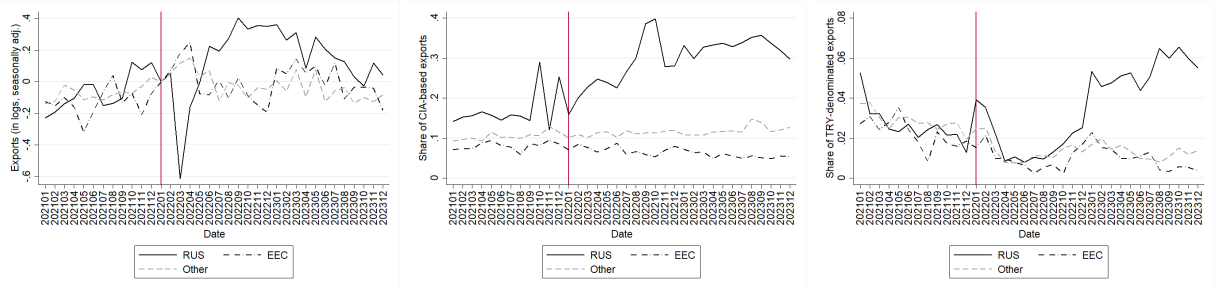
targeted more than 1,200 individuals and 100 companies (see Drott, Goldbach, and Nitsch (2023) for a discussion of financial sanctions and their effectiveness).

A total of 45 jurisdictions including Australia, Canada, members of the European Economic Area, Japan, Korea, New Zealand, Switzerland, Taipei China, UK and US adopted their own sanction packages. At the same time, China and Türkiye are among Russia's main trading partners that did not impose economic sanctions on Russia.

2.3 Stylized Facts

To set the stage for and motivating our econometric analysis, we highlight three stylized facts in Figure 1. Panel (a) illustrates the rise in the value of Turkish exports to Russia soon after Russia's invasion of Ukraine. After a short-lived drop, Turkish exporters scaled up their sales to Russia, way above their trade to both Eastern Europe and the rest of the world. The export boom was across the board—for goods that fall under the EU sanctions as well as for goods that are not subject to the EU sanctions—see Figure A1 in the Appendix.

Figure 1: **Monthly Exports by Destination**



(a) Value of exports (b) Share of CIA-based exports (c) Share of TRY-denominated exports

Note: Panel (a) plots the (logarithm of) monthly product-country-level exports, demeaned by their product, country, and monthly averages, over the 2021-2023 period. Panel (b) plots the fraction of exports based on CIA payments, and panel (c) fraction of exports denominated in Turkish Liras. The vertical red line marks the start of the war on Ukraine.

Panel (b) shows that, when trading with Russia in the aftermath of Russia's invasion

of Ukraine, Turkish exporters increased their reliance on Cash-in-Advance payment contracts. They did not do so when trading to EEC and the rest of the world during the same period. Finally. Panel (c) shows evidence of a marginal switch towards producer currency (Turkish liras).

The three facts in the figure motivate our analysis in the rest of the paper. In the next section, we discuss formally the economics underlying the general empirical patterns shown in Figure 1. In Section 4.1 we draw on this model to structure and conduct empirical tests, fully exploiting the rich and detailed information in our dataset.

3 Theoretical framework

In this section, we will draw on the literature to gain theoretical insights on the multidimensional nature of the incentives underlying trade diversion in the aftermath of geopolitical shocks. In particular, drawing on Crowley, Han, and Son (2023), we frame our empirical exercises using a stylized model featuring oligopolistic competition à la Atkeson and Burstein (2007)—allowing firms to differ in their market shares (reflecting productivity) and the markup they charge.[2] As a simplification, we posit that a firm uses labor and intermediate inputs from home and foreign countries with a Cobb-Douglas production technology. Following Schmidt-Eisenlohr (2013) and Antràs and Foley (2015), we will enrich the framework with an analysis with a the optimal choice of the payment contracts.

We will develop the model in a modular way. We will first write up the firm maximization problem assuming flexible price, then discuss the choice of payment contracts introducing a finer, within-period, timing; finally, we allow for nominal frictions, in the form of one-period sticky price. We write f, o, d, t, c for firm, origin country, destination country, time and currency of denomination, and we use ρ_i, η to denote elasticities within and across industries, respectively.

[2] In the model, when a firm chooses its product price $p^c_{f,o,d,t}$ denominated in the currency c, it internalizes the impact on the industry level price index in the destination country $P^c_{d,t}$.

3.1 Real and financial determinants of trade diversion

We start by writing the firm problem conditional on price flexibility. Define the revenue a firm f derives from exporting to destination d:

$$R^c_{f,o,d,t} = q_{f,o,d,t}\left[\Omega_{f,o,d,t}[p^c_{f,o,d,t}e^c_{o,d,t}]\right];$$

where q denotes quantities, $p^c_{f,o,d,t}$ the export price denominated in the currency c, $e^c_{o,d,t}$ the bilateral exchange rate between this currency and the domestic one, and, finally, the term $\Omega_{f,o,d,t}$ captures the cost associated to different terms of payment, to be discussed below. Denoting with mc marginal costs in domestic currency, and ruling out complementarities across destinations, for each d the firm problem can be written as follows

$$\Pi^c_{f,o,d,t} \equiv \max_{p^c_{f,o,d,t}e^c_{d,t}}\left[R^c_{f,o,d,t} - mc_{f,o,t} - F^c_f - \Phi_{f,t}(c,d)\right] \geq \chi_d \tag{1}$$

subject to

$$q_{f,o,d,t} = \left(p^d_{f,o,d,t}\right)^{-\rho_i}\left(P^d_{d,t}\right)^{\eta-\rho} D_{d,t}$$

and

$$c = argmax\left(\Pi^c_{f,o,d,t}\right). \tag{2}$$

In the above expressions, $D_{d,t}$ is a demand shifter that we posit as exogenous and $P^d_{d,t}$ is the price index which is defined as $P^d_{d,t} \equiv \left(\sum_f P^d_{f,d,t}\right)^{\frac{1}{1-\rho}}$; χ_d is a sunk cost incurred by the firm when exporting to the destination market; the terms F^c_f and $\Phi_{f,t}(c,d)$ allow, respectively, for financial costs of managing a currency, and "reputational" risk, that may be increasing in the use of specific currencies of invoicing (say, the US dollar) in a specific destination. Overall, the firm problem above is standard up to the inclusion of these last two terms and the term $\Omega_{f,o,d,t}$. Note that, through F^c_f, and $\Phi_{f,t(c,.)}$, the choice of the currency of denomination of export prices, c, is relevant independently of price rigidities.

Hence, even if prices are flexible, in the problem we write these prices conditional on such choice, i.e., we write $p^c_{f,o,d,t} e^c_{o,d,t}$.

The problem yields three baseline testable predictions. The first two are implied by the optimal price expressed in the destination currency,

$$\Omega_{f,o,d,t} P^d_{f,d} = \underbrace{\frac{\epsilon(S_{f,d})}{\epsilon(S_{f,d}) - 1}}_{\text{markup}} \frac{mc_f}{e^d}$$

where $S_{f,d}$ denotes the share of the firm f in the destination market d. This condition suggests that, to the extent that the market share of the Turkish firms rises in the Russian market, so does the markup they charge. After the imposition of the sanctions on Russia the data should record an increase in the unit values (proxying for prices) of transactions originating in Türkiye, reflecting the exit of (large) exporters from the US, Europe and other regions.[3] In the short to the medium run, however, nominal price rigidities (discussed below) could translate into larger quantity responses vis-á-vis relatively stable unit values. Relatedly, higher prospective profits also prompt new entry in the market. As the drop in competitive pressures due to the exit of exporters from countries imposing the sanctions, for many firms higher prospective markups and market shares can be expected to raise $\Pi^c_{f,o,d,t}$ above the costs χ_d.

The third testable implication reflects the endogenous choice of the invoicing currency, (2). Turkish firms may switch out of the dollar and other Western currencies in their export denomination as both the administrative costs and the reputational risks of using them were increased by the sanctions.[4]

[3]For evidence on exit of Western exporters and Western multinationals, see Chupilkin, Javorcik, Peeva, and Plekhanov (2023) and Chupilkin, Javorcik, Peeva, and Plekhanov (2024), respectively.

[4]Chupilkin, Javorcik, Peeva, and Plekhanov (2023) show that large Russian firms tend to have import transactions denominated in dollars, while smaller importers gravitate towards the renminbi as a currency of invoicing. This is consistent with high costs of clearing dollar-denominated payments. They also show that imports of sanctioned goods saw a decline in reliance on dollars and an increase in the use of renminbi as a vehicle currency.

3.2 Terms of payment and financing costs

To analyze the effects of the sanctions on the payment contracts, drawing on the seminal contribution by Schmidt-Eisenlohr (2013) and Antràs and Foley (2015), we augment the firm problem positing that each period t is split into two sub-periods, 0 and 1. Trade contracts are signed at 0 and enforced with probability γ at 1, specifying quantities, prices and payments. Specifically, γ_q refers to the probability of enforcement in the delivery of goods by the exporters in 1 if payments PAY_0 is settled at 0, i.e., for cash-in-advance (CIA) contracts; and γ_p refers to the probability of enforcement of payments in 1, PAY_1, i.e., for contracts where the payment is postponed after delivery (PST). If the contract is not enforced, the importers will receive a fraction μ_q of the contractual quantity in the case of CIA contracts; and the exporters will receive a fraction μ_p of the contractual payment in the case of PST contracts. Given this structure, the CIA requires the importer to obtain working capital at the rate $(1 + r_{IMP})$ between 0 and 1, with r_{IMP} denoting the cost of financing in the importer's country. The corresponding cost for the exporter in the case of PST contracts is $(1 + r_{EXP})$.

Given these definitions, the importer will accept CIA contracts only if

$$(1 + r_{IMP})PAY_0 \leq \left[\gamma_q + (1 - \gamma_q)\mu_q\right] R^c_{f,t}$$

while the exporter will accept a postponement of the payment if

$$(1 + r_{EXP})PAY_1 \leq \left[\gamma_p + (1 - \gamma_p)\mu_p\right] R^c_{f,t}.$$

As in Antràs and Foley (2015), for the CIA contracts to be preferred, it must be the case that the following condition is satisfied:

$$\frac{1 + r_{EXP}}{1 + r_{IMP}} \geq \frac{\left[\gamma_p + (1 - \gamma_p)\mu_p\right]}{\left[\gamma_q + (1 - \gamma_q)\mu_q\right]}$$

This condition suggests that, given financial costs (on the left-hand-side of the above expression), the incentives to adopt CIA depend on the ratio of the expected loss of the exporter if the importer fails to honor the contract, to the analogous (symmetric) expected loss of the importer. Namely, at the margins, firms have a stronger incentive to enter CIA contract if γ_p falls and μ_p rises, jointly offsetting the effect of any contemporaneous change in γ_q and μ_q. This incentive may be moderated by a relative worsening of the financing conditions faced by importers.

3.3 Currency denomination of export prices and pass through

A large body of literature has shown that the currency in which a firm presets prices matters for its ability to stabilize exports markups and profits around their natural level. Intuitively, the choice of the currency in which prices are preset impinges on the covariance between total export sale revenues (price multiplied by quantities) and overall costs, both measured in the exporter's currency. The optimal choice is then informed by the factors underlying this covariance. In light of the established evidence, throughout the paper, we will treat the choice of an invoicing currency as informative on nominal price rigidities in that currency. Hence we will use 'pricing' and 'invoicing' currency interchangeably.

Translating the above general principle into testable predictions, there are at least four key determinants of the choice of pricing currency that turn out to be crucial in our study of sanctions. Two of them have been extensively studied by the literature. The first is *strategic complementarity*. Essentially, the incentive for an exporter to set prices in a specific currency in a destination market is increasing in the share of goods priced in that currency in the same market—as to prevent exchange rate fluctuations from pricing the firm's product out of line relative to the market equilibrium. A discontinuous drop in exports from Western countries priced in dollars or Western currencies creates incentives for pricing either in the producer currency (Turkish lira), in local currency (the ruble) or in an another (non-Western) vehicle currency (e.g., the renimbi), depending on the post-

sanction standards prevailing in the market. The second is *operational (or costs) hedging*, which depends on the currency denomination of production inputs (their share in total costs). Sanctions may or may not alter trade in inputs in global markets, although they may affect practices in regional markets.

In addition, recent literature has called attention to *financial and currency management costs* that firms may learn to minimize over time. While learning and establishing practices could produce path dependence (see Crowley, Han, and Son 2023), financial sanctions affect these costs, reducing the attractiveness of operating in Western currencies.

In our analysis, we call attention to further elements, linked to the geopolitics of sanctions. Exporters may prefer to conduct transactions in a currency different from the US dollar, on the ground that they could be less traceable in international circuits. In other words, the choice of the currency in which trade is conducted may be motivated by a firm's desire to contain reputational risks and exposure to potential secondary sanctions. A similar argument applies to payment contracts: as the war enhances the risk of non-payment, it produces an incentive to switch to cash-in-advance.

Building on the model above, it is possible to derive an intuitive analytical expression synthesizing the above considerations assuming that (i) prices are preset in the tradition of the Obstfeld and Rogoff (1995), (ii) exchange rate movements are the only source of within-period uncertainty, and (iii) reputational risks can be assessed independently of exchange rates uncertainty. Under these assumptions, as shown by Crowley, Han, and Son (2023), the choice of currency can be approximated using a result recently emphasized by Amiti, Itskhoki, and Konings (2020), that, in any currency, the optimal preset price is equal to the expected value of the optimal flexible price.[5] Under this approximation, the difference in expected profits from choosing a currency $CI = \{USD, EUR, RUB, RMB\}$

[5]See Corsetti and Pesenti (2002), for a derivation and early discussion of this result.

relative to own currency *TRY* can be written as follows:

$$\mathbb{E}[\Pi_{fd}^{\text{CI}}] - \mathbb{E}[\Pi_{fd}^{TRY}] \propto \lambda_{fd}\Bigg[\underbrace{\frac{\Gamma_{fd}}{1+\Gamma_{fd}}(\zeta_{(-f)d}^{\text{CI}} - \zeta_{(-f)d}^{TRY})}_{\text{Strategic complementarity}} + \underbrace{\frac{1}{1+\Gamma_{fd}}(\psi_{f}^{\text{CI}} - \psi_{f}^{TRY})}_{\text{Operational hedging}}\Bigg] - \underbrace{(F_{fd}^{\text{C0}} - F_{fd}^{TRY})}_{\text{Financial cost}} - \underbrace{\Delta\Phi_{f}^{CI,TRY}}_{\text{Reputational risk}}$$

where $\mathbb{E}[\Pi_{fd}^{c}]$ denotes the expected profit from invoicing in currency c; λ_{fd} is a positive, non-stochastic term;[6] Γ_{fd} is the markup elasticity, which depends on both the substitutability within and across industrial product types and the size of the exporter; $\zeta_{(-f)d}^{c}$ denotes a firm f's competitors' invoicing share of currency c; ψ_{f}^{c} is the firm's share of imports invoiced in currency c; F_{fd}^{c} is the cost of invoicing in a foreign currency c; and Φ_{f}^{C0} captures the firm manager's assessment of the expected losses from trading with Russia in a particular currency, conditional on this trade being detected in international circuits and prompting retaliatory measures.

The model predicts that, as a result of sanctions which led to exit of Western suppliers from the Russian market, Turkish exporters should be more likely to use TRY as fewer competitors use the US dollar or Western currencies in the Russian market (first term on the right hand side). However, the expression also suggests the possibility of a rise in the renminbi invoicing associated with the increasing ties between Russia and China which may have created an incentive to use this currency in some markets.[7] One may also note that, as the sanctions and the fragmentation of the geopolitical space for financial and currency transactions had further reduced the incentives to use rubles in international trade, the Russian authorities may have simultaneously intensified their efforts to promote the use of own currency. The net effect would reflect these two opposing forces. The disincentive to use the US dollar and Western currencies reflects the rise of payment clearance costs and reputation risks driven by sanctions (third and fourth terms). Finally, as for the role played by the hedging motive, reflecting the currency denomination of productive inputs, the net effect is ambiguous.

[6] As shown by Crowley, Han, and Son (2023), Appendix A, this term is related to the second derivative of the operational profit function.

[7] For evidence on the increase in Russian imports from China, see Chupilkin, Javorcik, and Plekhanov (2023). More than 80% of these flows was denominated in renminbi by the end of 2023 (Chupilkin, Javorcik, Peeva, and Plekhanov (2023)).

4 Empirical Evidence

In this section, we first draw on the model to build a consistent testing framework and then articulate our analysis in seven subsections, discussing all the dimensions that theory suggest to be relevant to the adjustment of Turkish exporters to the post-sanction environment: the rise in trade flows towards Russia; payment terms and risk of non-payment; competition and pricing; trade diversion vs. creation; invoicing currency; reputational risk and the risk of secondary sanctions. We conclude running exercises verifying the robustness of our exercises to varying our sample and the control group, and accounting for currency mismatch in a firm imports and exports.

4.1 Empirical Model

Throughout our analysis we will estimate a standard difference-in-difference specification and conduct an event study exercise, comparing Turkish exports to Russia with Turkish exports to EEC as the main control group. Our regressions will include all products, both sanctioned and non-sanctioned. We estimate the following baseline specification:

$$Y_{fpdt} = \beta \text{Post}_t \times \text{RUS}_d + \alpha_{fpd} + \alpha_{pt} + \alpha_{ft} + e_{fpdt} \tag{3}$$

where Y_{fpdt} denotes the variable of interest at the level of firm, product, (destination) country (Russia or EEC as a group), and time (year-month). Our outcomes of interest are the (logarithm of the) value of exports, unit values the share of exports on cash-in-advance terms, and the share of TRY- or USD-denominated exports. We saturate the specification with a rich set of fixed effects. Including firm-product-destination (fpd) fixed effects allows us to control for any time invariant characteristic within cross-section units. Product-time (pt) fixed effects control for time-varying demand and price changes for each product, and firm-time (ft) fixed effects capture any time-varying shocks faced by firms, such as supply shocks. Our coefficient of interest is β, which captures the effect of the interaction between the binary variable for post-invasion period (Post_t) and another binary variable indicating Russia as destination (RUS_d).

We also estimate an event study version of equation (3):

$$Y_{fpdt} = \sum_{l=-7}^{11} \beta^l \times \mathbb{1}_{t=l} \times \text{RUS}_d + \alpha_{fpd} + \alpha_{pt} + \alpha_{ft} + \epsilon_{fpdt}, \tag{4}$$

The coefficients of interest, β^l, compare Turkish exports to Russia with Turkish exports to EEC for each month in the post-invasion period relative to the base period, i.e. January 2022.

4.2 The rise of Turkish exports to Russia: disaggregated evidence

As the Western sanctions on Russia in 2022 caused a sudden dramatic drop in Western exports to Russia, the discontinuous drop in competition in this market translated into significant opportunities to expand sales and profits for firms operating in countries, like Türkiye, that kept their export to Russia unrestricted.

Table 1 looks at the development in Turkish exports through the lens of a the difference-in-difference regression outlined in equation (3). As shown in the first of column of the table, in the aftermath of Russia's invasion of Ukraine, Turkish firms increased their exports to Russia by about 31.5 log point (about 37 percent) relative to their exports to EEC. This effect is economically sizeable and highly statistically significant. To appreciate it fully, recall that we consider exports of a given 8-digit HS product by a given producer in a given month, controlling for firm-product-country fixed effects.

As shown in column 2, there is a differential rise in exports of goods subject and not subject to sanctions with the former group registering an increase of 37 log points (44.8 percent) and the latter of 23.6 log points (26.6 percent). Further, the results in column 3 document an additional distinct rise in exports of goods that are "similar" to sanctioned products—pointing to the possibility of misclassification. As discussed below, concealing exports of sanctioned goods by misclassifying them may reflect firms' concern about own reputational risks and the risk of becoming target of restrictive measures.

When we disaggregate sanctioned products by type—Dual use, Industrial and Luxury (column 4)—our analysis unveils that export growth in product sanctioned by the EU due to their potential to enhance Russia's industrial capacity was twice as fast as the growth across the board.

Table 1: Impact on export values

Dependent Variable: Log Export Value	(1)	(2)	(3)	(4)	(5)
$\text{Post}_t \times \text{RUS}_d$	0.315a	0.236a	0.181a	0.181a	0.235a
	(0.0234)	(0.0294)	(0.0422)	(0.0421)	(0.0268)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.134a	0.0953b		
		(0.0372)	(0.0441)		
$\text{Post}_t \times \text{RUS}_c \times \text{Similar}_p$			0.0937c	0.0992c	
			(0.0533)	(0.0530)	
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				0.178b	
				(0.0757)	
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				0.0232	
				(0.0547)	
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				0.0708	
				(0.0511)	
$\text{Post}_t \times \text{RUS}_d \times \text{High EU Share}_p$					0.154a
					(0.0363)
Fixed Effects :					
Firm×Product×Country	✓	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓	✓
R^2	0.896	0.896	0.896	0.896	0.896
# observations	485185	485185	485185	485185	485185

Notes: a, b and c denote statistical significance at the 1, 5 and 10% level, respectively.

And the rise of exports of goods "similar" to sanctioned goods was 50% faster than the increase across the board.

A key issue is whether and to what extent these findings are driven by a discontinuous drop in competition in the Russian market resulting from the exit of Western exporters. To address this issue, we introduce into the model a triple interaction allowing for a differential post-invasion increase in exports to Russia in product markets in which EU exporters had a high share prior to the war. To do so, we define an indicator variable taking on the value of one for 6-digit HS products for which, during the 2019-2021 period, the EU share in total Russian imports was above the mean. As shown in the last column of Table 1, the exit of European exporters mattered a great deal. In markets where European exports used to be prominent, Turkish producers increased their

sales to Russia by additional 18.7 log points (with the aggregate effect remaining similar to that in the baseline specification).

The differences-in-differences results are also confirmed by the standard event study exercise presented in panel (a) of Figure A2. The event study shows that no meaningful pre-trends have been present and that Turkish exports to Russia have been steadily increasing over time.

4.3 Payment terms and the risk of non-payment

A plausible implication of uncertainty about the evolution of the war and the impact of sanctions on the Russian economy is an increase in the risk of default on payment perceived by foreign exporters, arguably motivating a preference for cash-in-advance over other types of payment arrangements. This risk is systemic, reflecting financial sanctions or war-related disruptions, hence not specific to market for sanctioned goods.

In line with our conjecture, the regression results in column 1 of Table 2 show that the share of CIA transactions in exports destined for Russia increased by about 6.6 percentage points from their pre-invasion average level of 18.5%, implying an economically significant switch. This result is best appreciated by noting that our sample includes only continuing exporters, presumably familiar with the buyers and the financial intermediaries facilitating trade across the Russian border. As might be expected, the rise in CIA transactions is somewhat stronger for sanctioned products (see columns 2 and 4). It also appears to be stronger in products that registered a drop in the level of competition (see column 5).

The extent to which Turkish exporters have switched to CIA in the aggregate is illustrated by the event study depicted in Panel (b) of Figure A2.

4.4 Currency of invoicing and the costs and risks of invoicing in USD

Financial sanctions and reputation costs have undermined the advantages of invoicing exports to Russia in Western currencies—relative to producer currencies or non-Western currencies. At the same time, however, the war weighs against the use of rubles. These factors together are likely to have strengthened the incentive for firms to resort to the Turkish lira in invoicing exports to

Table 2: Impact on payment terms

Dep. Var.: Share of CIA-based exports	(1)	(2)	(3)	(4)	(5)
$\text{Post}_t \times \text{RUS}_d$	0.0662a	0.0583a	0.0521a	0.0521a	0.0484a
	(0.00457)	(0.00542)	(0.00771)	(0.00773)	(0.00511)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.0140b	0.00966		
		(0.00617)	(0.00695)		
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			0.0106	0.0131	
			(0.00892)	(0.00889)	
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				0.0262b	
				(0.0117)	
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				0.0136	
				(0.00832)	
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				-0.00859	
				(0.00874)	
$\text{Post}_t \times \text{RUS}_d \times \text{High EU Share}_p$					0.0345a
					(0.00611)
Fixed Effects :					
Firm×Product×Country	✓	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓	✓
R^2	0.918	0.918	0.918	0.918	0.918
# observations	485185	485185	485185	485185	485185

Notes: a, b and c denote statistical significance at the 1, 5 and 10% level, respectively.

Russia.

Our regression results in the top panel of Table 3 lend empirical support to this hypothesis. The magnitude of the switch in favor of Turkish lira in invoicing is non-negligible, amounting to about four percentage point on average and somewhat more for goods under Western sanctions. This change is also visible in the event study in panel (c) in Figure A2.

To dig further into the effect of sanctions on the currency of invoicing, the bottom panel of Table 3 and the last panel of Figure A2 present evidence suggesting that the increase in the share of TRY-denominated exports corresponds, more than proportionally, to a decline in the use of USD as a vehicle currency. We find no evidence of a significant change in the use of rubles or renminbi, despite the fact that, according to political news, their adoption has been actively promoted by the

Russian authorities.

Table 3: Impact on currency denomination

	(1)	(2)	(3)	(4)
Panel A				
Dep. Var.: Share of TRY-den. exports				
$\text{Post}_t \times \text{RUS}_d$	0.0416a	0.0368a	0.0371a	0.0372a
	(0.00196)	(0.00253)	(0.00391)	(0.00392)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.00787a	0.00806b	
		(0.00285)	(0.00315)	
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			-0.000472	-0.000154
			(0.00452)	(0.00449)
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				0.000573
				(0.00357)
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				0.0142a
				(0.00478)
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				0.00858b
				(0.00376)
R^2	0.863	0.863	0.863	0.863
Panel B				
Dep. Vrb.: Share of USD-den. exports				
$\text{Post}_t \times \text{RUS}_d$	-0.0598a	-0.0614a	-0.0868a	-0.0868a
	(0.00486)	(0.00665)	(0.00864)	(0.00868)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.00261	-0.0151b	
		(0.00687)	(0.00763)	
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			0.0435a	0.0442a
			(0.0103)	(0.0102)
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				0.0150
				(0.00931)
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				-0.00277
				(0.00870)
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				-0.0410a
				(0.0100)
R^2	0.927	0.927	0.927	0.927
Fixed Effects :				
Firm×Product×Country	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓
# observations	485185	485185	485185	485185

Notes: a, b and c denote statistical significance at the 1, 5 and 10% level, respectively.

4.5 Robustness checks and extensions

We subject our findings to several robustness checks.

The results explained so far are not specific to the sample of continuing exporters, or using EEC countries as a control group. Table A1 reports the results from estimating the same specification as in (3) for all firms exporting to Russia at any time before or after Russia's invasion of Ukraine. The estimated coefficient on $\text{Post}_t \times \text{RUS}_d$ for export values (column 1) remains virtually unchanged compared to the baseline estimate. As an additional robustness check, we run the baseline specification on a sample including the full set of destination countries in the control group. The results for this extended sample are presented in Table A2 in the appendix. The estimated coefficient for the value of exports in column 1 is smaller than the baseline estimate but remains both economically and statistically significant.

In the final exercise, presented in Table A3, we control for currency mismatch in the firm's export and import transactions as it may matter for invoicing decisions. Currency mismatch is defined as the difference between the sum of USD and EUR denominated exports and imports, divided by the sum of total exports and imports at the firm level. This variable is constructed using pre-invasion data, i.e. 2019-2021. All of our baseline results remain robust to this additional control. As for the mismatch itself, a positive net balance in Western currencies is associated with a greater increase in TRY-denominated exports to Russia after the start of the war.

4.6 Trade diversion or trade creation?

An important question is whether higher exports to Russia replaced exports to other destinations after the invasion, or led to trade creation. We can address this question at the firm level. We hypothesize that Turkish firms already producing and exporting to other markets the products in which European exporters held a significant market share in Russia before the war would more readily seize this new business opportunity after the exit of European exporters and expand their overall exports. To capture this idea, we construct a variable that measures the share of exports of products with High EU $\text{Share}_p = 1$ in firm's total exports before the start of the war:

$$\text{Product Overlap}_{f,t=0} = \frac{\sum_{p \in \Theta} \text{Exports}_{fp,t=0}}{\sum_{p} \text{Exports}_{fp,t=0}},$$

where Θ denotes the set of products with High EU Share$_p = 1$. We also control for the firm-level exposure to Russia as an export destination before the invasion by adding a variable that measures the share of total exports destined for Russia in 2021. We then estimate the following equation:

$$\begin{aligned} \ln \text{Exports}_{ft} &= \theta_1 \text{Post}_t \times \text{Product Overlap}_{f,t=0} + \theta_2 \text{Post}_t \times \text{Share of exports to RUS}_{f,t=0} \\ &+ \sum_{s=1}^{5} \alpha^s \text{Post}_t \times \mathbb{1}_{f \in \text{Class size bin}_s} + \varepsilon_{ft} \end{aligned} \quad (5)$$

We construct class-size bins based on firm-level employment in the pre-invasion period. The coefficient of interest is θ_1; a positive estimate would be consistent with trade creation at the firm level. The results obtained from estimating the equation above are presented in Table 4. The coefficient of interest is estimated to be positive and statistically significant, which is consistent with a trade-creation effect of the invasion for Turkish exporters.

Table 4: Impact on total-firm level exports

Dependent Variable: Log Total Firm-level Export Value	(1)	(2)
Post$_t \times$ Product Overlap$_{f,t=0}$	0.155a	0.157a
	(0.0213)	(0.0214)
Post$_t \times$ Share of exports to RUS$_{f,t=0}$		0.0439
		(0.0398)
Fixed Effects :		
Firm	✓	✓
Size quintile$\times$Time	✓	✓
R^2	0.820	0.820
# observations	163030	163030

Notes: a, b and c denote statistical significance at the 1, 5 and 10% level, respectively.

4.7 Competition channel

To the extent that the exit of Western firms from Russia translates into a higher market share of Turkish exporters, these naturally experience a rise in their monopoly power in the Russian

market. In line with a changing competitive environment, one may expect Turkish firm to face a lower price elasticity of demand, hence adjust their markups and export prices upwards.

To dig deeper into the analysis of the monopoly power of Turkish exporters in Russia, we adopt the methodology proposed early on by Knetter (1989) and developed for application to large custom datasets by Corsetti, Crowley, Han, and Song (2023). This methodology consists of differencing out marginal costs by expressing prices in deviations from their average across destinations at each point in time, and then comparing changes in prices between any two points in time. The estimator requires observing a "trade pattern", i.e. set of destination markets for a given firm-product pair, in multiple periods. To conduct the analysis below, we extract from our sample a balanced panel of exporters ensuring continuity in the sale at exporter-product level, pre- and post sanctions.[8] The analysis proceeds in two steps. First, the mean value of unit values over all active destinations is subtracted from the firm-product-destination unit value in a period, $\dot{p}_{fpdt}$. Second, the mean value of the demeaned unit values obtained in the first step for a given trade pattern is subtracted from $\dot{p}_{fpdt}$ to obtain double-demeaned unit values, $\ddot{p}_{fpdt}$ which we use as a proxy for markups below.

Although the "double-demeaning" process includes all destination markets, our estimation, as before, compares the relative change in markups in the Russian market to those in the control group, i.e., EEC countries. The regression results in Table 5 lend empirical support to the hypothesis that prices and markups charged by Turkish exporters increase with the increase in their market share in the Russian market after the invasion. In particular, we document an increase in average unit values of exports by almost 8 percent (column 1), and a markup increase of 5 percent (column 5). As shown in columns 2 and 6, respectively, unit values and markups of Turkish exports rise more for exports of goods under Western sanctions. Note that estimated increase in export prices, while sizable, is contained relative to the increase in the total export value, shown in Table 1. We conclude that the rise in total export values was primarily driven by a quantity rather

[8] In a balanced panel, the relative change in markups across destinations obtained by differencing out marginal costs is precisely estimated under the assumption that these costs have no destination-specific component. If the panel is unbalanced, the approach would also work if the set of destination varies randomly. See Corsetti, Crowley, Han, and Song (2023) for the development of a methodology for the general case, allowing for the choice of destination markets to be endogenous. These restrictions lead to a smaller estimation sample in Table 5 relative to the baseline.

than a price response.

The results in Table 5 are remarkable in two respects. First, in line with our conjecture, our estimations point to a significant post-war rise in the markups charged by Turkish exporters in the Russian market, with the estimated markup adjustment accounting for more than 60% of the estimated change in unit values. Second, the increases in both prices and markups are more pronounced in product markets where EU exporters had a high share prior to the war (columns 4 and 8). Following the exit of European exporters from the Russian market, Turkish exporters seized a greater opportunity to expand their market share in these products. This finding provides a more direct test of the competition channel. [9]

Table 5: Impact on Unit Values and Markups

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log of unit value				Log of markups			
$Post_t \times RUS_d$	0.0764a	0.0398c	0.0248	0.0128	0.0476a	0.0150	0.00770	0.0261c
	(0.0190)	(0.0222)	(0.0314)	(0.0276)	(0.00961)	(0.0126)	(0.0175)	(0.0150)
$Post_t \times RUS_d \times Sanctioned_p$		0.0649a	0.0426b			0.0660a	0.0568a	
		(0.0236)	(0.0214)			(0.0178)	(0.0212)	
$Post_t \times RUS_d \times Similar_p$			0.0212c				0.0164	
			(0.0113)				(0.0244)	
$Post_t \times RUS_d \times$ High EU $Share_p$				0.0812a				0.0390b
				(0.0287)				(0.0188)
R^2	0.948	0.948	0.948	0.948	0.0386	0.0386	0.0386	0.0386
Fixed Effects :								
Firm×Product×Country	✓	✓	✓	✓	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓	✓	✓	✓	✓
# observations	172036	172036	172036	172036	172036	172036	172036	172036

Notes: a, b and c denote statistical significance at the 1, 5 and 10% level, respectively.

[9] Recent literature has documented puzzling pro-competitive effects of preferential trade agreement favoring exporters from one country—whereas markups appear to decrease rather than increase (as predicted by virtually all model based on oligopolistic competition). A possible resolution to this puzzle rests on increasing competition among exporters from the favored country (as documented by Crowley, Han, and Son (2023)). This literature is arguably relevant for our study since, *in relative terms*, sanctions amount to a drop in trade costs for Turkish exports. In spite of the large increase in the number of Turkish exporters and the volume of their exports, in equilibrium, we do not detect a drop in unit values.

4.8 Reputational risk and threat of secondary sanctions

Specific to war sanctions are the risk of being targeted by secondary measures as well as reputational risk, which firms face when maintaining commercial ties with Russia. Once these ties are singled out in the open, firms could be subject to boycott or different kinds of (formal and informal) penalties by governments. These risks may thus translate into significant differences in a firm incentive to export to Russia, depending on its ownership structure as well as on the extent of its reliance on Western countries as destination markets. In particular, one can expect Turkish affiliates of Western multinationals or Turkish firms with significant amount of exports to the Western countries to be the least willing to increase their engagement with Russia.[10] Below, we present evidence supporting this hypothesis.

A first piece of evidence lending support to these risk considerations is presented in the first column of Table 6, which investigates the probability of exit from the Russian relative to the EEC market by Turkish exporters following Russia's full-scale invasion of Ukraine. The results suggest that Turkish exporters with direct ties to Western multinationals were disproportionately affected by geopolitical tensions in the Russian market, as evidenced by the significant increase in their exit probability post-invasion. The same is not true for exporters with high exposure to Western countries only through exports (i.e., no multinational affiliation), indicating that the nature of the Western connection (e.g., multinational ties) matters in the exposure to reputational risks. Moreover, the baseline effect on Turkish exporters is insignificant—Turkish exporters in the Russian market were generally not likely to exit post invasion. This result highlights that the main drivers of exit are tied to firm-specific factors rather than market-level risks.

Focusing now on continuing exporters, the second column of Table 6 further shows that firms with Western parents, unlike their domestic counterparts, do not appear to have increased their sales to the Russian market—consistent with our hypothesis that Western multinationals limited their operations in Russia.[11] In the lower panel of the same table, we again check whether ex-

[10] To capture the latter, we define a binary variable indicating whether the pre-war fraction of exports to the US and the EU was above the mean or not. This variable takes the value zero for Turkish affiliates of Western MNCs.

[11] Chupilkin, Javorcik, Peeva, and Plekhanov (2024), using announcement data collected by Sonnenfeld, Tian, Zaslavsky, Bhansali, and Vakil (2022), document a sharp drop in imports to Russia of products bearing trademarks owned by Western multinationals that have publicly announced their exit from Russia.

posure through exports also matters, by adding an interaction with the firm's pre-war share of exports to the Western countries. The results suggest that for Turkish firms relying heavily on the Western markets for exports, the fear of secondary sanctions or reputational risks have not motivated disengagement. In this richer specification, the effect of exposure through ownership remains significant.

Table 6: Role of Western exposure

Dependent Variable:	Exit probability (1)	Log value exports (2)	Log of unit value (3)	Log of markups (4)
$Post_t \times RUS_d$	-0.000901	0.347a	0.0540a	0.0427a
	(0.00333)	(0.0241)	(0.0198)	(0.00984)
$Post_t \times RUS_d \times$ Western MNC_f	0.229a	-0.312a	0.184a	0.0773a
	(0.0265)	(0.0843)	(0.0458)	(0.0295)
R^2	0.741	0.896	0.948	0.0380
$Post_t \times RUS_d$	-0.00132	0.357a	0.0618b	0.0556a
	(0.00373)	(0.0259)	(0.0245)	(0.0115)
$Post_t \times RUS_d \times$ Western MNC_f	0.228a	-0.322a	0.176a	0.0645b
	(0.0265)	(0.0853)	(0.0477)	(0.0296)
$Post_t \times RUS_d \times$ High West. $Share_f$	0.00168	0.0536	-0.0252	-0.0768a
	(0.00813)	(0.0109)	(0.0407)	(0.0211)
R^2	0.742	0.896	0.948	0.0380
Fixed Effects :				
Firm×Product×Country	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓
# observations	485185	485185	172036	172036

Notes: a, b and c denote statistical significance at the 1, 5 and 10% level, respectively.

Our evidence allows us to carry out an exercise quantifying the extent of export revenue foregone by firms in their efforts to protect reputational standing. As a first step, we run a difference-in-differences specification to compare the growth in exports to Russia by Western MNCs and Turkish exporters heavily reliant on Western markets, with that of other Turkish exporters that are less reliant on Western markets. The results are presented in Table A4. Results show that Western-owned firms experienced significantly slower growth of exports to Russia. Using these estimates, we can proceed with a back-of-the envelope calculation, combining our results with the pre-invasion average monthly exports based on raw data, to obtain an estimate of the fore-

gone export revenues. The annualized foregone revenues for Turkish affiliates of Western MNCs was $ 2.8 million. Another way to assess the effects of reputation risk consists of calculating its tariff-equivalent, using the average trade elasticity reported by Fontagné, Guimbard, and Orefice (2022).[12] In tariff equivalent terms, the estimated reputational effect for Western MNCs amounts to 11.4%.

Consistent with limiting their sales to Russia, MNCs have charged higher prices and markups—compensating for heightened reputational risks. The results presented in columns 3-4 provide supporting evidence. Turkish affiliates of Western MNCs disproportionately increased their prices (and markups) when exporting to the Russian market in the post-invasion period.

Table 7: Role of Western exposure: misclassification

Dependent Variable: Log value exports		
	Domestic exporters	Western MNCs
	(1)	(2)
$Post_t \times RUS_d$	0.230a	-0.125
	(0.0468)	(0.114)
$Post_t \times RUS_d \times Sanctioned_p$	0.167a	-0.117c
	(0.0514)	(0.0614)
$Post_t \times RUS_d \times Similar_p$	0.143a	0.248a
	(0.0494)	(0.0944)
Fixed Effects :		
Firm×Product×Country	✓	✓
Product×Time	✓	✓
Firm×Time	✓	✓
R^2	0.897	0.910
# observations	418677	51775

Notes: a, b and c denote statistical significance at the 1, 5 and 10% level, respectively.

Finally, we investigate whether Turkish affiliates of Western MNCs used other strategies to avoid reputational risks arising from exporting to Russia. One such strategy is misclassifying

[12]This elasticity is calculated as $e^{\hat{\beta}/\sigma} - 1$, where $\hat{\beta}$ is the corresponding DiD estimate reported in column 2 of Table A4, and σ is the average estimated of tariff elasticity (≈ 5.3) as reported by Fontagné, Guimbard, and Orefice (2022).

sanctioned products, which would imply a differential increase in the exports of “similar" products. Results presented in Table 7 show that Turkish affiliates of Western MNCs increased their exports of products closely related to sanctioned products to Russia, suggesting that these firms used misclassification as a strategy to mitigate reputational risks.

5 Conclusions

The ongoing process of geopolitical fragmentation dividing the world into blocks, which resort to bilateral and multilateral sanctions foreshadows a far-reaching transformation of the global economy. There are many unknowns in this process (see the discussion in Felbermayr, Morgan, Syropoulos, and Yotov (2021)). A particularly important question concerns the implications for countries that are able to carve their own economic and political space across blocks, potentially playing a role in attenuating, if only partially, the dissolution of global economic linkages.

This paper addresses this question through the lens of theory and provides empirical evidence based on detailed data on Turkish exports during the 2021-22 period. We document evidence of trade diversion, not creation, and show that the hike in exports to Russia takes place particularly strongly in goods that are under Western sanctions. The hike in trade responds to strong pull factors: we provide evidence of a significant rise in prices and markups charged by Turkish exporters in the Russian market, consistent with a rise of their monopoly power in the post-sanction period. Yet, we also provide evidence that the risk of payment disruption and reputational risks weigh on the incentive to expand trade, motivating adjustment in the way transactions are conducted. We document an increase in the share of Cash-in-Advance payment contracts as well as a shift away from invoicing in the US dollar, in favor or Turkish lira.

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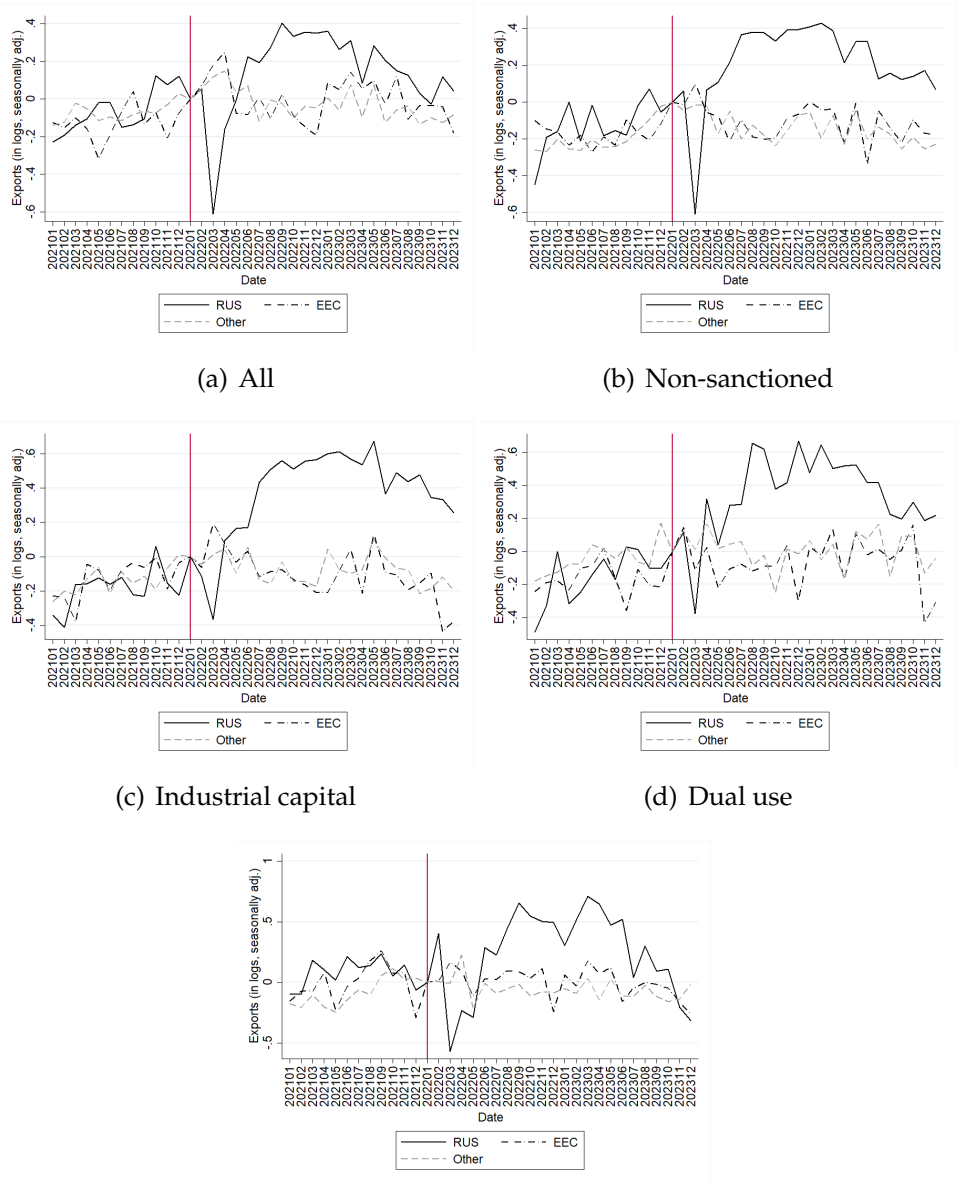
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A Additional Figures and Tables

Figure A1: **Monthly Exports by Destination and Product Type**



(a) All

(b) Non-sanctioned

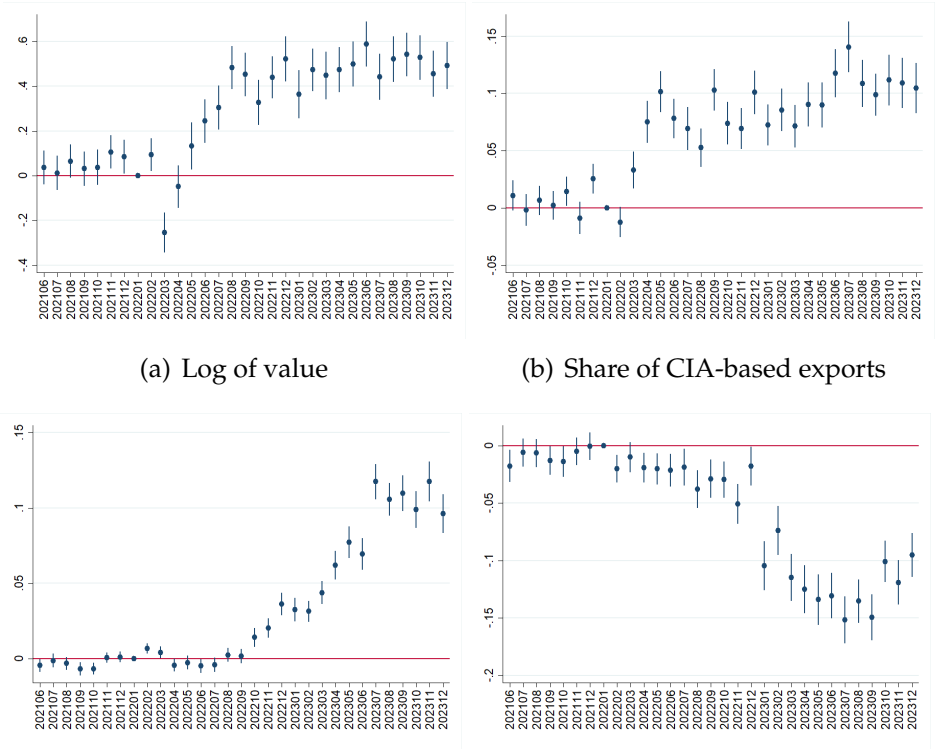
(c) Industrial capital

(d) Dual use

(e) Luxury

Note: The figure plots the (logarithm of) monthly product-country-level exports, demeaned by their product, country, and monthly averages, over the 2021-2023 period. The vertical red line marks the start of the war on Ukraine. Non-demeaned flows exhibit a similar trend.

Figure A2: **Event study estimates**



(a) Log of value (b) Share of CIA-based exports

(c) Share of TRY-denominated exports (d) Share of USD-denominated exports

Note: The figure plots the event study estimates based on equation (4)

Table A1: Baseline DiD Estimates: Including New and Exiting Exporters to Russia

Dependent Variable:	Log Value	Share of CIA-based exports	Share of TRY-den. exports	Share of USD-den. exports
	(1)	(2)	(3)	(4)
$Post_t \times RUS_d$	0.315a	0.0662a	0.0418a	-0.0597a
	(0.0234)	(0.00457)	(0.00198)	(0.00490)
Fixed Effects :				
Firm×Product×Country	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓
R^2	0.896	0.930	0.890	0.937
# observations	742115	742115	742115	742115

Notes: a, b and c denote statistical significance at the 1, 5 and 10% level, respectively.

Table A2: Baseline DiD Estimates: RoW as the Control Group

Dependent Variable:	Log Value	Share of CIA-based exports	Share of TRY-den. exports	Share of USD-den. exports
	(1)	(2)	(3)	(4)
$Post_t \times RUS_d$	0.256a	0.0402a	0.0399a	-0.0448a
	(0.0148)	(0.00264)	(0.00156)	(0.00329)
Fixed Effects :				
Firm×Product×Country	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓
R^2	0.739	0.715	0.670	0.496
# observations	4160387	4160387	4160387	4160387

Notes: a, b and c denote statistical significance at the 1, 5 and 10% level, respectively.

Table A3: Baseline DiD Estimates: Impact of Currency Mismatch

Dependent Variable:	Log Value	Share of CIA-based exports	Share of TRY-den. exports	Share of USD-den. exports
	(1)	(2)	(3)	(4)
$Post_t \times RUS_d$	0.289a	0.0685a	0.0313a	-0.0570a
	(0.0404)	(0.00893)	(0.00231)	(0.00747)
$Post_t \times RUS_d \times Mismatch_f$	0.0456	-0.00277	0.0170a	-0.00469
	(0.0519)	(0.0117)	(0.00345)	(0.00969)
Fixed Effects :				
Firm×Product×Country	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓
R^2	0.895	0.917	0.863	0.927
# observations	485185	485185	485185	485185

Notes: a, b and c denote statistical significance at the 1, 5 and 10% level, respectively. Currency mismatch is defined as the difference between the sum of USD and EUR denominated exports and imports, divided by the sum of total exports and imports at the firm level. This variable is constructed using pre-invasion data, i.e. 2019-2021.

Table A4: DiD Estimates for Export Growth by Firm Type

Dependent Variable:	Annual (12-month) growth of export values	
	(1)	(2)
$\text{Post}_t \times \text{RUS}_d$	-0.00445	0.304a
	(0.0161)	(0.0195)
$\text{Post}_t \times \text{RUS}_d \times$ Western MNC_f		-0.570a
		(0.0644)
$\text{Post}_t \times \text{RUS}_d \times$ High West. Shr._f		-0.0302
		(0.0541)
$\text{RUS}_d \times$ Western MNC_f		0.0874
		(0.0679)
$\text{RUS}_d \times$ High West. Shr._f		-0.809a
		(0.0518)
R^2	0.306	0.320
Fixed Effects :		
Product×Time	✓	✓
Firm×Time	✓	✓
# observations	393430	393430

Notes: a, b and c denote statistical significance at the 1, 5 and 10% level, respectively. The estimating equation is:

$$\Delta Y_{fpdt} = \gamma \text{Post}_t \times \text{RUS}_d + \alpha_{pt} + \alpha_{ft} + \varepsilon_{fpdt},$$

where ΔY_{fpdt} denotes the 12-month change in the value of export values for a given firm-product-destination flow at time t.