# 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, as Turkish exports to Russia have risen sharply, Turkish firms have charged higher markups and prices, increased their reliance on cash-in-advance transactions and invoiced in Turkish liras instead of dollars. However, affiliates of Western MNCs showed a significantly lower growth in exports to Russia, suggesting a desire to avoid reputational costs. A back-of-the-envelope calculation points to annualized foregone revenues of $50 million for Turkish affiliates of Western MNCs, with the reputational risk effect equivalent to tariffs of up to 376%.

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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

[1]Secondary sanctions aim to prevent third parties from trading with countries subject to sanctions imposed by another country, even if these third parties are not citizens of the sanctioning country or based in the sanctioning country. For instance, when the US reinstated sanctions against Iran, it reinstated secondary sanctions for non-US persons trading with Iran. "While there are a range of penalties that can be imposed under various U.S. sanctions regulations, the most severe is the loss of access to the financial system in the U.S. (and by U.S. financial institutions, located wherever). This measure effectively bars the sanctioned party from doing business with customers and suppliers in the U.S., since it prevents access to the currency. It also makes being a significant force in international trade considerably more difficult, as the U.S. dollar is not only involved in over 60 percent of foreign exchange deals (...), but is also the primary currency in which important commodities such as oil and precious metals are typically bought and sold." (See Dow Jones, https://www.dowjones.com/professional/risk/glossary/sanctions/secondary-sanctions/). According to an article by Reuters, published on May 15, 2024, "Raiffeisen Bank International (RBIV.VI), was warned by the U.S. Treasury in writing that its access to the U.S. financial system could be curbed because of its Russia dealings ..." (see https://www.reuters.com/business/us-warned-raiffeisen-access-dollar-system-could-be-curbed-over-russia-source-2024-05-15/).

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, and especially digging into the economics of "reputational risk".

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 (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 experienced a significant increase in trade with Russia, relative to its trade with other countries, after Russia's invasion of Ukraine in February 2022. This would be consistent with the trade-diversion hypothesis. Secondly, reputational risk may have deterred some firms from expanding their engagement with Russia, depending on their ownership structure. Specifically, we test whether reputational risks predominantly affected Turkish affiliates of Western multinationals, including those with US ownership. Thirdly, 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. Fourthly, 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. Finally, 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.

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 signifi-

cant upsurge of Turkish exports to Russia after the start of the war, of about 33 percent, relative to the exports to the rest of the world. This effect is visible in both values and quantities and is confirmed by event studies.

While many Turkish firms expanded their operations in Russia, Western MNCs – facing higher reputational costs due to their extensive international operations – held back. For the average Turkish affiliate of a Western MNC, foregone annual revenues from exports to Russia are estimated at around $50 million. Interpreted through the lens of trade elasticities, these reputational costs are substantial. Based on the estimates of Fontagné, Guimbard, and Orefice (2022), the effect is equivalent to a tariff of approximately 25%. Using the short-run elasticity estimates of Boehm, Levchenko, and Pandalai-Nayar (2023), the implied tariff equivalent reaches 376%, highlighting the strength of this non-pecuniary barrier to trade. As anticipated, Turkish affiliates of non-Western multinationals behaved in the same way as Turkish companies.

The findings for affiliates of Western MNCs were driven by affiliates with US ownership, which arguably are the most vulnerable to the US sanctions. Affiliates with a 10% US equity share did not expand their exports to Russia after the war started, relative to their exports elsewhere, while affiliates with a higher US equity share actually saw a relative decline in their sales to Russia.

A further analysis focusing on margins of adjustment shows that Western affiliates were more likely to exit the Russian market than any other market after the war started, while the opposite was true for Turkish firms and non-Western affiliates. And at the time when Turkish exporters were increasingly entering the Russian market with new products, Western affiliates (primarily those with US ownership) were less likely to do so. Although some new exporters, including Western affilates, entered the Russian market, the share of Western affiliates in Turkish exports to Russia dropped from 16% in the pre-invasion to 5% in the post-invasion period.

Among the Turkish firms that continued exporting to Russia, we observe adjustments

along several margins. These firms increasingly moved away from invoicing in US dollars and adopted Turkish lira as the preferred currency. This finding is consistent with the increased cost of conducting transactions in Western currencies on the part of Russian firms after the imposition of sanctions. There was also a significant shift toward more secure payment terms, with greater use of CIA, consistent with the idea that Turkish exporters reacted to the increased risk of non-payment. In addition, these firms raised both their export prices and markups.

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 6 concludes.

# 2 Data and Background

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; and we finish with some summary statistics to set the stage for our analysis.

## 2.1 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. We intentionally exclude re-exports from the analysis, to focus on trade diversion clean of the possibility of goods produced by third (sanctioning) countries be-

ing reshipped via Türkiye.

We merge the customs data with annual census data, which provide information on firms' total employment and ownership structure. A firm is classified as an affiliate of a Western MNC if at least 10% of its ownership is held by a company based in the US, EU, Canada, or Australia.

## 2.2 Sanctions on Russia

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.

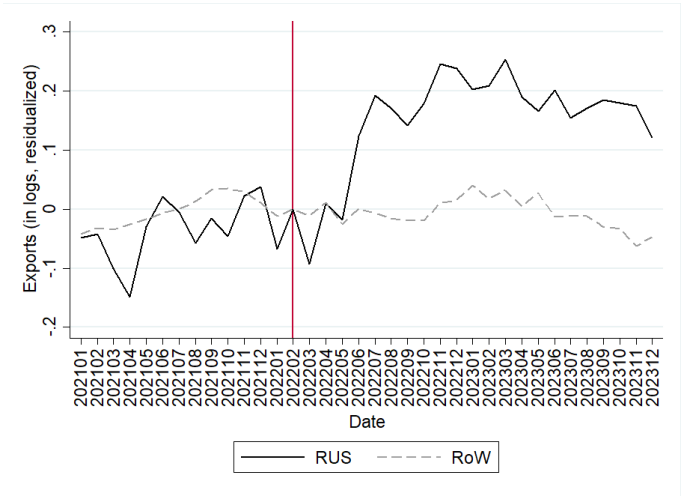
In addition to exports, sanctions have also applied to investments in a number of sectors; use of public funds; imports from Russia of certain goods such as coal, iron and steel, and wood; aviation, Russian freight operators; and restrictions on financial services including transactions with Russia's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

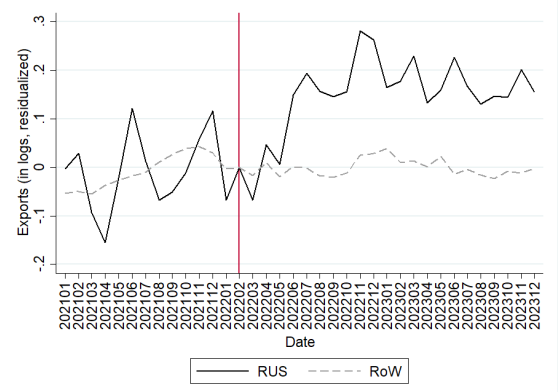
## 2.3 Descriptive statistics

To set the stage and motivate our econometric analysis, Figure 1 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 the rest of the world. The export boom was acoss the board—for goods that fall under the EU sanctions as well as for goods that are not subject to the EU sanctions.

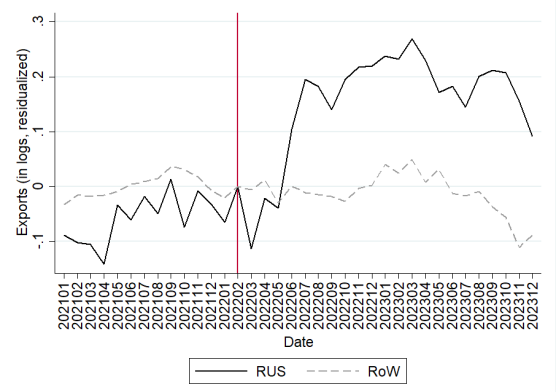
Figure 1: **Monthly Exports by Destination and Product Type**




(a) All




(b) Non-sanctioned




(c) Sanctioned

**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.

There was substantial heterogeneity in Turkish firms' responses to the imposition of

Table 1: Number of Turkish exporters to Russia by type

| Number of firms | Pre-invasion | | Post-invasion | |
|---|---|---|---|---|
| | Western MNCs | Others | Western MNCs | Others |
| | 283 | 9,759 | 274 | 14,541 |
| Of which: | | | | |
| Continuing | | | 195 | 6,497 |
| Of which: | | | | |
| Reduced exports | | | 99 | 2,036 |
| Increased exports | | | 96 | 4,461 |
| Exit | 88 | 3,262 | - | - |
| New Entry | - | - | 79 | 8,044 |
| Contribution to exports (%) | 16 | 84 | 5 | 95 |

sanctions on Russia, both at the extensive and intensive margins (see Table 1). Out of the 9,759 Turkish firms that were exporting to Russia before the invasion, 3,262 firms (33%) exited the Russian market entirely. Among the 6,497 continuing Turkish exporters, 2,036 (21%) reduced their exports, while 4,461 firms (45%) increased them.

Western MNCs exhibit a similarly varied pattern. Among the 283 Western MNCs exporting to Russia before the invasion, 31% exited the market, 34% reduced their exports, but only 33% – compared to 45% of Turkish firms – increased them.

The post-invasion period also saw substantial new entry into the Russian market, particularly among Turkish firms. A total of 8,044 Turkish firms began exporting to Russia after the sanctions – more than double the number that exited. These entrants were larger: on average, their export volumes were twice as large as those of the firms that exited. Entry among Western MNCs was far more limited. Only 79 new MNC exporters entered the Russian market – fewer than the number that exited, and the average export size of these entrants was half that of the exiters. As a result, the share of Western MNCs in total Turkish exports to Russia declined significantly, falling from 16 percent to just 5 percent.

# 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 $\rho_i, \eta$ to denote elasticities within and across industries, respectively.

## 3.1 Real and financial determinants of trade diversion and invoicing currency

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

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

[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 $P^c_{d,t}$.

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 with different terms of payment, to be discussed below. Denoting with $mc$ marginal costs in domestic currency, 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 $P^d_{d,t} \equiv \left( \sum_f P^d_{f,d,t} \right)^{\frac{1}{1-\rho}}$; $\chi_d$ 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 are conditional on such choice, i.e., we write $p^c_{f,o,d,t} e^c_{o,d,t}$. Most crucially, the term in reputational risk captures in reduced form the cross-destination dimension of the firm choice in a market: with some probability, trading in market "d" may lead to a loss of profits in other markets.

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 $\chi_d$.

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 $\gamma$ at 1, specifying quantities, prices and payments. Specifically, $\gamma_q$ 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 $\gamma_p$ 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 $\mu_q$ of the contractual quantity in the case of CIA contracts; and the exporters will receive a fraction $\mu_p$ 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 $\gamma_p$ falls and $\mu_p$ rises, jointly offsetting the effect of any contemporaneous change in $\gamma_q$ and $\mu_q$. 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

The choice of the currency in which firms set prices is relevant to the extent that it impinges on the covariance between total export sale revenues (price multiplied by quantities) and overall costs. We have argued above that reputation costs may be a factor driving this covariance, when transactions in some currency may exposed the firms to international scrutiny. In a large body of literature, however, the choice of currency denomination of exports has been studied in models with nominal rigidities, as such choice then directly matters for a firm ability to stabilize exports markups and profits around their natural level.[5]

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

[5] 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.

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).[6] 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.[7] Under this approximation, the difference in expected profits from choosing a currency $CI = \{USD, EUR, RUB, RMB\}$

[6] Recent literature stresses the relevance of currency denomination of trade credit a firm receives to acquire intermediate inputs, see e.g., Bahaj and Reis (2021).

[7] 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 $c$; $\lambda_{fd}$ is a positive, non-stochastic term;[8] $\Gamma_{fd}$ 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 $c$; $\psi_f^c$ 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 $\Phi_f^{C0}$ 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.[9] 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.

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

[9] 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 various subsections, discussing all the dimensions the theory suggests to be relevant to the adjustment of Turkish exporters to the post-sanction environment.

## 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 the rest of the world (RoW). 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, and time (year-month). Our main outcomes of interest are the (logarithm of the) value and quantity of 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 $\beta$, which captures the effect of the interaction between the binary variable for post-invasion period ($\text{Post}_t$) and another binary variable indicating Russia as destination ($\text{RUS}_d$).

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, $\beta^l$, compare Turkish exports to Russia with Turkish exports to RoW for each month in the post-invasion period relative to the base period, i.e. February 2022.

## 4.2 Turkish exports to Russia

As the Western sanctions on Russia in 2022 caused a sudden dramatic drop in Western exports to Russia (Chupilkin, Javorcik, and Plekhanov (2023)), 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 exports to Russia unrestricted.

Table 2: Impact on export values and quantities

| Dep. Variable: | Log Value (1) | Log Quantity (2) |
|---|---|---|
| $\text{Post}_t \times \text{RUS}_d$ | 0.284a | 0.249a |
| | (0.0273) | (0.0282) |
| **Fixed Effects :** | | |
| Firm×Product×Country | ✓ | ✓ |
| Product×Time | ✓ | ✓ |
| Firm×Time | ✓ | ✓ |
| $R^2$ | 0.867 | 0.897 |
| # observations | 14436818 | 14436818 |

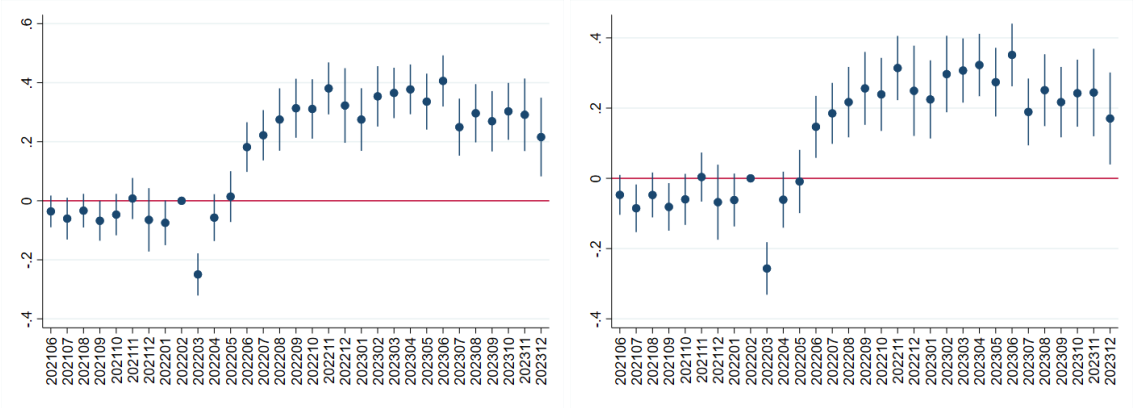
*Notes:* a, b and c denote statistical significance at the 1, 5 and 10% level, respectively.

Table 2 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 column of the table, in the aftermath of Russia's invasion of Ukraine, Turkish firms increased their exports to Russia by 28.4 log points (about 33 percent) relative to their exports to RoW. 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.

The second column of Table 2 presents the estimates from equation (3) using export quantity as the outcome. The coefficient is slightly smaller than that for export value, suggesting that Turkish exporters also raised their prices when exporting to Russia. 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.

Figure 2: **Event study estimates**



(a) Log of value (b) Log of quantity

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

The differences-in-differences results are also confirmed by the standard event study exercise presented in Figure 2. The event study shows that no meaningful pre-trends have been present and that Turkish exports to Russia have been steadily increasing over time.

Table 3: Impact on export values and quantities by firm type

| Dep. Variable: | Log Value | Log Quantity | Log Value | Log Quantity |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| $Post_t \times RUS_d$ | 0.300a | 0.266a | 0.299a | 0.265a |
| | (0.0271) | (0.0276) | (0.0275) | (0.0281) |
| $Post_t \times RUS_d \times$Western $MNC_f$ | -0.215b | -0.214b | -0.214c | -0.213c |
| | (0.103) | (0.106) | (0.115) | (0.116) |
| $Post_t \times RUS_d \times$Other $MNC_f$ | | | 0.0717 | 0.0464 |
| | | | (0.0904) | (0.0949) |
| **Fixed Effects :** | | | | |
| Firm×Product×Country | ✓ | ✓ | ✓ | ✓ |
| Product×Time | ✓ | ✓ | ✓ | ✓ |
| Firm×Time | ✓ | ✓ | ✓ | ✓ |
| $R^2$ | 0.867 | 0.897 | 0.867 | 0.897 |
| # observations | 14436818 | 14436818 | 14436818 | 14436818 |

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

Specific to war sanctions are the risk of being targeted by secondary measures as well as repu-

tational risk, which firms face when maintaining commercial ties with Russia. Once these ties are singled out in the open, firms could be subject to boycotts 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. In particular, one can expect Turkish affiliates of Western multinationals to be the least willing to increase their engagement with Russia.

We explore the potential heterogeneity in the response of firms depending on their ownership structure and test whether affiliates of Western MNCs altered their export behavior differently from other firms. The results are presented in Table 3. Columns (1) and (2) report the estimates for export value and quantity, respectively. While the baseline effect of the sanctions-induced demand shock (captured by the interaction $Post \times RUS$) remains positive and significant, the additional interaction with a Western MNC affiliate indicator yields a negative and significant coefficient. This suggests that affiliates of Western MNCs were less likely to expand exports to Russia in the post-invasion period, consistent with the idea that reputational concerns may have constrained their ability or willingness to serve the Russian market.

To further investigate the role of firm ownership, we differentiate between affiliates of Western MNCs and those affiliated with MNCs from other regions. Columns (3) and (4) of Table 3 present the results. The interaction term $Post \times RUS$ remains positive and significant, indicating an overall increase in exports to Russia following the the invasion of Ukraine. When distinguishing MNC affiliates by their origin, we find that the negative effect is driven entirely by Western MNC affiliates. The coefficient on the triple interaction involving Western MNCs is negative and statistically significant in both the value and quantity regressions, while the interaction with other MNCs is small and statistically insignificant. These results suggest that reputational concerns associated with operating in the Russian market were specific to firms with ownership ties to Western countries, while affiliates of non-Western MNCs did not exhibit the same restraint in their export behavior.

One potential concern is that the differential behavior of Western MNC affiliates may reflect differences in firm size rather than ownership per se. To address this, we control for firm size by introducing an indicator for large domestic firms – defined as those above the mean threshold in either employment or total sales, and interact it with the treatment variable. As presented in Table

Table 4: Impact on export values and quantities by firm type

| Dep. Variable: | Log Value | | Log Quantity | |
|---|---|---|---|---|
| Size measure | Employment | Sales | Employment | Sales |
| | (1) | (2) | (3) | (4) |
| $\text{Post}_t \times \text{RUS}_d$ | 0.295a | 0.281a | 0.266a | 0.249a |
| | (0.0512) | (0.0576) | (0.0501) | (0.0534) |
| $\text{Post}_t \times \text{RUS}_d \times \text{Western MNC}_f$ | -0.210c | -0.196c | -0.214c | -0.197c |
| | (0.112) | (0.115) | (0.112) | (0.113) |
| $\text{Post}_t \times \text{RUS}_d \times \text{Other MNC}_f$ | 0.0760 | 0.0902 | 0.0454 | 0.0621 |
| | (0.100) | (0.104) | (0.104) | (0.105) |
| $\text{Post}_t \times \text{RUS}_d \times \text{Large}_f$ | 0.00694 | 0.0276 | -0.00170 | 0.0234 |
| | (0.0599) | (0.0649) | (0.0600) | (0.0627) |
| **Fixed Effects :** | | | | |
| Firm×Product×Country | ✓ | ✓ | ✓ | ✓ |
| Product×Time | ✓ | ✓ | ✓ | ✓ |
| Firm×Time | ✓ | ✓ | ✓ | ✓ |
| $R^2$ | 0.867 | 0.867 | 0.897 | 0.897 |
| # observations | 14436818 | 14436818 | 14436818 | 14436818 |

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

4, the inclusion of the size interaction does not alter our main findings. The negative and significant effect for Western MNC affiliates persists across all specifications, while the coefficient on the interaction involving large domestic firms is small and statistically insignificant. This suggests that the muted export response of Western MNCs is not driven by size, but rather by differences in ownership and possibly associated reputational risks.

We further investigate which Western countries are driving the observed constrained behavior in exporting to Russia after its full-scale invasion of Ukraine. In particular, we examine the role of U.S. ownership by interacting the indicator for exporting to Russia in the post-invasion period with the share of U.S. ownership (in percentage points) in each firm. Table 5 presents the results. The coefficient on the triple interaction with U.S. ownership share is negative and statistically significant in both the value and quantity regressions, indicating that the dampening effect is stronger for firms with higher U.S. ownership. Once we control for U.S. share directly, the previously estimated effect for Western MNC affiliates becomes smaller in magnitude and loses statistical significance. This suggests that U.S.-owned firms are the primary drivers of the

observed reputational response, consistent with the higher salience of sanctions enforcement and reputational risk for U.S. entities during this period.

Table 5: Impact on export values and quantities by firm type

| Dep. Variable: | Log Value | Log Quantity |
|---|---|---|
| | (1) | (2) |
| $\text{Post}_t \times \text{RUS}_d$ | 0.295a | 0.266a |
| | (0.0512) | (0.0501) |
| $\text{Post}_t \times \text{RUS}_d \times \text{Western MNC}_f$ | -0.107 | -0.0926 |
| | (0.0939) | (0.0982) |
| $\text{Post}_t \times \text{RUS}_d \times \text{US Share}_f$ | -0.032a | -0.037a |
| | (0.0084) | (0.0102) |
| $\text{Post}_t \times \text{RUS}_d \times \text{Other MNC}_f$ | 0.0761 | 0.0454 |
| | (0.100) | (0.104) |
| $\text{Post}_t \times \text{RUS}_d \times \text{Large}_f$ | 0.00695 | -0.00170 |
| | (0.0599) | (0.0600) |
| **Fixed Effects :** | | |
| Firm×Product×Country | ✓ | ✓ |
| Product×Time | ✓ | ✓ |
| Firm×Time | ✓ | ✓ |
| $R^2$ | 0.867 | 0.897 |
| # observations | 14436818 | 14436818 |

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

## 4.3 Margins of adjustment

Having established that Western MNC affiliates responded differently to the shock induced by Western sanctions on Russia in the aftermath of its full-scale invasion of Ukraine, we next explore the margins along which these firms adjusted. In particular, we examine extensive margin responses such as market exit and product-level entry, as well as intensive margin adjustments in pricing, currency invoicing, and payment choices.

We begin by analyzing firm-level exit decisions from destination markets following the invasion of Ukraine. To do so, we estimate the following specification:

$$\text{Exit}_{fd} = \beta_1 \text{RUS}_d + \beta_2 \text{RUS}_d \times \text{Western MNC}_f + \alpha_f + e_{fd}, \tag{5}$$

where $\text{Exit}_{fd}$ is a binary variable that takes on the value one if firm $f$ stopped exporting to destination country $d$ in the post-invasion period. The equation includes firm fixed effects to account for any firm-specific shocks that could be correlated with the exit from its export markets.

Table 6 presents the results obtained from estimating equation (5). The results suggest that Turkish exporters with direct ties to Western MNCs were disproportionately affected by geopolitical tensions in the Russian market, as evidenced by the significant increase in their exit probability post-invasion (column 2). The same is not true for domestic exporters: the baseline effect on Turkish exporters is negative and statistically significant, suggesting that they were less likely to exit the Russian market relative to other destinations post invasion. This result highlights that the main drivers of exit are tied to firm-specific factors rather than market-level risks, and it is consistent with reputational or regulatory pressures being particularly salient for Western MNCs.[10]

Table 6: Exit from the Russian market in the post-invasion period

| Dep. Vrb.: | Dummy for exiting a country after Feb 2022 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| $\text{RUS}_d$ | -0.0372a | -0.0429a | | -0.0495a |
| | (0.00469) | (0.00475) | | (0.00791) |
| $\text{RUS}_d \times$ Western $\text{MNC}_f$ | | 0.168a | 0.176a | 0.177a |
| | | (0.0284) | (0.0284) | (0.0296) |
| $\text{RUS}_d \times$ US $\text{Share}_f$ | | | | -0.0746 |
| | | | | (0.230) |
| $\text{RUS}_d \times$ Other $\text{MNC}_f$ | | | | 0.130a |
| | | | | (0.0487) |
| $\text{RUS}_d \times$ $\text{Large}_f$ | | | | 0.00845 |
| | | | | (0.00991) |
| **Fixed Effects :** | | | | |
| Firm | ✓ | ✓ | ✓ | ✓ |
| Country | | | ✓ | |
| $R^2$ | 0.334 | 0.334 | 0.360 | 0.334 |
| # observations | 447789 | 447789 | 447789 | 447789 |

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

The effects presented in the second column of Table 6 are robust to the inclusion of other

[10] 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.

controls, including destination-level fixed effects (column 3) as well as adding interactions with U.S. ownership share and firm size (column 4). Finally, while Turkish exporters affiliated with non-Western MNCs were also more likely to exit the Russian market after February 2022, the estimated effect is smaller than the one for the affiliates of Western MNCs.

Among firms that continued exporting to Russia, Western MNC affiliates also exhibited distinct patterns. Table 7 restricts the sample to continuing exporters, i.e. those that exported to Russia pre and post invasion, and shows that Western MNCs expanded exports significantly less than other firms.

Table 7: Effect on export values and quantities for continuing exporters

| Dependent Variable: | Log Value (1) | Log Quantity (2) |
|---|---|---|
| $\text{Post}_t \times \text{RUS}_d$ | 0.299a | 0.264a |
| | (0.0273) | (0.0279) |
| $\text{Post}_t \times \text{RUS}_d \times \text{Western MNC}_f$ | -0.213c | -0.211c |
| | (0.116) | (0.117) |
| **Fixed Effects :** | | |
| Firm×Product×Country | ✓ | ✓ |
| Product×Time | ✓ | ✓ |
| Firm×Time | ✓ | ✓ |
| $R^2$ | 0.874 | 0.900 |
| # observations | 5707558 | 5707558 |

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

Continuing exporters also adjusted their transaction terms, e.g. payment methods and currency invoicing. Table 8 shows that, following the shock, firms shifted toward CIA terms and away from USD and EUR invoicing, with a corresponding increase in TRY-denominated transactions. These shifts are consistent with efforts to manage heightened counterparty and financial risk. Interestingly, Western MNC affiliates were significantly less likely to increase the share of TRY-denominated exports, suggesting more limited flexibility or a stronger preference to maintain pre-existing transaction currencies.[11]

Table 9 investigates prices and markups, following the approach developed by Corsetti, Crow-

[11]Table A1 in the appendix further investigates the the importance of different channels predicted by the model in drivinf the effect of the invasion on currency invoicing.

Table 8: Effect on payment choice and currency denomination for continuing exporters

| Dependent Variable: | Share of CIA-based exports (1) | Share of TRY-den. exports (2) | Share of USD-den. exports (3) | Share of EUR-den. exports (4) |
|---|---|---|---|---|
| $\text{Post}_t \times \text{RUS}_d$ | 0.0643a | 0.0462a | -0.0526c | -0.0315a |
| | (0.0185) | (0.00771) | (0.0274) | (0.0100) |
| $\text{Post}_t \times \text{RUS}_d \times \text{Western MNC}_f$ | -0.00475 | -0.0420a | 0.0361 | 0.0412 |
| | (0.0590) | (0.00806) | (0.0428) | (0.0263) |
| **Fixed Effects :** | | | | |
| Firm×Product×Country | ✓ | ✓ | ✓ | ✓ |
| Product×Time | ✓ | ✓ | ✓ | ✓ |
| Firm×Time | ✓ | ✓ | ✓ | ✓ |
| $R^2$ | 0.889 | 0.826 | 0.891 | 0.893 |
| # observations | 5707558 | 5707558 | 5707558 | 5707558 |

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

ley, Han, and Song (2023) which adopted the methodology by Knetter (1989) for application to large custom datasets. This approach 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. 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.[12]

The results are presented in Table 9. We find that, on average, exporters to Russia increased

[12]If we had a balanced panel at the product level, the relative change in markups across destinations obtained by differencing out marginal costs would be precisely estimated under the assumption that these costs have no destination-specific component. Panels obtained from custom data are, however, unbalanced. In this case direct differentiation would work only if the set of destination varied 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 9 relative to the baseline.

both unit values and estimated markups, suggesting increased market power or a pass-through of increased risks and costs. However, the responses do not appear to differ systematically for Western MNC affiliates, implying that markup adjustment was a general response rather than one specific to ownership structure.

Table 9: Effect on unit values and markups for continuing exporters

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Log of unit value | | Log of markups | |
| $\text{Post}_t \times \text{RUS}_d$ | 0.0367a | 0.0347b | 0.0406a | 0.0409a |
| | (0.0129) | (0.0135) | (0.0104) | (0.0106) |
| $\text{Post}_t \times \text{RUS}_d \times$ Western $\text{MNC}_f$ | | 0.0274 | | -0.00433 |
| | | (0.0453) | | (0.0464) |
| $R^2$ | 0.926 | 0.926 | 0.0001 | 0.0001 |
| **Fixed Effects :** | | | | |
| Firm×Product×Country | ✓ | ✓ | ✓ | ✓ |
| Product×Time | ✓ | ✓ | ✓ | ✓ |
| Firm×Time | ✓ | ✓ | ✓ | ✓ |
| # observations | 6059902 | 6059902 | 6059902 | 6059902 |

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

Finally, we examine adjustments at the product margin. Table 10 presents results where the dependent variable is an indicator for exporting a new product to a given destination. We find that while firms were generally more likely to introduce new products to Russia after the shock, Western MNC affiliates were significantly less likely to do so. This differential behavior is again most pronounced for firms with higher shares of U.S. ownership. In contrast, firms affiliated with non-Western MNCs or large domestic firms were more likely to expand their product scope in Russia.

# 5 Quantification

We conclude by quantifying the economic cost of reputational concerns for Western MNC affiliates. Specifically, we estimate how much export revenue these firms forewent in the aftermath of the invasion of Ukraine, both by reducing their exports to Russia and by exiting the market altogether.

Table 10: Exporting new products for continuing exporters

| Dep. Vrb.: | Dummy for exporting a new product to a country | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| $RUS_d$ | 0.00248a | 0.0373a | | 0.0958a |
| | (0.000113) | (0.00167) | | (0.0118) |
| $RUS_d \times$ Western $MNC_f$ | | -0.0363a | -0.0342a | 0.466b |
| | | (0.00177) | (0.00166) | (0.205) |
| $RUS_d \times$US $Share_f$ | | | | -0.023a |
| | | | | (0.0059) |
| $RUS_d \times$Other $MNC_f$ | | | | 0.666b |
| | | | | (0.282) |
| $RUS_d \times Large_f$ | | | | 0.536a |
| | | | | (0.0426) |
| **Fixed Effects :** | | | | |
| Firm×Product | ✓ | ✓ | ✓ | ✓ |
| Country | | | ✓ | |
| $R^2$ | 0.373 | 0.373 | 0.375 | 0.373 |
| # observations | 52401090 | 52401090 | 52401090 | 52401090 |

*Notes:* The table shows the estimates obtained from estimating the following equation:

$$\text{New Product}_{fpd} = \beta_1 \text{RUS}_d + \beta_2 \text{RUS}_d \times \text{Western MNC}_f + \alpha_{fp} + e_{fpd}.$$

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

To do so, we compare the export growth of Western MNC affiliates to that of other Turkish exporters. We compute 12-month midpoint growth in export value across firm-product-destination triplets and use the following difference-in-differences specification:

$$\frac{Val_{fpd,t} - Val_{fpd,t-12}}{0.5(Val_{fpd,t} + Val_{fpd,t-12})} = \gamma \text{Post}_t \times \text{RUS}_d + \alpha_{fpd} + \alpha_{pt} + \alpha_{ft} + \varepsilon_{fpdt} \quad (6)$$

As shown in Table 11, exports by Turkish firms to Russia increased significantly after the invasion while Western MNC affiliates experienced a sharp contraction in exports to Russia, with an estimated growth differential of over 1.18 percentage points relative to the former group.

We combine this estimate with information on pre-invasion average monthly export values to Russia by Western MNC affiliates to compute the implied revenue loss by an average Western MNC affiliate of almost USD 50 million. This back-of-the-envelope calculation captures both the extensive and intensive margins of adjustment.

Table 11: Exporting new products for continuing exporters

| Dependent Variable: | Annual (12-month) mid-point growth of export values | |
|---|---|---|
| | (1) | (2) |
| $\text{Post}_t \times \text{RUS}_d$ | -0.0427 | 0.0760a |
| | (0.0473) | (0.0287) |
| $\text{Post}_t \times \text{RUS}_d \times$ Western $\text{MNC}_f$ | | -1.186a |
| | | (0.278) |
| $R^2$ | 0.439 | 0.439 |
| **Fixed Effects :** | | |
| Firm×Product×Country | ✓ | ✓ |
| Product×Time | ✓ | ✓ |
| Firm×Time | ✓ | ✓ |
| # observations | 26750694 | 26750694 |

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

To interpret the magnitude of this cost, we express it as a tariff-equivalent – a common approach in the trade literature. Following standard formulas, we translate the estimated reduction in export growth into an ad valorem tariff equivalent using alternative values for the elasticity of substitution ($\sigma$). As reported in Table 12, the implied tariff ranges from approximately 25% (using a high trade elasticity) to over 375% (under a short-run elasticity estimate). These estimates highlight the economic significance of reputational concerns: the constrained behavior observed among Western MNC is equivalent to facing a prohibitively high tariff on exports to Russia.

Table 12: Quantification of the reputational risk

| | $\tau^r$ |
|---|---|
| $\sigma = 5.3$ (Fontagné, Guimbard, and Orefice (2022)) | 25.1% |
| $\sigma = 0.76$ (Short-run estimate in Boehm, Levchenko, and Pandalai-Nayar (2023)) | 376.1% |
| $\sigma = 2$ (Long-run estimate in Boehm, Levchenko, and Pandalai-Nayar (2023)) | 80.9% |

*Notes:* Tariff equivalence, $\tau^r$, is calculated using the following formula: $\tau^r = 100 \times (\exp(\hat{\gamma}/\sigma) - 1)$

# 6 Conclusions

The ongoing process of geopolitical fragmentation and increasing use of bilateral and multilateral sanctions foreshadows a far-reaching transformation of the global economy. There are many un-

knowns 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 geopolitical rivals, 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 2021-23 period. We focus on the trade dynamics between Türkiye and Russia following Russia's full-scale invasion of Ukraine in 2022 and the subsequent imposition of Western sanctions.

Our empirical findings reveal a 33% surge in Turkish exports to Russia compared to other destinations. However, Western multinational affiliates in Türkiye refrained from expanding in Russia due to reputational concerns, leading to an estimated $50 million in foregone annual revenue. For U.S.-owned affiliates, the effect was even stronger, with some experiencing a relative decline in sales to Russia.

The hike in trade responded 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. However, 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 of Turkish lira.

Overall, our study highlights how firms strategically adjust trade behavior in response to sanctions, balancing risks and opportunities in a rapidly changing geopolitical landscape.

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# A Additional Figures and Tables

Table A1: Channels for the effect on currency invoicing

| Dependent Variable: | Share of TRY-den. exports (1) | Share of USD-den. exports (2) | Share of EUR-den. exports (3) |
|---|---|---|---|
| $\text{Post}_t \times \text{RUS}_d$ | 0.0283a | -0.0365c | -0.0339a |
| | (0.00558) | (0.0216) | (0.000958) |
| $\text{Post}_t \times \text{RUS}_d \times \text{Currency mismatch}_f$ | 0.0122 | -0.00444 | 0.0123 |
| | (0.00869) | (0.0215) | (0.0125) |
| $\text{Post}_t \times \text{RUS}_d \times \text{Share of TRY den. exports}_d^{-f}$ | 0.102a | | |
| | (0.0259) | | |
| $\text{Post}_t \times \text{RUS}_d \times \text{Share of USD den. exports}_d^{-f}$ | | 0.135a | |
| | | (0.0371) | |
| $\text{Post}_t \times \text{RUS}_d \times \text{Share of EUR den. exports}_d^{-f}$ | | | 0.122a |
| | | | (0.0340) |
| **Fixed Effects :** | | | |
| Firm×Product×Country | ✓ | ✓ | ✓ |
| Product×Time | ✓ | ✓ | ✓ |
| Firm×Time | ✓ | ✓ | ✓ |
| $R^2$ | 0.962 | 0.928 | 0.931 |
| # observations | 14436818 | 14436818 | 14436818 |

*Notes:* Currency mismatch$_f$ captures the firm's pre-invasion currency mismatch on its international trade transactions. It 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. Share of TRY den. exports$_d^{-f}$ denotes the average share of TRY-denominated exports by other Turkish firms, i.e. excluding $f$, serving country $d$. Note that this variable is firm-country-time specific as it excludes the firm itself when calculating the average. Share of USD den. exports$_d^{-f}$ and Share of EUR den. exports$_d^{-f}$ are defined similarly. a, b and c denote statistical significance at the 1, 5 and 10% level, respectively.