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Giancarlo Corsetti, Banu Demir, Beata Javorcik

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Oxford, OX1 3UQ

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Giancarlo Corsetti † Banu Demir ‡ Beata Javorcik §

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Abstract

Geopolitical fragmentation triggers complex dynamics in international trade. Sanctions forcing existing (large) exporters to discontinue or reduce their sales in target countries create profit opportunities in these markets. But firms responding to these opportunities face (i) risk of nonpayment, (ii) reputational risks and the threat of punitive measures, if exposed trading with unfriendly countries and (iii) higher costs of established trading practice, e.g., payment in international currencies through international circuits. This paper builds a stylized model accounting for these factors and provides empirical evidence exploiting developments in Türkiye's international trade in the aftermath of Russia's invasion of Ukraine and the subsequent introduction of western sanctions on Russia. It shows that Turkish exports to Russia have risen sharply across sanctioned and nonsanctioned products, with Turkish firms charging higher markups and prices. These developments were accompanied by an increase in the share of cash-in-advance transactions and the share of Turkish firms invoicing in Turkish liras instead of dollars. Overall, the paper provides evidence of strong trade diversion, particularly for products for which the pre-war market share of European exporters was high. Yet, exports of firms with significant Western ties via ownership and trade have dropped or remained unchanged.

JEL Codes: F13, F14, F51
Keywords: sanctions, trade diversion, dominant currency pricing, producer currency pricing, cash in advance

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†European University Institute and CEPR; email giancarlo.corsetti@eui.eu
‡Oxford, Bilkent, and CEPR; email banu.demirpakel@economics.ox.ac.uk
§Oxford, EBRD, and CEPR; email beata.javorcik@economics.ox.ac.uk

1 Introduction

Rising geopolitical tensions and the proliferation of sanctions have far-reaching and complex implications on 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. 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. Second, the extension of restrictive measures to the financial and payment systems raises the financial costs of cross-border transactions, up to disrupting 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 the 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.

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 the US or those with ownership links to the US, 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 structure 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 2022, thus cover 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 evenly spread across both sanctioned and nonsanctioned products. 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 modest but significant increase in the

share of cash-in-advance transactions in exports to Russia, consistent with the idea that Turkish exporters acted on the risk of non-payment. We document a moderate but significant increase in unit values and markups charged by Turkish exporters, 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 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 and Stein (2020)). 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 consideration 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 and Stein (2020)). We provide evidence of a marginal exit from the dollar, into "producer currency pricing", motivated by 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

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. The sample period covers from January 2021 until December 2022. 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.

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).

In the period following Russia's invasion of Ukraine, the total number of Turkish firms exporting to Russia more than doubled—rising to about 13,500, from a pre-invasion level as low as 6,465. 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 (75 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)).

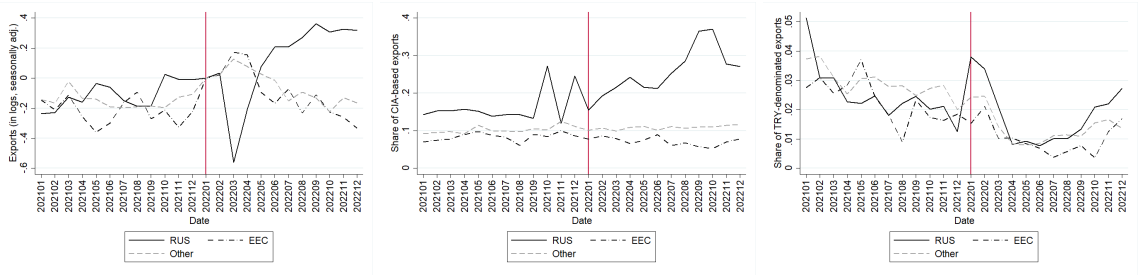
In addition to exports, sanctions have also applied to investments in a number of sectors; use of public funds; imports from Russia of certain goods such as coal, iron and steel, and wood; aviation, Russian freight operators; and restrictions on financial services including transactions with Russia's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



(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 2021-2022 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 motivates 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 productiv-

ity) and the markup they charge.[1] 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.

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:

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

where q denotes quantities, mc marginal costs in domestic currency, $p^c_{f,o,d,t}$ the export price denominated in the currency c, $e^c_{o,d,t}$ the bilateral exchange rate between this currency and the domestic one. Ruling out complementarities across destinations, for each d the firm problem can be written as follows

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

subject to

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

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

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; finally, the term $\Omega_{f,o,d,t}$, captures the cost associated to different terms of payment, to be discussed below. Overall, the firm problem above is standard up to the inclusion of these last three terms. 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 Russion market rises, 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.[2] In the short to the medium run, however, nominal price rigidities (discussed below) could translate into larger quantity responses vis-á-vis relatively stable

[2]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.

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 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.[3]

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 $(1 + r_{EXP})$.

[3] 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 vehicle currency.

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 firms 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 established 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 for 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 have 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.[4] Under this approximation, the difference in expected profits from choosing a currency $CI = \{USD, EUR, RUB, RMB\}$ 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;[5] 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.[6] One may also note that, as the sanctions and the fragmentation of

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

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

[6] For evidence on the increase in Russian imports from China, see Chupilkin, Javorcik, and Plekhanov

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.

4 Empirical Evidence

4.1 Empirical Model

In this section, we draw on the model to build a consistent testing framework. Specifically, 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:

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

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

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. A variant of the model will be introduced in 4.5 below.

(2023). More than 80% of these flows was denominated in renminbi by the end of 2023 (Chupilkin, Javorcik, Peeva, and Plekhanov (2023)).

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: Impact on export values

Dependent Variable: Log Export Value	(1)	(2)	(3)	(4)	(5)
$\text{Post}_t \times \text{RUS}_d$	0.239a	0.209a	0.159a	0.157a	0.222a
	(0.0277)	(0.0279)	(0.0412)	(0.0411)	(0.0236)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.0503	0.0139		
		(0.0367)	(0.0418)		
$\text{Post}_t \times \text{RUS}_c \times \text{Similar}_p$			0.0866c	0.0898c	
			(0.0506)	(0.0502)	
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				0.149b	
				(0.0669)	
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				-0.0309	
				(0.0546)	
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				-0.0529	
				(0.0498)	
$\text{Post}_t \times \text{RUS}_d \times \text{High EU Share}_p$					0.158a
					(0.0519)
Fixed Effects :					
Firm×Product×Country	✓	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓	✓
R^2	0.900	0.900	0.900	0.900	0.900
# observations	358482	358482	358482	358482	358482

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 24 log point relative to the 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.[7]

In the aggregate, the differential rise in exports is comparable across goods subject and not subject to sanctions, as shown in column 2. Nonetheless, at a disaggregated level, the picture is more nuanced. First, our results in column 3 document a distinct rise in exports of goods that are "similar" to sanctioned products—pointing to the possibility of misclassification. As further 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. Second, 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.

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 8-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 16 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 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

[7] All these results are not specific to the sample of continuing exporters—as shown in Table A1, or using EEC countries as a control group — as shown in Table A2 in the appendix.

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.

Table 2: Impact on payment terms

Dep. Var.: Share of CIA-based exports	(1)	(2)	(3)	(4)	(5)
$\text{Post}_t \times \text{RUS}_d$	0.0485a	0.0446a	0.0391a	0.0391a	0.0469a
	(0.00383)	(0.00472)	(0.00687)	(0.00687)	(0.00365)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.00641	0.00237		
		(0.00535)	(0.00606)		
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			0.00963	0.0111	
			(0.00808)	(0.00801)	
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				0.00576	
				(0.0100)	
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				-0.00022	
				(0.00824)	
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				-0.00254	
				(0.00656)	
$\text{Post}_t \times \text{RUS}_d \times \text{High EU Share}_p$					0.0153
					(0.0120)
Fixed Effects :					
Firm×Product×Country	✓	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓	✓
R^2	0.921	0.921	0.921	0.921	0.921
# observations	358482	358482	358482	358482	358482

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 5 percentage points from their pre-invasion average level of 40%. While not massive, the switch in the payment arrangements is economically significant. 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. Remarkably, the rise in CIA transactions is detected across both sanctioned and non-sanctioned products (see columns 2-4)—and does not vary with the level of competition (see column 5). These results suggest that the perceived payment risk rose

across the board.

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 Competition and pricing

To the extent that the exit of Western firms from Russia translates into a higher market share of Turkish exporters, it naturally raises their monopoly power. 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. The regression results in Table 3 lends empirical support to this hypothesis, documenting an increase in average unit values of exports by about 3 log points. This result is true across the board. As shown in columns 2 and 3, respectively, unit values of Turkish exports do not rise more for exports of goods under Western sanctions or goods similar to sanctioned goods. Note that, quantitatively, the change in export prices, while positive, is relatively contained. In light of the results in Table 1, we conclude that the rise rise in total export values was primarily driven by a quantity rather than a price response.

We now dig deeper into the analysis of the monopoly power of Turkish exporters in Russia by adopting 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 result is an estimator of the relative change in markups—in our exercise, in the Russian market relative to the control group which now includes both EEC and the rest of the world. When the panel is balanced, the estimator can be implemented by using firm-product-time and firm-product-time fixed effects. 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]

[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

The results, presented in Table 4, are remarkable in two dimensions. 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—in our balanced panel, as high as 12 log points (column 4). Second, the estimated markup adjustment appears to explain fully the estimated change in unit values (columns 1 and 4). These results are robust to using the rest of the world as a control group by adding an interaction between a post-invasion dummy and another indicating EEC destinations (columns 2 and 5).[9]

An increase in markups and unit value by 12 log points on average is especially remarkable in light of the significant rise in cash-in-advance contracts, documented earlier. Cash-in-advance exports are typically associated with a price discount relative to exports on other payment terms. To control for the potential confounding influence of a switch in payment contracts, we introduce an interaction term with the share of exports on CIA in 2021 (i.e., before the war). As shown in columns 3 and 6 of Table 4, consistent with our expectations, price and markup adjustments are even larger for trade flows that already had a high share of CIA payments in the pre-invasion period. In these cases, since there is little or no room for further upward adjustments in CIA payments, the adjustment is entirely on markups.

4.5 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. To do so, we construct a variable that captures the firm-level exposure to Russia as an export destination

case, allowing for the choice of destination markets to be endogenous. These restrictions lead to a smaller estimation sample in Table 4 relative to the baseline.

[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.

Table 3: Impact on Unit Values

Dependent Variable: Log of unit value	(1)	(2)	(3)
$\text{Post}_t \times \text{RUS}_d$	0.0310a	0.0314a	0.0321c
	(0.00745)	(0.0111)	(0.0189)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		-0.000673	-0.000166
		(0.0133)	(0.0144)
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			-0.00121
			(0.0223)
Fixed Effects :			
Firm×Product×Country	✓	✓	✓
Product×Time	✓	✓	✓
Firm×Time	✓	✓	✓
R^2	0.939	0.939	0.939
# observations	358482	358482	358482

before the invasion, and then we estimate the following equation:

$$\ln \text{Export value}_{ft} = \theta \text{Post}_t \times \text{Share of exports to RUS}_{f,t=0} + \sum_{s=1}^{5} \alpha^s \text{Post}_t \times \mathbb{1}_{f \in \text{Class size bin}_s} + \varepsilon_{ft} \quad (5)$$

We construct class-size bins based on firm-level employment in the pre-invasion period. The coefficient of interest is θ; 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 5. The coefficient of interest is estimated to be quantitatively and qualitatively insignificant, which is consistent with ruling out a trade-creation effect of the invasion for Turkish exporters.

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

Financial sanctions and reputation costs have undermined the advantages of processing exports to Russia denominated 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 Russia.

Our regression results in the top panel of Table 6 lend empirical support to this hypothesis. The

Table 4: Impact on Unit Values and Markups by Payment Method

	(1)	(2)	(3)	(4)	(5)	(6)
	Log of unit value			Log of markups		
$\text{Post}_t \times \text{RUS}_d$	0.121b	0.121b	0.0856c	0.119b	0.119b	0.0843c
	(0.0493)	(0.0510)	(0.0519)	(0.0491)	(0.0508)	(0.0510)
$\text{Post}_t \times \text{EEC}_d$		0.00112			0.000338	
		(0.0617)			(0.0617)	
$\text{Post}_t \times \text{RUS}_d \times \text{CIA Share}_{t=0}$			0.294c			0.288c
			(0.104)			(0.105)
$\text{Post}_t \times \text{CIA Share}_{t=0}$			0.162			0.162
			(0.195)			(0.195)
R^2	0.974	0.974	0.974	0.209	0.209	0.212
Fixed Effects :						
Firm×Product×Country	✓	✓	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓	✓	✓
# observations	18620	18620	18620	18620	18620	18620

Table 5: Impact on total-firm level exports

Dependent Variable: Log Total Firm-level Export Value	(1)	(2)
$\text{Post}_t \times$ Share of exports to $\text{RUS}_{f,t=0}$	-0.0029	-0.0031
	(0.0420)	(0.0420)
$\text{Post}_t \times$ Log of employment$_{f,t=0}$		-0.0000
		(0.00002)
Fixed Effects :		
Firm	✓	✓
Size quintile×Time	✓	✓
R^2	0.839	0.839
# observations	106,886	106,886

magnitude of the switch in favor of Turkish lira in invoicing is not large, amounting to about one percentage point on average. Yet it is statistically significant and broad based, across sanctioned and non-sanctioned products—as is the case for cash-in-advance transactions, see 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 6 and the last panel of Figure A2 present evidence suggesting that the increase in the share of TRY-denominated exports corresponds 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 6: Impact on currency denomination

	(1)	(2)	(3)	(4)	(5)
Panel A					
Dep. Var.: Share of TRY-den. exports					
$\text{Post}_t \times \text{RUS}_d$	0.00913a	0.00773a	0.00692a	0.00696a	0.00910a
	(0.000896)	(0.000944)	(0.00249)	(0.00249)	(0.00365)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.00230	0.00237		
		(0.00172)	(0.00606)		
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			0.00142	0.00201	
			(0.00288)	(0.00287)	
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				-0.000394	
				(0.00209)	
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				0.00333	
				(0.00260)	
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				0.00219	
				(0.00201)	
$\text{Post}_t \times \text{RUS}_d \times \text{High EU Share}_p$					0.000303
					(0.00197)
R^2	0.887	0.887	0.887	0.887	0.887
Panel B					
Dep. Vrb.: Share of USD-den. exports					
$\text{Post}_t \times \text{RUS}_d$	-0.00784b	-0.0125b	-0.0235a	-0.0235a	-0.0104a
	(0.00348)	(0.00491)	(0.00655)	(0.00655)	(0.00361)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.00766	-0.00040		
		(0.00519)	(0.00601)		
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			0.0192b	0.0193b	
			(0.00805)	(0.00796)	
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				-0.0005	
				(0.00676)	
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				0.00358	
				(0.00674)	
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				-0.00298	
				(0.00741)	
$\text{Post}_t \times \text{RUS}_d \times \text{High EU Share}_p$					0.0237a
					(0.00699)
R^2	0.940	0.940	0.940	0.940	0.940
Fixed Effects :					
Firm×Product×Country	✓	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓	✓
# observations	358482	358482	358482	358482	358482

4.7 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, directly or indirectly through third-party intermediation. 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 firms exporting to the US to be the least willing to increase their engagement with Russia.

The evidence lends support to these risk considerations. As shown the top panel of Table 7, first column, unlike their domestic counterparts, firms with Western parents appear to have shrunk their sales to the Russian market—consistent with Western multinationals stopping or severely limiting their operations in Russia.[10]

We further explore whether exposure through exports also matters in the second panel of the same table. Here we introduce an interaction with the firm's pre-war share of exports to the US.[11] Comparing the two coefficients in the panel, the results suggest that firms relying heavily on exports to the US have essentially kept their exports to Russia unchanged. For Turkish firms relying heavily on the US market for exports, the fear of secondary sanctions or reputational risks have not motivated complete disengagement—suggesting high costs of discontinuing ongoing trade relationships. Note however when we control for the share of exports to all Western markets (defined analogously to the US share), the interaction term does not appear to be statistically significant. In the final two panels, we run a horse race between the two types of exposure, ownership vs. exports. We find that the first matters more than the latter. The coefficient in export exposure either is insignificant, or has the wrong sign.

Reputational risk can be expected to impinge on the choice of invoicing currency. Transactions

[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.

[11] We define a binary variable indicating whether the pre-war fraction of exports to the US is above the mean or not.

involving dollars may in fact be more conspicuous, i.e., leave more traces, than transactions not involving a western currency. Reputational concerns may have contributed to the switch from the dollar to the TRY, documented above. The last columns of Table 7 shows evidence that Western multinationals have decreased the share of USD-denominated transactions by more than other firms–with the combined effect amounting to more than 5% points. High exposure to Western markets seemed to matter in a similar fashion. When it comes to denominating exports in the producer currency, the estimates are either not statistically significant or not meaningful in economic terms.

Finally, the second column of Table 7 suggests that, in the post-war trade with Russia, Western multinationals resorted to CIA payment contracts in a similar way than domestic firms.

4.8 Robustness checks and extensions

In our analysis, we have focused on continuing exporters and direct exports. As shown in Table A1, however, all our results are robust to including new exporters in the sample. While throughout the paper we have intentionally abstracted from issues in sanction evasion through shipping goods originating in sanctioning countries via Türkiye to Russia, this robustness exercise suggests that our evidence may shed light on a broader set of questions.

Throughout the paper, the control group includes exports to the eastern European EU members. In a robustness check, presented in Table A2, we include all countries other than Russia (i.e., the rest of the world) in the control group. This analysis confirms all previous findings, except for the shift away from the US dollar.

In another exercise, we ask whether currency mismatch in the firm's import and export transactions matters for invoicing decisions. Currency mismatch is defined as the difference between the sum of USD and EUR denominated imports and exports, 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. As expected, we find that currency mismatch creates an incentive for USD invoicing. Nevertheless, our findings on exports to Russia shifting away from USD invoicing remains robust and the estimated coefficient increases in magnitude.

Table 7: Role of Western exposure

Dependent Variable:	Log Value (1)	Shr of CIA-based exports (2)	Shr of TRY-den. exports (3)	Shr of USD-den. exports (4)
$\text{Post}_t \times \text{RUS}_d$	0.216a	0.0443a	0.00714a	-0.0204a
	(0.0420)	(0.00716)	(0.00250)	(0.00673)
$\text{Post}_t \times \text{RUS}_d \times$ Western MNC_f	-0.580a	-0.0533a	-0.00199	-0.0316a
	(0.0822)	(0.0137)	(0.00274)	(0.0120)
R^2	0.900	0.921	0.887	0.940
$\text{Post}_t \times \text{RUS}_d$	0.243a	0.0495a	0.00924a	-0.00761b
	(0.0228)	(0.00389)	(0.000896)	(0.00352)
$\text{Post}_t \times \text{RUS}_d \times$ High US Share_f	-0.222b	-0.0493a	-0.00551	-0.0122
	(0.108)	(0.0114)	(0.00562)	(0.0279)
R^2	0.900	0.921	0.887	0.940
$\text{Post}_t \times \text{RUS}_d$	0.237a	0.0498a	0.0102a	0.0136a
	(0.0244)	(0.00472)	(0.00104)	(0.00359)
$\text{Post}_t \times \text{RUS}_d \times$ High Western Share_f	0.00803	-0.00490	-0.00406c	-0.0809a
	(0.0521)	(0.00929)	(0.00213)	(0.0101)
R^2	0.900	0.921	0.887	0.940
$\text{Post}_t \times \text{RUS}_d$	0.297a	0.0541a	0.00937a	-0.00472
	(0.0230)	(0.00421)	(0.000956)	(0.00379)
$\text{Post}_t \times \text{RUS}_d \times$ Western MNC_f	-0.586a	-0.0507a	-0.00149	-0.0318a
	(0.0856)	(0.0144)	(0.00285)	(0.0116)
$\text{Post}_t \times \text{RUS}_d \times$ High US Share_f	0.0605	-0.0248c	-0.00479	0.00318
	(0.111)	(0.0137)	(0.00581)	(0.0273)
R^2	0.900	0.921	0.887	0.940
$\text{Post}_t \times \text{RUS}_d$	0.260a	0.0518a	0.0102a	0.0132a
	(0.0246)	(0.00483)	(0.00105)	(0.00368)
$\text{Post}_t \times \text{RUS}_d \times$ Western MNC_f	-0.674a	-0.0584a	0.000256	0.0141
	(0.0858)	(0.0142)	(0.00291)	(0.0132)
$\text{Post}_t \times \text{RUS}_d \times$ High Western Share_f	0.176a	0.00966	-0.00413c	-0.0845a
	(0.0526)	(0.00952)	(0.00227)	(0.0110)
R^2	0.900	0.921	0.887	0.940
Fixed Effects :				
Firm×Product×Country	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓
# observations	358482	358482	358482	358482

5 Conclusions

The ongoing process of geopolitical fragmentation dividing the world into blocks waging occasional local wars and resorting to bilateral and multilateral sanctions foreshadows a far-reaching transformation of the global economy. There are many unknowns in this process (see the discus-

sion 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, showing that the hike in exports to Russia takes place across the board in goods that are under Western sanctions and those that are not. 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.

References

AHN, D. P., AND R. D. LUDEMA (2020): "The sword and the shield: The economics of targeted sanctions," *European Economic Review*, 130, 103587.

AMITI, M., O. ITSKHOKI, AND J. KONINGS (2020): "Dominant Currencies: How Firms Choose Currency Invoicing and Why It Matters," *The Quarterly Journal of Economics*, 137(3), 1435–1493.

ANTRÀS, P., AND C. F. FOLEY (2015): "Poultry in Motion: A Study of International Trade Finance Practices," *Journal of Political Economy*, 123(4), 809–852, From November 2011.

ARKOLAKIS, C., A. COSTINOT, D. DONALDSON, AND A. RODRIGUEZ-CLARE (2018): "The Elusive Pro-Competitive Effects of Trade," *The Review of Economic Studies*, 86(1), 46–80.

ATKESON, A., AND A. BURSTEIN (2007): "Pricing-to-Market in a Ricardian Model of International Trade," *The American Economic Review*, 97(2), 362–367.

BABINA, T., B. HILGENSTOCK, O. ITSKHOKI, M. MIRONOV, AND E. RIBAKOVA (2023): "Assessing the impact of international sanctions on Russian oil exports," CEPR discussion paper 58455, Centre for Economic Policy Research.

BACCHETTA, P., AND E. VAN WINCOOP (2005): "A theory of the currency denomination of international trade," *Journal of International Economics*, 67(2), 295–319.

BERTHOU, A. (2023): "International sanctions and the dollar: Evidence from trade invoicing," Banque de France Working Paper 294, Banque de France.

CHUPILKIN, M., B. JAVORCIK, A. PEEVA, AND A. PLEKHANOV (2023): "Exorbitant privilege and economic sanctions," mimeo, European Bank for Reconstruction and Development.

——— (2024): "Decision to leave: Economic sanctions and intermediated trade," mimeo, European Bank for Reconstruction and Development.

CHUPILKIN, M., B. JAVORCIK, AND A. PLEKHANOV (2023): "The Eurasian roundabout: Trade flows into Russia through the Caucasus and Central Asia," EBRD Working Paper 276, European Bank for Reconstruction and Development.

CORSETTI, G., M. CROWLEY, L. HAN, AND H. SONG (2023): "Markets and Markups: A New Empirical Framework and Evidence on Exporters from China," .

CORSETTI, G., AND P. PESENTI (2002): "Self-Validating Optimum Currency Areas," Working Paper 8783, National Bureau of Economic Research.

CROWLEY, M., L. HAN, AND M. SON (2023): "The Swift Decline of the British Pound: Evidence from UK Trade-invoicing after the Brexit Vote," Working paper, Janeway Institute, Cambridge.

CROWLEY, M. A., L. HAN, AND T. PRAYER (2024): "The pro-competitive effects of trade agreements," *Journal of International Economics*, 150, 103936.

CROZET, M., AND J. HINZ (2020): "Friendly fire: The trade impact of the Russia sanctions and counter-sanctions," *Economic Policy*, 35(101), 97–146.

CROZET, M., J. HINZ, A. STAMMANN, AND J. WANNER (2021): "Worth the pain? Firmsâ exporting behaviour to countries under sanctions," *European Economic Review*, 134, 103683.

DRACA, M., J. GARRED, L. STICKLAND, AND N. WARRINNIER (2022): "On Target? Sanctions and the Economic Interests of Elite Policymakers in Iran," *The Economic Journal*, 133(649), 159–200.

DROTT, C., S. GOLDBACH, AND V. NITSCH (2023): "The Effects of Sanctions on Russian Banks in TARGET2 Transactions Data," Technische UniversitÃ€t Darmstadt working paper, Technische UniversitÃ€t Darmstadt.

FELBERMAYR, G., T. C. MORGAN, C. SYROPOULOS, AND Y. V. YOTOV (2021): "Understanding economic sanctions: Interdisciplinary perspectives on theory and evidence," *European Economic Review*, 135, 103720.

FISMAN, R., Y. HAMAO, AND Y. WANG (2014): "Nationalism and Economic Exchange: Evidence from Shocks to Sino-Japanese Relations," *The Review of Financial Studies*, 27(9), 2626–2660.

GLICK, R., AND A. M. TAYLOR (2010): "COLLATERAL DAMAGE: TRADE DISRUPTION AND THE ECONOMIC IMPACT OF WAR," *The Review of Economics and Statistics*, 92(1), 102–127.

GOLDBERG, L. S., AND C. TILLE (2008): "Vehicle currency use in international trade," *Journal of International Economics*, 76(2), 177–192.

GOPINATH, G., AND J. C. STEIN (2020): "Banking, Trade, and the Making of a Dominant Currency," *The Quarterly Journal of Economics*, 136(2), 783–830.

HAIDAR, J. I. (2017): "Sanctions and Export Deflection: Evidence from Iran," *Economic Policy*, 32(90), 319–355.

KNETTER, M. M. (1989): "Price Discrimination by U.S. and German Exporters," *American Economic Review*, 79(1), 198–210.

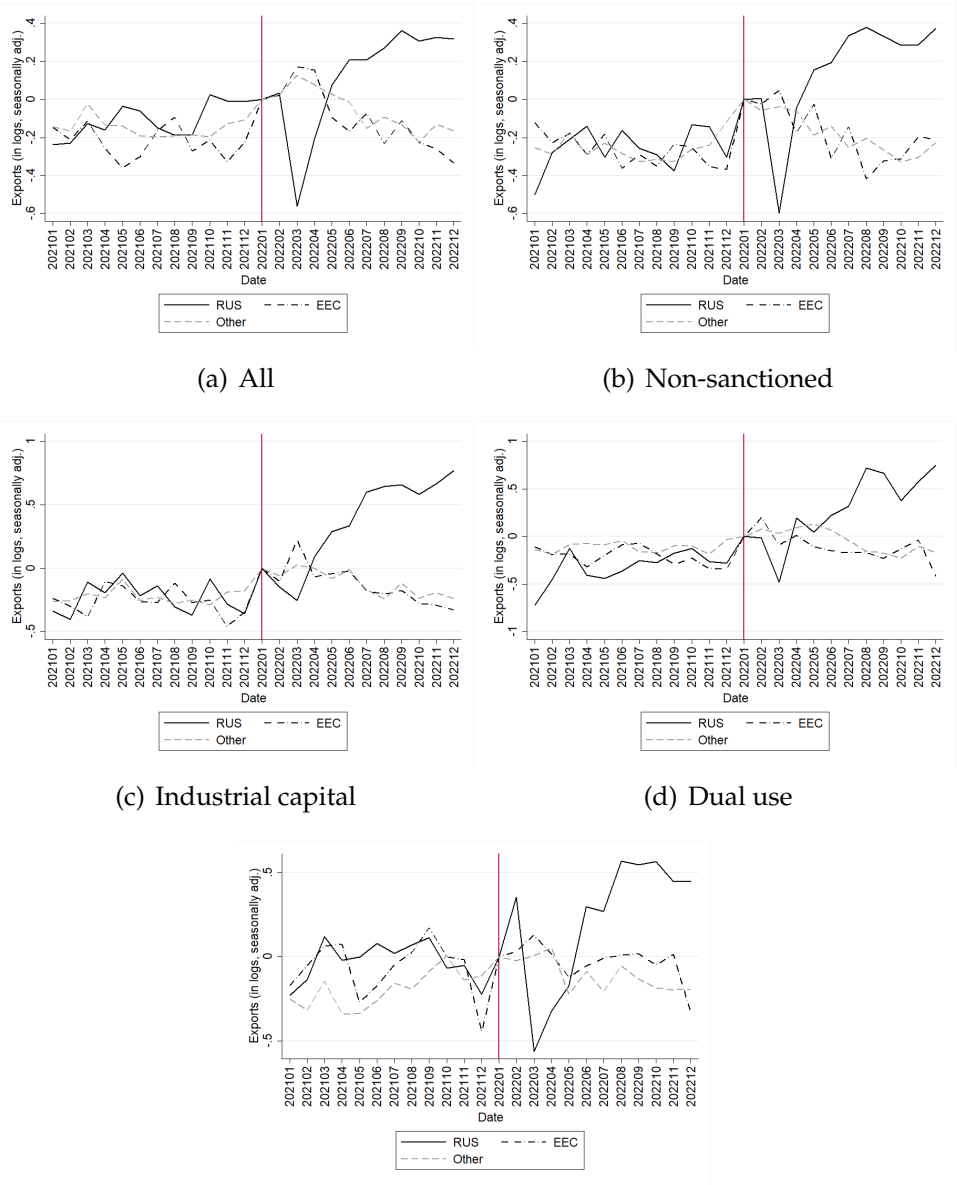
OBSTFELD, M., AND K. ROGOFF (1995): "Exchange Rate Dynamics Redux," *The Journal of Political Economy*, 103(3), 624–660.

SCHMIDT-EISENLOHR, T. (2013): "Towards a theory of trade finance," *Journal of International Economics*, 91(1), 96–112.

SONNENFELD, J., S. TIAN, S. ZASLAVSKY, Y. BHANSALI, AND R. VAKIL (2022): "It Pays For Companies To Leave Russia," SSRN working paper, Social Sciences Research Network.

A Additional Figures and Tables

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



(a) All

(b) Non-sanctioned

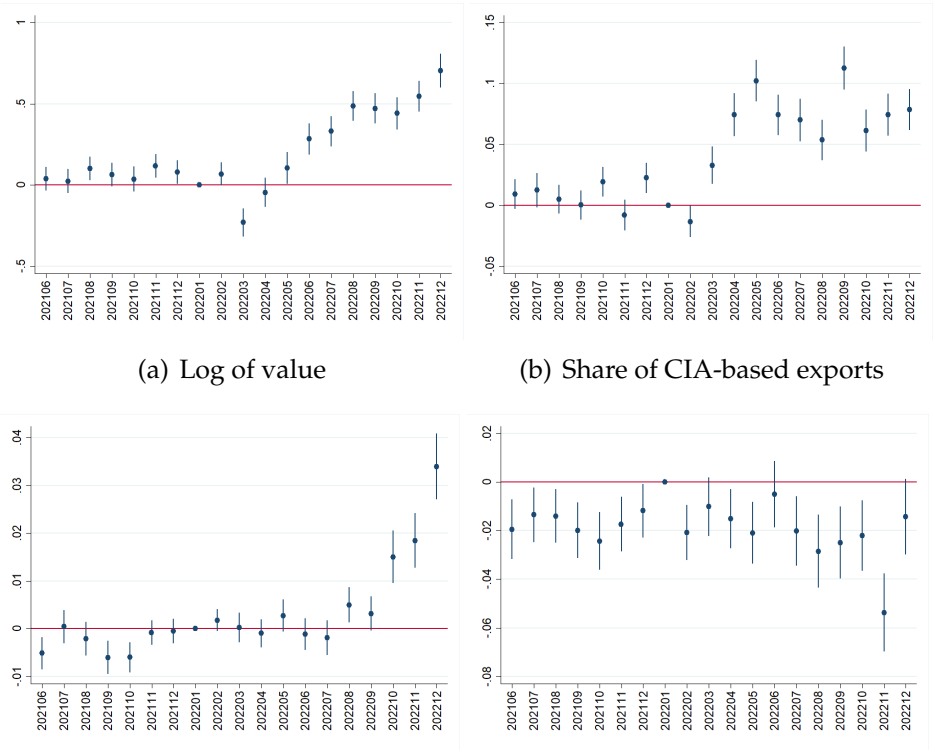
(c) Industrial capital

(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 2021-2022 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 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)
$\text{Post}_t \times \text{RUS}_d$	0.238a	0.0482a	0.00915a	-0.00777b
	(0.0228)	(0.00384)	(0.000908)	(0.00350)
Fixed Effects :				
Firm×Product×Country	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓
R^2	0.899	0.931	0.909	0.948
# observations	546062	546062	546062	546062

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)
$\text{Post}_t \times \text{RUS}_d$	0.238a	0.0303a	0.00973a	0.00290
	(0.0133)	(0.00224)	(0.000780)	(0.00239)
Fixed Effects :				
Firm×Product×Country	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓
R^2	0.754	0.729	0.669	0.528
# observations	3100460	3100460	3100460	3100460

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)
$\text{Post}_t \times \text{RUS}_d$	0.228a	0.0220a	0.00931a	-0.0185a
	(0.0351)	(0.00830)	(0.00144)	(0.00564)
$\text{Post}_t \times \text{RUS}_d \times \text{Mismatch}_f$	0.0194	0.0454a	-0.000291	0.0181b
	(0.0467)	(0.0113)	(0.00196)	(0.00766)
Fixed Effects :				
Firm×Product×Country	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓
R^2	0.900	0.921	0.887	0.940
# observations	546062	546062	546062	546062

Note: Currency mismatch is defined as the difference between the sum of USD and EUR denominated imports and exports, 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.