

Trading around Geopolitics

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Motivation

- ▶ Complex implications of geopolitical tensions and economic sanctions for international trade flows
 - ▶ (Virtually) discontinued trade flows from sanctioning countries
 - ▶ Trade diversion: exporters from non-sanctioning economies step in to fill the gap
- ▶ Non-sanctioned exporters trade-off short-term profits with
 - ▶ heightened risk of reputational damage
 - ▶ higher transaction costs
 - ▶ heightened risk of non-payment

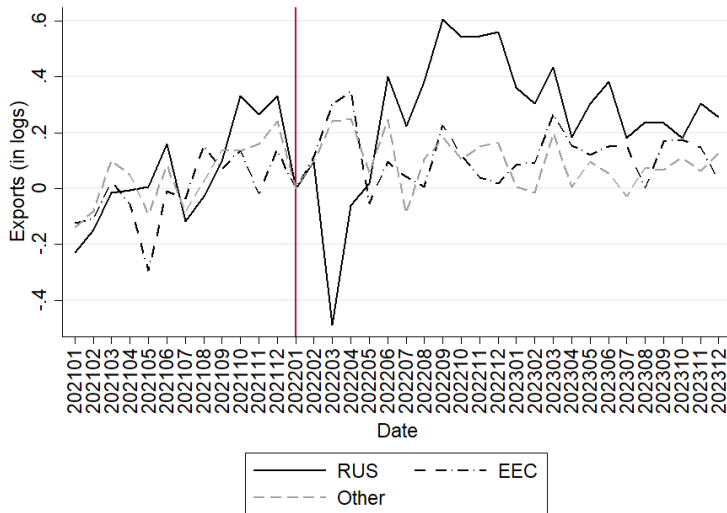
Context

- ▶ Western sanctions on Russia targeted a wide range of goods: e.g. arms, advanced and dual-use technology, and luxury products
- ▶ Russian financial institutions were disconnected from the SWIFT system, making trade with Russia more costly for firms dealing in Western currencies
- ▶ Most sanctions were in place by the end of March 2022
- ▶ This sanctions episode stands out in terms of its comprehensiveness and the size of the sanctioned economy (11th largest in 2021)

Our contribution

- ▶ A **unified theoretical and empirical framework** to study the trade effects of geopolitical tensions along various margins:
 - ▶ trade flows
 - ▶ prices and markups
 - ▶ invoicing currency choice
 - ▶ payment method choice
- ▶ Empirical setting exploits the response of **Turkish exporters** to the implementation of **comprehensive Western sanctions on Russia** following its full-scale invasion of Ukraine in 2022

Monthly Turkish exports by destination



Data

- ▶ Detailed monthly exports data from Türkiye for the 2021-2023 period, including information on products, firms, payment methods, and invoicing currencies
- ▶ Firm registry reports industry of operation and ownership structure
- ▶ **Exclude re-exports** from the sample (to abstract from possible sanction violations)
- ▶ Baseline sample covers **continuing Turkish exporters** to Russia ($\approx 6,750$ firms)
- ▶ Use EEC as a control group (and ROW in robustness checks)

Setup

- Builds on Crowley, Han, and Son (2023)
- Assume oligopolistic competition, Cobb-Douglas production technology combining labor and intermediate inputs
- f, o, d, t, c denote firm, origin country, destination country, time and currency of denomination
- ρ_i, η denote elasticities within and across industries
- Revenue of a firm:

$$R_{f,o,d,t}^c = \left[q_{f,o,d,t} \left[\underbrace{\Omega_{f,o,d,t} [p_{f,o,d,t}^c e_{o,d,t}^c]}_{\substack{\text{cost of using} \\ \text{a given payment method}}} - mc_{f,o,t} \right] \right]$$

Profit maximization

$$\Pi_{f,o,d,t}^c \equiv \max_{p_{f,o,d,t}^c e_{d,t}^c} \left[R_{f,o,d,t}^c - \underbrace{F_f^c}_{\substack{\text{currency} \\ \text{management} \\ \text{cost}}} - \underbrace{\Phi_{f,t}(c, d)}_{\text{reputational risk}} \right] \geq \underbrace{\chi_d}_{\text{sunk cost}}$$

s.t.

$$q_{f,o,d,t} = \left(p_{f,o,d,t}^d \right)^{-\rho_i} \left(P_{d,t}^d \right)^{\eta-\rho} \underbrace{D_{d,t}}_{\substack{\text{exogenous} \\ \text{demand shifter}}}$$

$$c = \operatorname{argmax} \left(\Pi_{f,o,d,t}^c \right)$$

Predictions

- ▶ Markups increase with market share:

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

- ▶ Attractiveness of CIA contracts relative to post-delivery contracts increases after the war as payment probability, γ_p , falls:

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

- ▶ Expected profits from choosing RMB or a vehicle currency relative to own currency *TRY* is proportional to:

$$\lambda_{fd} \left[\underbrace{\frac{\Gamma_{fd}}{1 + \Gamma_{fd}} (\zeta_{(-f)d}^{CI} - \zeta_{(-f)d}^{TRY})}_{\text{Strategic complementarity}} + \underbrace{\frac{1}{1 + \Gamma_{fd}} (\psi_f^{CI} - \psi_f^{TRY})}_{\text{Operational hedging}} \right] - \underbrace{(F_{fd}^{C0} - F_{fd}^{TRY})}_{\text{Financial cost}} - \underbrace{\Delta \Phi_f^{CI, TRY}}_{\text{Reputational risk}}$$

Empirical specification

- ▶ A standard DID and ES specification, comparing Turkish exports to Russia with Turkish exports to EEC:

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

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

- ▶ Rich set of fixed effects:
 - ▶ firm-product-destination (fpd)
 - ▶ product-time (pt)
 - ▶ firm-time (ft)
- ▶ $\text{Post}_t = 1$ for the post-invasion period, i.e. after January 2022
- ▶ $\text{RUS}_d = 1$ for Russia, and $= 0$ for EEC countries

Large increase in exports to Russia, particularly in goods under Western sanctions

Dep. Variable: Log Export Value					
	(1)	(2)	(3)	(4)	(5)
$\text{Post}_t \times \text{RUS}_d$	0.315a (0.0234)	0.236a (0.0294)	0.181a (0.0422)	0.181a (0.0421)	0.297a (0.0238)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.134a (0.0372)	0.0953b (0.0441)		
$\text{Post}_t \times \text{RUS}_c \times \text{Similar}_p$			0.0937c (0.0533)	0.0992c (0.0530)	
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				0.178b (0.0757)	
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				0.0232 (0.0547)	
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				0.0708 (0.0511)	
$\text{Post}_t \times \text{RUS}_d \times \text{High EU Share}_p$					0.187a (0.0567)
Fixed Effects :					
Firm $\times$ Product $\times$ Country	✓	✓	✓	✓	✓
Product $\times$ Time	✓	✓	✓	✓	✓
Firm $\times$ Time	✓	✓	✓	✓	✓
R^2	0.896	0.896	0.896	0.896	0.896
# observations	485185	485185	485185	485185	485185

Strong trade diversion

Dep. Variable: Log Export Value					
	(1)	(2)	(3)	(4)	(5)
$Post_t \times RUS_d$	0.315a (0.0234)	0.236a (0.0294)	0.181a (0.0422)	0.181a (0.0421)	0.297a (0.0238)
$Post_t \times RUS_d \times Sanctioned_p$		0.134a (0.0372)	0.0953b (0.0441)		
$Post_t \times RUS_c \times Similar_p$			0.0937c (0.0533)	0.0992c (0.0530)	
$Post_t \times RUS_d \times Industrial_p$				0.178b (0.0757)	
$Post_t \times RUS_d \times Dual_p$				0.0232 (0.0547)	
$Post_t \times RUS_d \times Luxury_p$				0.0708 (0.0511)	
$Post_t \times RUS_d \times High\ EU\ Share_p$					0.187a (0.0567)
Fixed Effects :					
Firm×Product×Country	✓	✓	✓	✓	✓
Product×Time	✓	✓	✓	✓	✓
Firm×Time	✓	✓	✓	✓	✓
R^2	0.896	0.896	0.896	0.896	0.896
# observations	485185	485185	485185	485185	485185

No evidence of trade creation at the firm level

Dependent Variable: Log Total Firm-level Export Value		
	(1)	(2)
$\text{Post}_t \times \text{Share of exports to RUS}_{f,t=0}$	0.0222 (0.0400)	0.0222 (0.0400)
$\text{Post}_t \times \text{Log of employment}_{f,t=0}$		0.0000 (0.00002)
Fixed Effects :		
Firm	✓	✓
Size quintile $\times$ Time	✓	✓
R^2	0.820	0.820
# observations	163030	163030

Increased reliance on CIA due to higher payment risk

Dep. Variable: CIA Share					
	(1)	(2)	(3)	(4)	(5)
$\text{Post}_t \times \text{RUS}_d$	0.0662a (0.00457)	0.0583a (0.00542)	0.0521a (0.00771)	0.0521a (0.00773)	0.0637a (0.00437)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.0140b (0.00617)	0.00966 (0.00695)		
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			0.0106 (0.00892)	0.0131 (0.00889)	
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				0.0262b (0.0117)	
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				0.0136 (0.00832)	
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				-0.00859 (0.00874)	
$\text{Post}_t \times \text{RUS}_d \times \text{High EU Share}_p$					0.0295b (0.0139)
Fixed Effects :					
Firm $\times$ Product $\times$ Country	✓	✓	✓	✓	✓
Product $\times$ Time	✓	✓	✓	✓	✓
Firm $\times$ Time	✓	✓	✓	✓	✓
R^2	0.918	0.918	0.918	0.918	0.918
# observations	485185	485185	485185	485185	485185

Drop in competition: Increase in prices charged in the Russian market

Dependent Variable: Log of unit value			
	(1)	(2)	(3)
$\text{Post}_t \times \text{RUS}_d$	0.0259a (0.00722)	0.0191c (0.0102)	0.0146c (0.0086)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.0113 (0.0132)	0.00814 (0.0147)
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			0.00764 (0.0203)
Fixed Effects :			
Firm $\times$ Product $\times$ Country	✓	✓	✓
Product $\times$ Time	✓	✓	✓
Firm $\times$ Time	✓	✓	✓
R^2	0.938	0.938	0.938
# observations	485185	485185	485185

Price adjustment driven by adjustment to markups

	(1)	(2)	(3)	(4)	(5)	(6)
	Log of unit value			Log of markups		
$\text{Post}_t \times \text{RUS}_d$	0.0448a (0.0116)	0.0424a (0.0117)	0.0128 (0.0122)	0.0292a (0.00888)	0.0289a (0.00899)	-0.00271 (0.0152)
$\text{Post}_t \times \text{EEC}_d$		-0.0159c (0.00823)			-0.00180 (0.00670)	
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$			0.0434a (0.0182)			0.0319a (0.0113)
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			0.0419c (0.0225)			0.0216 (0.0162)
R^2	0.937	0.937	0.937	0.0705	0.0705	0.0705
Fixed Effects :						
Firm $\times$ Product $\times$ Country	✓	✓	✓	✓	✓	✓
Product $\times$ Time	✓	✓	✓	✓	✓	✓
Firm $\times$ Time	✓	✓	✓	✓	✓	✓
# observations	672199	672199	672199	672199	672199	672199

- Markup estimation follows Corsetti, Crowley, Han, and Song (2023) [► Details](#)

Price and markup adjustment more pronounced for sanctioned goods and linked to pre-war reliance on CIA

	(1)	(2)	(3)	(4)
	Log of unit value		Log of markups	
	Non-sanctioned	Sanctioned	Non-sanctioned	Sanctioned
$\text{Post}_t \times \text{RUS}_d$	-0.0244 (0.0183)	0.0495a (0.0143)	-0.0314b (0.0149)	0.0257a (0.00952)
$\text{Post}_t \times \text{RUS}_d \times \text{CIA Share}_{t=0}$	0.133a (0.0414)	0.160a (0.0380)	0.142a (0.0336)	0.148a (0.0285)
$\text{Post}_t \times \text{CIA Share}_{t=0}$	0.0152 (0.0176)	0.0369b (0.0177)	0.00663 (0.0126)	0.00177 (0.0127)
R^2	0.943	0.932	0.0931	0.0750
Fixed Effects :				
Firm $\times$ Product $\times$ Country	✓	✓	✓	✓
Product $\times$ Time	✓	✓	✓	✓
Firm $\times$ Time	✓	✓	✓	✓
# observations	309388	332392	309388	332392

Shift towards producer currency pricing

Dep. Var.: Share of TRY-den. exports	(1)	(2)	(3)	(4)	(5)
$\text{Post}_t \times \text{RUS}_d$	0.0416a (0.00196)	0.0368a (0.00253)	0.0371a (0.00391)	0.0372a (0.00392)	0.0419a (0.00206)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.00787a (0.00285)	0.00806b (0.00315)		
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			-0.000472 (0.00452)	-0.000154 (0.00449)	
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				0.000573 (0.00357)	
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				0.0142a (0.00478)	
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				0.00858b (0.00376)	
$\text{Post}_t \times \text{RUS}_d \times \text{High EU Share}_p$					-0.00308 (0.00325)
Fixed Effects :					
Firm $\times$ Product $\times$ Country	✓	✓	✓	✓	✓
Product $\times$ Time	✓	✓	✓	✓	✓
Firm $\times$ Time	✓	✓	✓	✓	✓
R^2	0.863	0.863	0.863	0.863	0.863
# observations	485185	485185	485185	485185	485185

And away from pricing in USD

Dep. Vrb.: Share of USD-den. exports	(1)	(2)	(3)	(4)	(5)
$\text{Post}_t \times \text{RUS}_d$	-0.0598a (0.00486)	-0.0614a (0.00665)	-0.0868a (0.00864)	-0.0868a (0.00868)	-0.0643a (0.00506)
$\text{Post}_t \times \text{RUS}_d \times \text{Sanctioned}_p$		0.00261 (0.00687)	-0.0151b (0.00763)		
$\text{Post}_t \times \text{RUS}_d \times \text{Similar}_p$			0.0435a (0.0103)	0.0442a (0.0102)	
$\text{Post}_t \times \text{RUS}_d \times \text{Industrial}_p$				0.0150 (0.00931)	
$\text{Post}_t \times \text{RUS}_d \times \text{Dual}_p$				-0.00277 (0.00870)	
$\text{Post}_t \times \text{RUS}_d \times \text{Luxury}_p$				-0.0410a (0.0100)	
$\text{Post}_t \times \text{RUS}_d \times \text{High EU Share}_p$					0.0434a (0.00851)
Fixed Effects :					
Firm $\times$ Product $\times$ Country	✓	✓	✓	✓	✓
Product $\times$ Time	✓	✓	✓	✓	✓
Firm $\times$ Time	✓	✓	✓	✓	✓
R^2	0.927	0.927	0.927	0.927	0.927
# observations	485185	485185	485185	485185	485185

Reputational risks matter

Dependent Variable:	Log Value	Shr of CIA-based exports	Shr of TRY-den. exports	Shr of USD-den. exports
	(1)	(2)	(3)	(4)
$\text{Post}_t \times \text{RUS}_d$	0.211a (0.0434)	0.0591a (0.00791)	0.0398a (0.00400)	-0.0855a (0.00883)
$\text{Post}_t \times \text{RUS}_d \times \text{Western MNC}_f$	-0.316a (0.0839)	-0.0777a (0.0184)	-0.0288a (0.00376)	-0.0177 (0.0147)
R^2	0.896	0.918	0.863	0.927
Fixed Effects :				
Firm $\times$ Product $\times$ Country	✓	✓	✓	✓
Product $\times$ Time	✓	✓	✓	✓
Firm $\times$ Time	✓	✓	✓	✓
# observations	485185	485185	485185	485185

Reputational risks also work through the exports channel

Dependent Variable:	Log Value	Shr of CIA-based exports	Shr of TRY-den. exports	Shr of USD-den. exports
	(1)	(2)	(3)	(4)
$\text{Post}_t \times \text{RUS}_d$	0.381a (0.0258)	0.0758a (0.00500)	0.0470a (0.00247)	-0.0684a (0.00547)
$\text{Post}_t \times \text{RUS}_d \times \text{Western MNC}_f$	-0.221b (0.0867)	-0.0730a (0.0189)	-0.0217a (0.00386)	-0.0441a (0.0145)
$\text{Post}_t \times \text{RUS}_d \times \text{High West. Shr.}_f$	-0.184a (0.0545)	-0.00861 (0.0100)	-0.0143a (0.00447)	0.0554a (0.0101)
R^2	0.896	0.918	0.863	0.927
Fixed Effects :				
Firm $\times$ Product $\times$ Country	✓	✓	✓	✓
Product $\times$ Time	✓	✓	✓	✓
Firm $\times$ Time	✓	✓	✓	✓
# observations	485185	485185	485185	485185

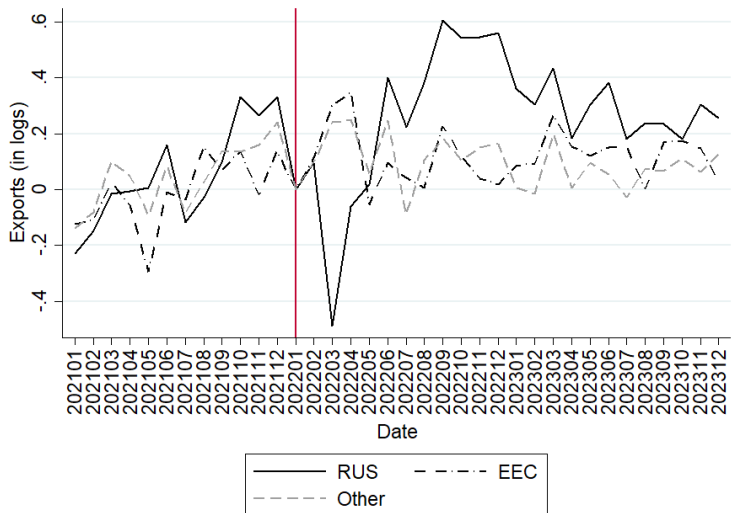
Conclusions

- ▶ Our model, building on Crowley, Han, and Son (2023) with added features from Schmidt-Eisenlohr (2013) and Antras and Foley (2015), yields three testable predictions for Turkish exporters:
 - ▶ markups increase
 - ▶ Western currencies lose importance against TRY (producer currency) for invoicing
 - ▶ cash-in-advance gains importance

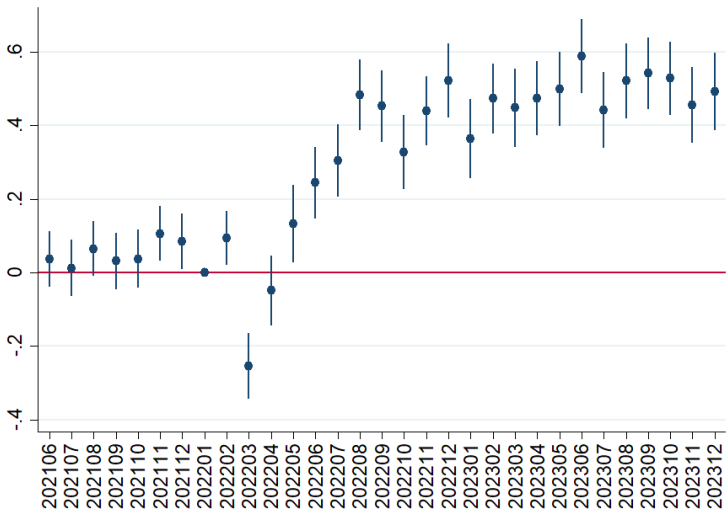
Conclusions

- ▶ Our model, building on Crowley, Han, and Son (2023) with added features from Schmidt-Eisenlohr (2013) and Antras and Foley (2015), yields three testable predictions for Turkish exporters:
 - ▶ markups increase
 - ▶ Western currencies lose importance against TRY (producer currency) for invoicing
 - ▶ cash-in-advance gains importance
- ▶ Empirical results based on detailed monthly data on Turkish exports for the January 2021-December 2023 period show:
 - ▶ sharp increase in Turkish exports to Russia
 - ▶ particularly for both products under Western sanctions
 - ▶ higher if the pre-war market share of the EU exporters was large
 - ▶ increase in the share of cash-in-advance transactions
 - ▶ shift from USD towards TRY invoicing
 - ▶ increase in markups, particularly for goods under Western sanctions

Monthly Turkish exports by destination



Event study estimates for export values



Estimation of markups

- ▶ Follow the approach developed by Corsetti, Crowley, Han, and Song (2023)
- ▶ A sequential fixed effects estimation that
 - ▶ removes time-varying factors such as unobservable marginal production costs
 - ▶ controls for the firm's time-varying set of export destinations
- ▶ Estimator requires observing a “trade pattern”, i.e. set of destination markets for a given firm-product pair, in multiple periods.
- ▶ Estimation proceeds in two steps:
 - ▶ Mean value of unit values over all active destinations is subtracted from the firm-product-destination unit value in a period, $\dot{p}_{fpdt}$
 - ▶ 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, $\ddot{p}_{fpdt}$