

# Trade Sanctions

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“Macroeconomic adjustments after large global shocks”

September 19-20, 2024

- Fragmentation of global trade
  - Brexit, US-China trade/chip war, ...
  - sanctions on/decoupling from Russia
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- [This paper](#): even partially enforced sanctions have a large effect!

- Sanctions on Russia after 2022
- Unprecedented scale
  - 6th largest economy in 2023 (PPP, IMF)
  - almost 60% of its imported products are under sanctions
    - account for >80% of its pre-2022 imports
  - consumer boycott, infrastructure sanctions, ...
    - EU is the largest partner, 48% of imports in 2021
  - most sanctions are a complete ban
    - but many exceptions
- Opportunities for evasion
  - plenty of oil revenues (Babina et al., 2023)
  - plenty of non-sanctioning countries (Chupilkin et al., 2023)
  - legalization of “piracy” in Russia

- The effect of sanctions:

- model-based counterfactuals: Bachmann et al. (2022), Borin et al. (2023), Bianchi and Sosa-Padilla (2023), Chowdhry et al. (2024), Corsetti et al. (2024), Crozet and Hinz (2020), Du and Wang (2022), Flach et al. (2024), Ghironi et al. (2024), Hausmann et al. (2024), Mamonov and Pestova (2022), Souza et al. (2024)
- empirical evidence: Ahn and Ludema (2020), Aytun et al. (2024), Babina et al. (2023), Chupilkin et al. (2023), Draca et al. (2019), Felbermayr et al. (2020), Görg et al. (2024), Haidar (2017), Huynh et al. (2023), Kohl et al. (2024), Kim et al. (2023), Nigmatulina (2021), Stone (2016), Teti et al. (2024)

⇒ event study of largest sanctions ever + comprehensive data

- Trade disruptions and deglobalization:

- Alvarez et al. (2023), Baqaee et al. (2023), Bhalotia and Dhingra (2024), Breinlich and Magli (2023), Crosignani et al. (2024), Fajgelbaum et al. (2020, 2023), Flach et al. (2024), Goldberg and Reed (2023), Thoenig (2023) ...

⇒ testing ground for future conflicts

We combine **five** datasets

- **Sanctions**: timing, product codes, countries
- *All* Russian **international trade transactions**, 2012–2023
- *Almost all* **financial statements** of Russian firms, 2012–2022
- *All* Russian **railroad shipments**, 2012–2023
- *All* Russian **government procurement contracts** (30% of GDP)



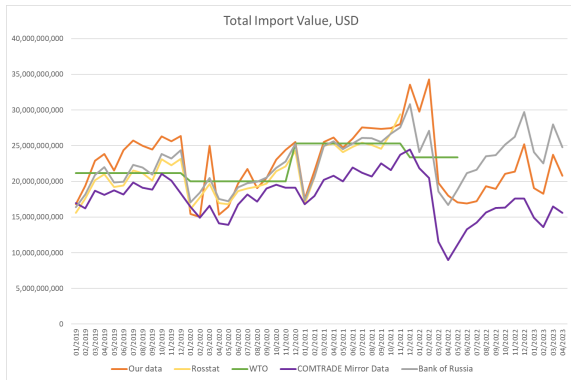
We combine **five** datasets → **comprehensive analysis**

- **Sanctions**: timing, product codes, countries
  - variation for identification
- *All* Russian **international trade transactions**, 2012–2023
  - every mechanism of adjustment: re-routing, substitution, etc.
- *Almost all* **financial statements** of Russian firms, 2012–2022
  - overall firm-level performance
- *All* Russian **railroad shipments**, 2012–2023
  - propagation through domestic economy
- *All* Russian **government procurement contracts** (30% of GDP)
  - the effect on the government

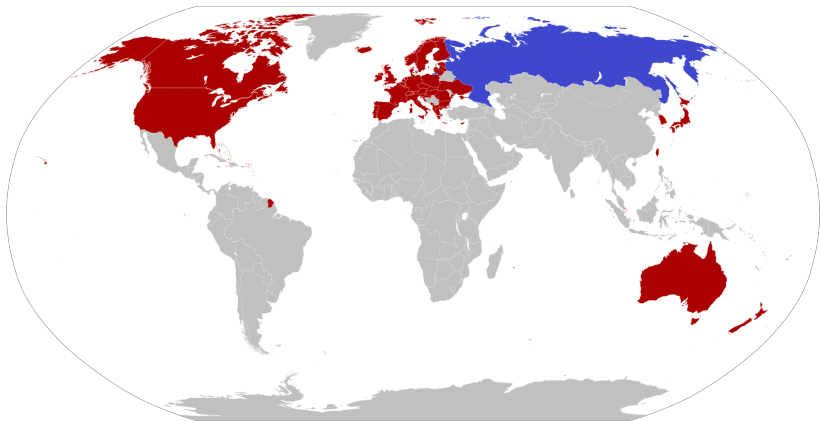
- *All* Russian **international trade transactions**, 2012–2023
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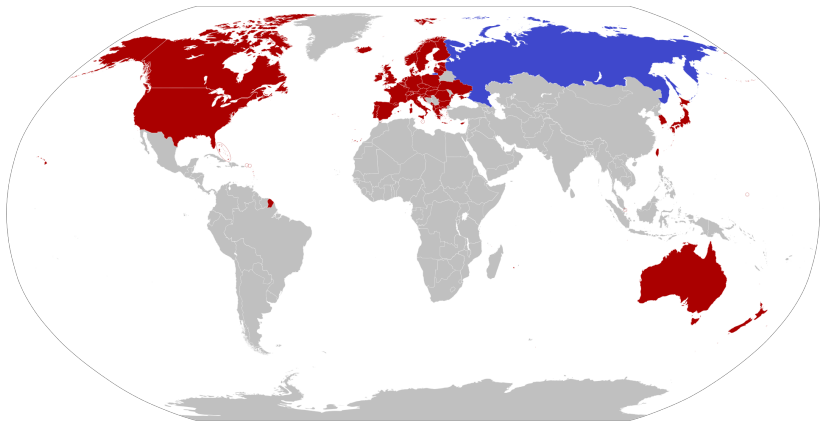


# Sanctions: Countries



“Unfriendly countries” according to the Russian government

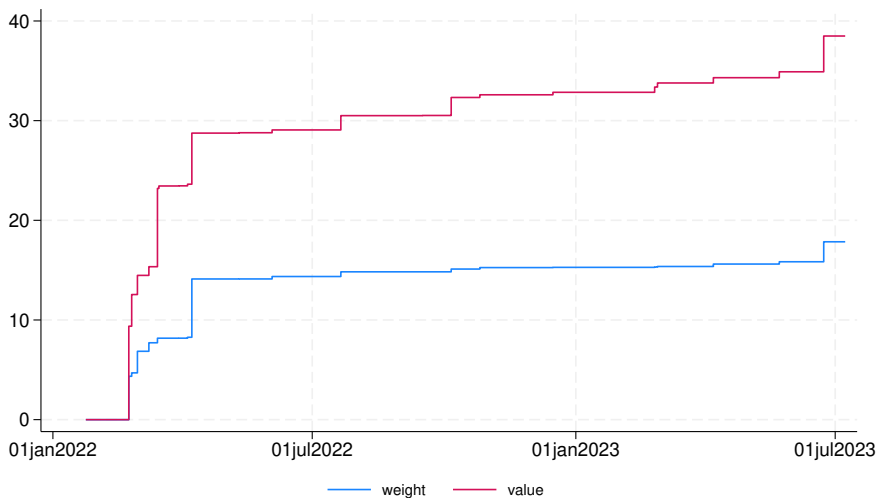
# Sanctions: Countries



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EU accounts for 83 (89)% of sanctioned imports by weight (value)

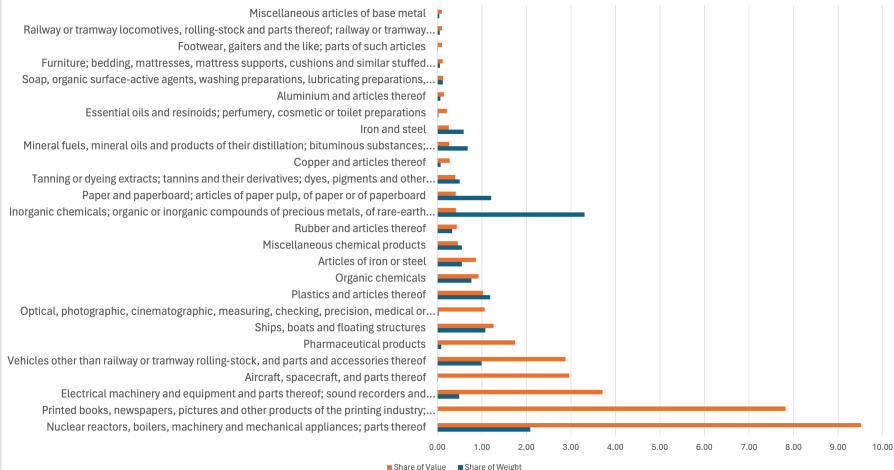
# Sanctions: Timing



Share of pre-war imports [► Products](#)

# Sanctions: Products

HS product groups sanctioned (capped at top 27 in terms of value share)





# Effect on Sanctioned Imports

- Dif-in-Dif with staggered treatment

$$y_{pct} = \alpha_{pc} + \alpha_{ct} + \alpha_{pt} + \sum_j \beta_{0j} I(event_{pct} = j) \\ + \sum_j \beta_{1j} I(event_{pct} = j) \times target_{pc} + \varepsilon_{pct}$$

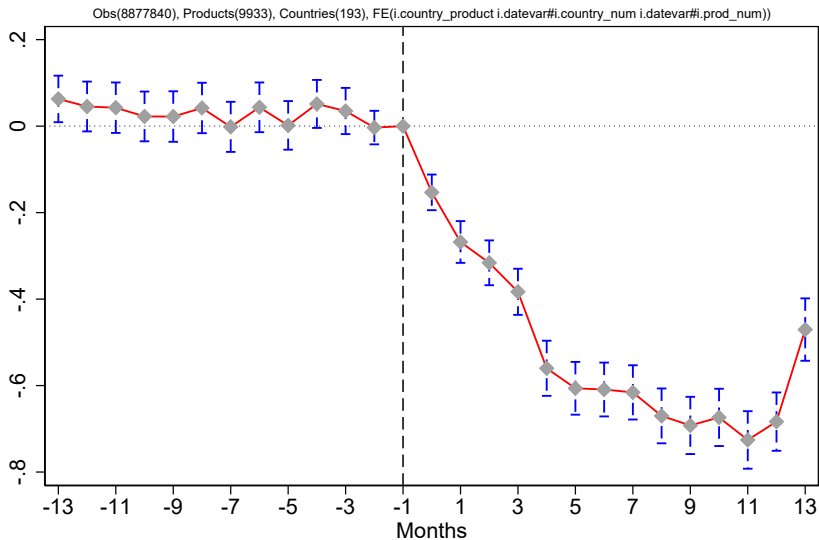
- 10-digit product  $p$ , country  $c$ , month  $t$ 
  - e.g., “microprocessors produced with  $\leq 32$  nm”
  - e.g., “automated washing machines, total load  $\leq 6$  kg, front loader”
- $y_{pct}$  is log-weight/value
- $target_{pc}$  is dummy for sanctioned flows

- Controls

- country trends: consumer boycott, infrastructure sanctions, ...
- product trends: change in demand/prices for microchips or drones, ...

# Effect on Sanctioned Imports

## Log Weight



► Value

► Unit value

► Non-staggered DiD

# Effect on Sanctioned Imports

- Results so far
  - no clear pre-trends (even during the war!)
  - up to 53% drop in sanctioned flows
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  - sanctioned vs “friendly” flows [▶ raw data](#)
  - sanctioned vs non-sanctioned products (DiD)

# Effect on Sanctioned Products

- Dif-in-Dif with staggered treatment

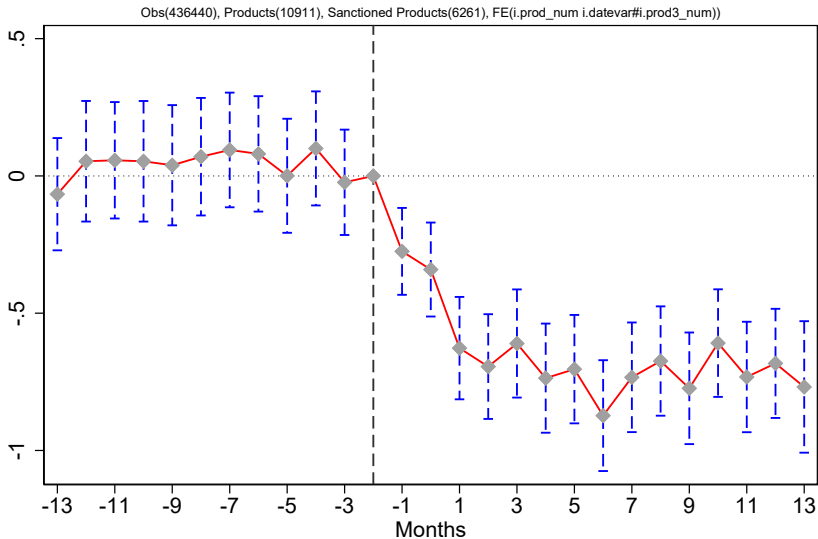
$$y_{pt} = \alpha_p + \alpha_{gt} + \sum_j \beta_{0j} I(event_{pt} = j) \\ + \sum_j \beta_{1j} I(event_{pt} = j) \times target_p + \varepsilon_{pt}$$

- 10-digit product  $p$ , 3-digit product group  $g$ , month  $t$
  - $y_{pct}$  is log-weight/value
  - $target_p$  is dummy for products sanctioned by *any* country
- Controls
    - product-group trends: change in demand/prices for *electronics*, ...



# Effect on Sanctioned Products

## Log Weight



► Value

► Unit value

► Non-staggered DiD

- Sanctions are surprisingly effective
  - big drop in imports of sanctioned products
    - despite substantial re-routing and substitution!
  - caveats
    - fewer controls
    - not as good control group
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- But sanctions can be *still* ineffective
  - due to domestic substitution, subsidies, etc.
- Next, *overall* performance of Russian firms
  - more vs less exposed to sanctioned imports

- Dif-in-Dif

$$y_{ft} = \alpha_f + \alpha_{st} + \alpha_{it} + \beta_t \times Exposure_f + \varepsilon_{ft}$$

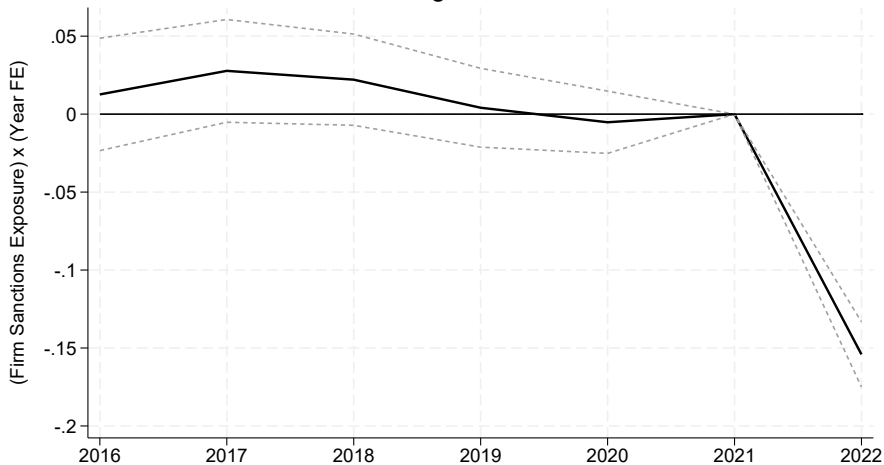
- firm  $f$ , sector  $s$ , importer-status  $i$ , year  $t$
- $y_{ft}$  is log-revenue
- $Exposure_f$  is pre-war share of sanctioned imports in total imports

- Controls

- sectoral trends
- a trend for all importers

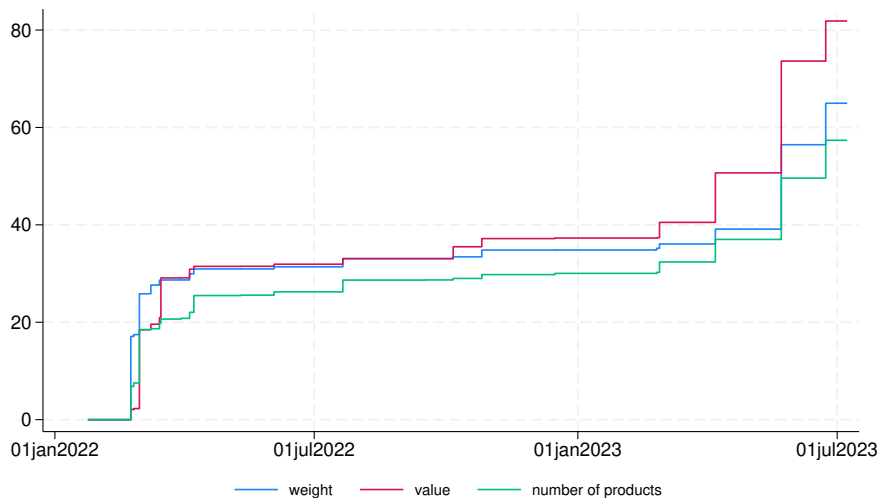
# Effect on Exposed Firms

Log Revenue



- Sanctions have a large impact
  - despite substitution and re-routing
  - despite domestic substitution/subsidies
    - in contrast to 2014 sanctions (Nigmatulina, 2021)
- Insignificant effect on unit values
  - + costlier shipping, less competition (*cf.* Corsetti et al., 2024)
  - substitution toward lower quality
- Future steps
  - re-routing vs substitution
  - heterogeneity wrt “priority” goods
  - propagation within domestic economy

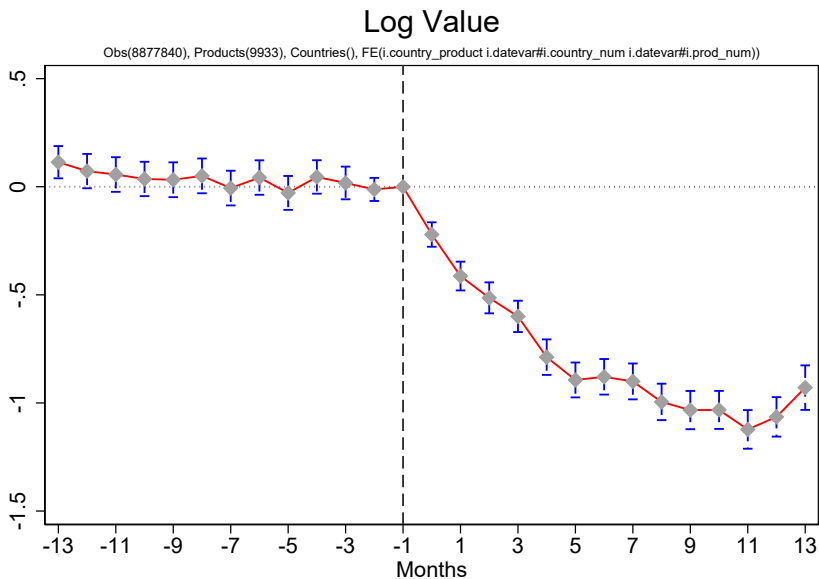
# Sanctions: Timing



Sanctioned **products**, share of pre-war imports [▶ back](#)



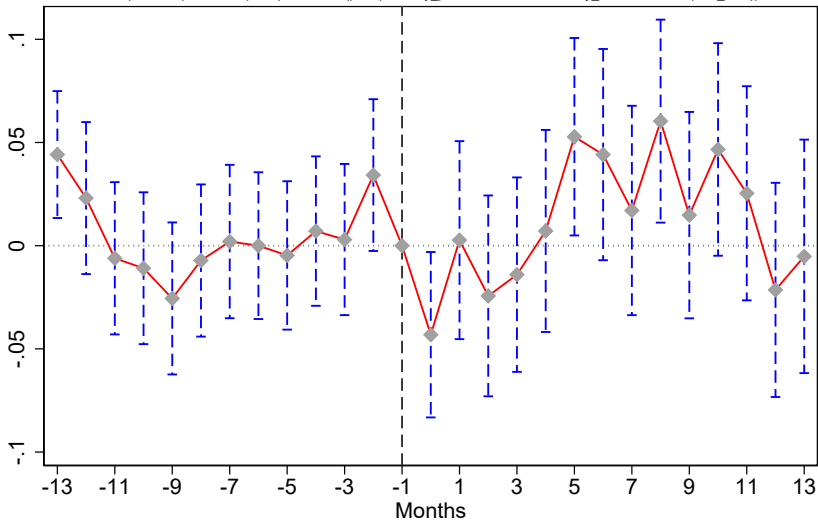
# Effect on Sanctioned Imports



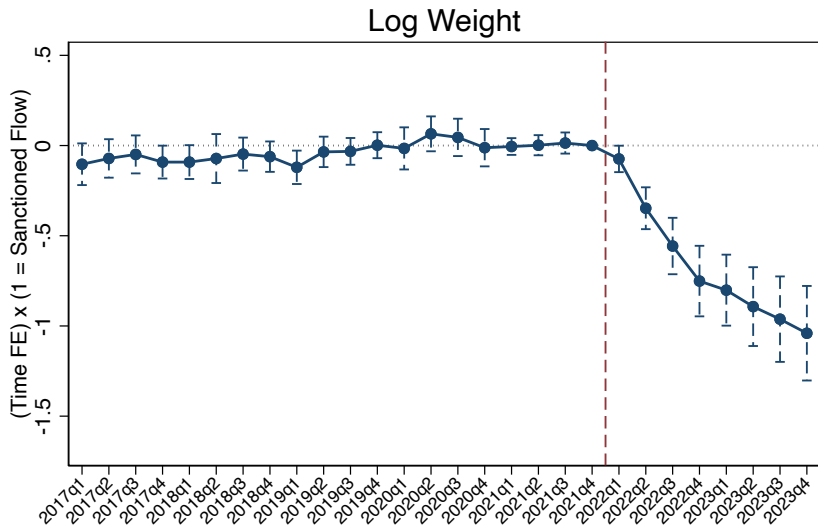
# Effect on Sanctioned Imports

## Log Unit Value (per weight)

Obs(2633599), Products(8385), Countries(), FE(i.country\_product i.datevar#i.country\_num i.datevar#i.prod\_num))



# Effect on Sanctioned Imports



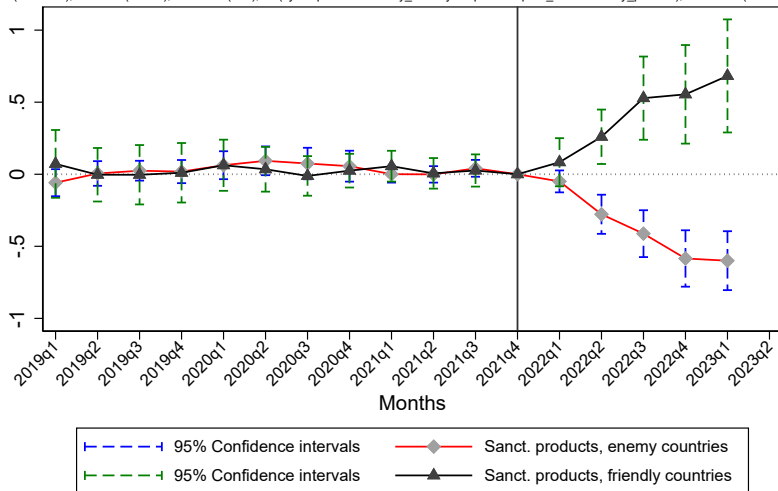
Notes: Total Obs.: 7,916,748, Products: 10,692, Countries: 214

FEs: i.yearquarter#i.country\_num i.yearquarter#i.prod\_num i.country\_product

# Substitution and Re-routing

## Ln Weight

Obs(4096201), Products(10201), Countries(203), FE(i.yearquarter#i.country\_num i.yearquarter#i.prod\_num i.country\_product), Treatment(eversancti

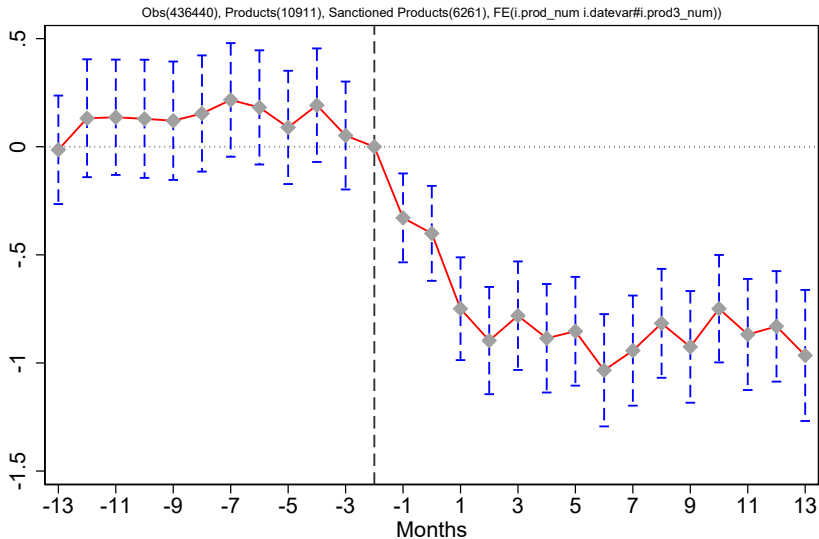


Sanctioned products from **sanctioning**/“friendly” vs “neutral” countries

[back](#)

# Effect on Sanctioned Products

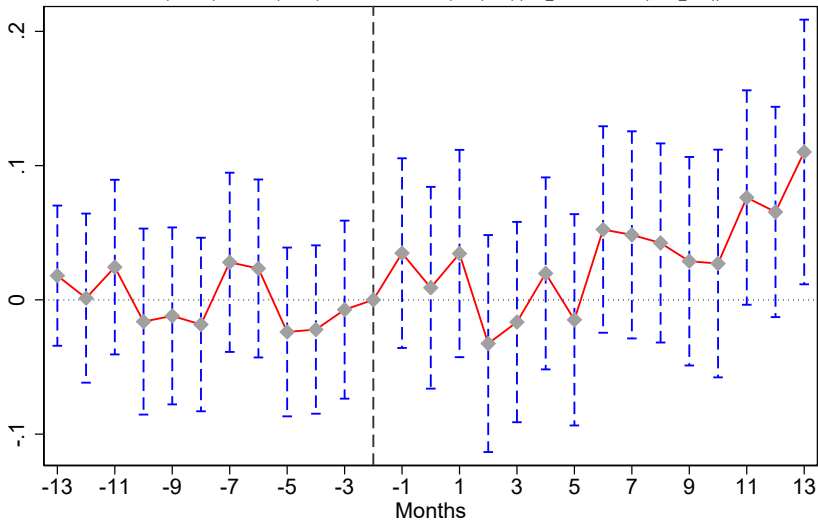
## Log Value



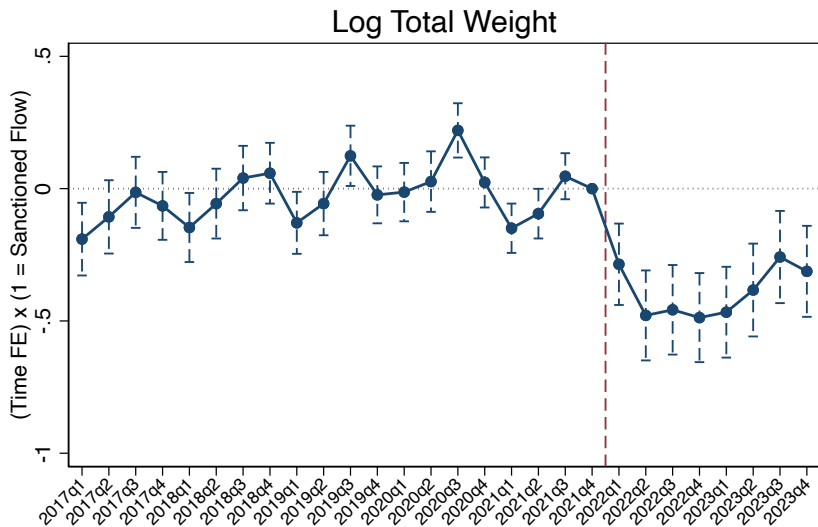
# Effect on Sanctioned Products

## Log Unit Value

Obs(305403), Products(10377), Sanctioned Products(6122), FE(i.prod\_num i.datevar#i.prod3\_num))



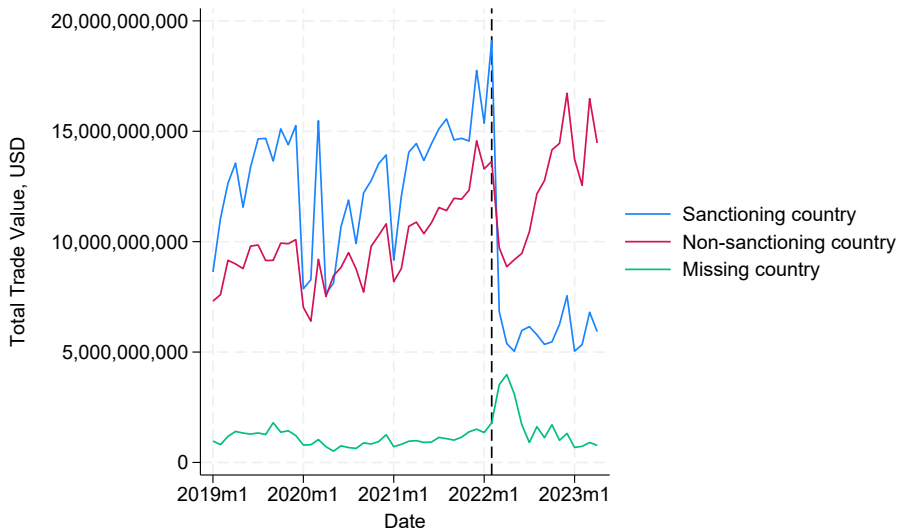
# Effect on Sanctioned Products



Notes: Total Obs.: 326,956, Products: 11,677, Countries: .

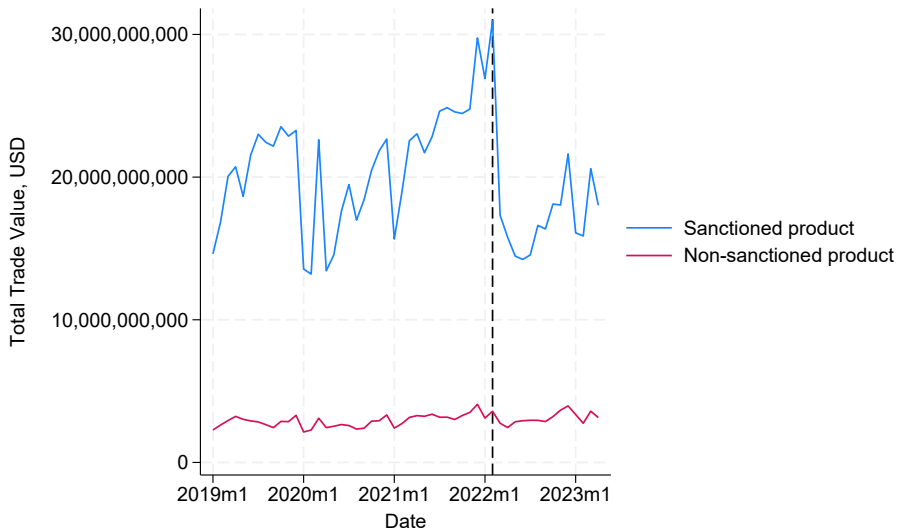
FEs: i.yearquarter i.prod\_num

# Raw Data on Countries



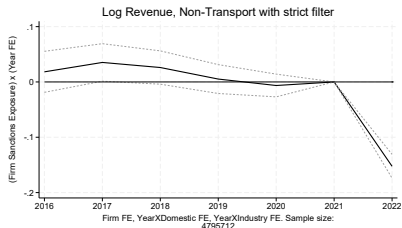
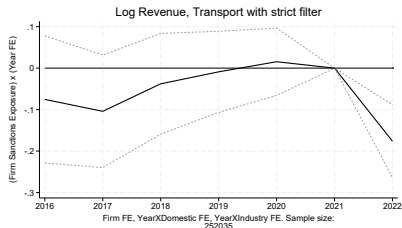


# Raw Data on Sanctioned Products



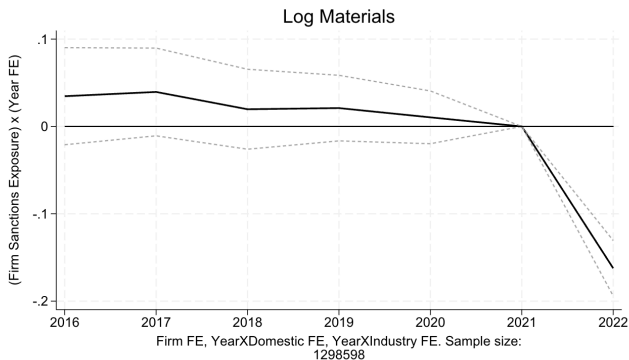
# Wholesalers

- Wholesalers are defined as having OKVED codes 492, 494, 502, 504, 512, 521, 522



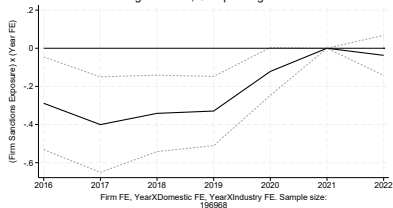
▶ back

# Material costs

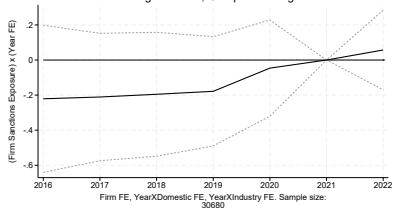


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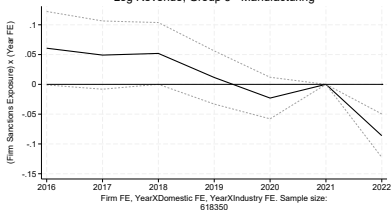
Log Revenue, Group 1 - Agriculture



Log Revenue, Group 2 - Mining



Log Revenue, Group 3 - Manufacturing



Log Revenue, Group 4 - Services, also water and energy



# Effect on Exposed Firms

	(1) Log Revenue	(2) Log Profit	(3) Log Capital	(4) Log Materials	(5) Log Labor
<i>Panel A: Difference-in-Differences Estimation: Ever Sanctioned</i>					
Post-2022 × Firm Imported Sanctioned Flows	-0.155*** (0.015)	-0.119*** (0.023)	-0.077*** (0.019)	-0.153*** (0.021)	-0.059*** (0.016)
Firm FE	✓	✓	✓	✓	✓
Year-Industry FE	✓	✓	✓	✓	✓
Year-Importer Status FE	✓	✓	✓	✓	✓
Mean Dep. Var.	16.73	14.04	14.62	17.55	16.11
SD Dep. Var.	2.26	2.46	2.65	2.70	2.26
R <sup>2</sup>	0.86	0.75	0.89	0.88	0.91
Observations	3,742,883	2,785,871	4,171,987	1,000,517	979,764
Number of Firms	606,255	527,155	670,024	192,372	187,237
<i>Panel B: Triple Differences Estimation: Sanctions and Military-Related</i>					
Post-2022 × Firm Ever Imported Sanctioned Flows	-0.151*** (0.010)	-0.036*** (0.014)	0.011 (0.014)	-0.108*** (0.019)	-0.028** (0.013)
Post-2022 × Military	-0.041*** (0.008)	0.037*** (0.011)	0.092*** (0.012)	-0.039** (0.018)	-0.057*** (0.013)
Post-2022 × Firm Ever Imported Sanctioned Flows × Military	-0.100*** (0.030)	-0.040 (0.041)	-0.002 (0.041)	0.023 (0.040)	-0.034 (0.033)
Firm FE	✓	✓	✓	✓	✓
Year-Industry FE	✓	✓	✓	✓	✓
Year-Importer Status FE	✓	✓	✓	✓	✓
Mean Dep. Var.	15.79	12.89	14.12	16.57	15.10
SD Dep. Var.	2.29	2.42	2.65	3.02	2.44
R <sup>2</sup>	0.80	0.74	0.88	0.86	0.90
Observations	13,124,007	9,925,402	6,429,426	1,919,138	1,781,141
Number of Firms	2,561,039	2,197,807	1,241,338	434,172	396,915