Sanctions and the Exchange Rate in Time

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Introduction
✓ Russia’s invasion of Ukraine reminder of interplay of geopolitics and international economics

→ Effects of sanctions on the exchange rate of targeted country?
Motivation

The Economist

China's changing debt diplomacy
Gene tweaking: a new era begins
How diversity training can backfire
Streaming wars: dragons v hobbits

Hardly troubled
Roubles per $, 2022
Inverted scale

Source: Refinitiv Datastream

The Economist
Motivation

✓ **Theoretical predictions**: effects of sanctions on exchange rate depend on sanction type (Itskhoki and Mukhin (2022), Lorenzoni and Werning (2022))
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✓ **Transmission channels:** balance of supply and demand in currency markets (Itskhoki and Mukhin (2022); rebalancing between sanctioned vs. non-sanctioned varieties in goods markets (Itskhoki and Mukhin (2022), Lorenzoni and Werning (2022)))
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✓ **Transmission channels:** balance of supply and demand in currency markets (Itskhoki and Mukhin (2022); rebalancing between sanctioned vs. non-sanctioned varieties in goods markets (Itskhoki and Mukhin (2022), Lorenzoni and Werning (2022))

✓ **Good data fit:** stronger import than export sanctions reduces USD scarcity + switch to consumption to less desired varieties → RUB appreciation
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Motivation

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✓ Limited evidentiary base on how sanctions affect exchange rates
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Limited evidentiary base on how sanctions affect exchange rates

Confounding factors

Does the response of the exchange rate reflect the effects of sanctions or that of Europe’s largest military conflict since 1945?
Motivation
Contribution

✓ We use the longer history of sanctions to test predictions of recent models and tease out transmission mechanisms to the exchange rate
Introduction

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– Lack of consistent conceptual frameworks in previous empirical studies
– Evidence limited to post-1945 period which is ill-suited for shedding light on current events
– Previous data lacking sufficient granularity to identify sanctions by type and date
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New database on sanctions over 1914-1945

- Large economies targeted in this earlier era, facilitating comparisons with today’s Russia
- 128 cases of sanctions, coded by timing and type
Contribution

- Empirical estimates of the dynamic response to sanctions of the exchange rate
Empirical estimates of the dynamic response to sanctions of the exchange rate

- Local projections controlling for country fixed effects, time fixed effects, war outbreaks and endings and relevant covariates
- Conditional impact depending on type of sanctions taken and its timing
- Estimated effects on variables acting as transmission channels (e.g. imports, exports and confiscated assets)
Findings

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  - Countries sanctioned pre-1945 comparable to Russia (2-3% of global GDP and trade)
  - Countries sanctioned post-1945 10 times smaller (0.2-0.3% of global GDP and trade)

✓ **Effects depend on sanctions type, consistent with theory**
Findings

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✓ Effects depend on sanctions type, consistent with theory
  - Import restrictions → stronger exchange rate and falling imports (in line with theory)
  - Export restrictions → weaker exchange rate and falling exports (in line with theory)
  - Trade embargoes restricting both exports and imports → no significant impact (offsetting effects)
  - Asset freeze → weaker exchange rate proportional to the amount of assets frozen (in line with theory)

✓ Models tested do not just match developments in today’s specific Russia episode but have broader applicability
Related Literature


✓ Features of sanction policies: Elliott and Hufbauer (1999), Hufbauer et al. (2009), Hufbauer et al. (2010), Clifton et al. (2014), Von Soest and Wahman (2015), Felbermayr et al. (2020)

✓ Empirical literature on international economic effects of sanctions: Dreger et al. (2016), Haidar (2017), Besedeš et al. (2017), Wang et al. (2019), Crozet and Hinz (2020), Laudati and Pesaran (2021), Besedeš et al. (2021), Federle et al. (2022)
Data and stylized facts
Data construction

✓ List of economic sanctions from Hufbauer et al (2009) and Mulder (2022) between 1914 and 1945

✓ Identification of features of sanctions using primary, contemporary and secondary sources, e.g. archives of the League of Nations, articles in contemporary newspapers and academic journals, scholarly accounts, etc.

✓ Focus on 1914-1945 because other periods not equally well suited to shed light on recent events:
  - Pre-1914: sanctions different subordinated to military policy in times of war or targeting minows in peace time (“gunboat diplomacy”)
  - Post-1945: sanctions pursued to preserve democracy or human rights, targeting small economies
The Co-ordination Committee and the Committee of
Eighteen, the directing body set up by it, accordingly
drafted, on October 19th, four proposals for depriving Italy
of a certain number of products or raw materials indispensable
for the prosecution of the war (arms and munitions, imple-
ments of war and key-products), and for reducing her financial
resources either by the direct stoppage of all financial aid or
by the interruption of her export trade.

Proposal I involved the prohibition of the exportation,
re-exportation or transit to Italy or Italian possessions
of arms, munitions and implements of war. States were also
asked: (1) to suspend any measures that they might be
applying for the prohibition or restriction of the exportation,
re-exportation or transit of arms, munitions and implements
of war to Ethiopia; (2) to take such steps as may be necessary
to secure that such articles, if exported to countries other than
Italy, would not be re-exported directly or indirectly to Italy
or to Italian possessions.

Proposal II asked States to render impossible all loans
to or for the Italian Government, or banking or other credits
to or for that Government or any public authority,
person or corporation in Italian territory, and all issues
of shares or other capital flotations in Italy or elsewhere,
made directly or indirectly for the Italian Government or for
public authorities, persons or corporations established in
Italian territory.

Proposal III related to the prohibition of importation
into the territory of States Members of all goods (other than
gold or silver bullion and coin) consigned from Italy or Italian
possessions.
C.10 The Petrich Incident (1925)

**Description:** The Incident at Petrich, or War of the Stray Dog, was a Greek–Bulgarian crisis that resulted in a brief invasion of Bulgaria by Greece near the border town of Petrich after the killing of a Greek captain on October 18th, 1925. On October 22nd Greece sent soldiers into Bulgaria with the goal of enforcing their financial compensation demands. Bulgaria appealed to the League of Nations to intervene in the dispute, which ordered a ceasefire, Greek troops withdrew on October 28th and Greece was ordered to pay financial compensation to Bulgaria.

**Economic sanctions:** The Council of the league of Nations, the predecessor the United Nations’ Security Council, discussed whether to impose economic sanctions on Greece on October 27th ([Barros (1964), pp. 375-376]). Some members thought that the Council had to act quickly and decisively on the basis of Article 16 of the Covenant of the League—which allow members to severe all trade or financial relations with a country committing an act of war against another member. Other members thought that a blockade would be an unnecessarily large action in such a situation. The Council agreed not to undertake action under Article 16. Nevertheless, the possibility of a naval demonstration against the Greeks led the League Secretariat to engage in unofficial discussions as to the form, and legal authority, under which, if the need arose, such action should be taken. But Greece gave in to Council pressure the following day on October 28th, 1925.

**Source:** Barros (1964).
Availability of data

Information on sanction features:

✓ Date and type: trade embargoes, import restrictions, export restrictions, asset freezes, financial market exclusions, arms embargoes

✓ target vs. targeting country

✓ actual vs. threat of sanctions

✓ links to war or not

✓ initial vs. subsequent escalating or de-escalating measures
Breakdown of sanctions by type: 1914-1945

Notes: The count of each type of sanctions is shown on its slice of the pie. There are in total 128 sanction-observations.
Countries sanctioned: 1914-1918

Notes: The black shade corresponds to countries which were targeted by economic sanctions, while the light grey shade shows countries that were not.
Countries sanctioned: 1919-1938

Notes: The black shade corresponds to countries which were targeted by economic sanctions, the dark grey shade shows countries that were threatened by sanctions and the light grey shade countries that were not sanctioned.
Countries sanctioned: 1939-1945

Notes: The dark grey shade corresponds to countries which were targeted by asset freezes, the black shade shows countries that were targeted by other economic sanctions (e.g. trade restrictions) and the light grey shade countries that were not sanctioned. Sanctions for Mexico and Argentina shown on the map were threats, not actual sanctions.
Average share of global GDP per sanctioned country (%)—Selected periods

Notes: The light blue bar corresponds to filtered cases where (i) the objective of sanctions was to “end war”, “prevent war”, or “territorial conflict” and (ii) measures targeted arms and international trade or financial transactions.
Average share of global trade per sanctioned country (%)—Selected periods

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Share of global trade under sanctions (%)—1914-2022

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Empirical framework and hypotheses
Empirical framework

Panel local projection estimates of the reaction of the exchange rate to sanctions up to horizon $k$:

$$s_{i,t+k} - s_{i,t-1} = \alpha_i + \alpha_t + \beta^j_k \cdot Sanction^j_{i,t} + \Gamma' X_{i,t} + \epsilon_{i,t+k} \quad (1)$$
Empirical framework

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where:

- $s_{i,t}$: log exchange rate per USD of country $i$ in week $t$ ($\downarrow = s$ appreciates) (based on extension Vicquéry (2022) to WWII using Swiss market and black market quotes)
- $\alpha_i, \alpha_t$: currency fixed effects & year fixed effects
- Sanction of type $j$: trade embargoes, import restrictions, export restrictions, asset freezes
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- $X_{i,t}$: control variables (geopolitical risk (Caldara and Iacovello (2022)), financial openness (Quinn and Voth (2008)), tariffs (Clemens and Williamson (2004)), fiscal balance-to-GDP, gold peggers and currency blocs, wars outbreak/end, etc.)
Empirical framework

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$$s_{i,t+k} - s_{i,t-1} = \alpha_i + \alpha_t + \beta_j^{i} \text{Sanction}_{i,t} + \Gamma' X_{i,t} + \varepsilon_{i,t+k} \quad (1)$$

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- $\alpha_i$ & $\alpha_t$: currency fixed effects & year fixed effects
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✓ $H_0 \ #1$: Import restrictions strengthen the exchange rate
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  • Imports & demand for foreign currency ↓
  • $s \downarrow$

✓ $H_0 \ #2$: Export restrictions weaken the exchange rate
  • Exports & supply of foreign currency ↓
  • $s \uparrow$

✓ $H_0 \ #3$: The impact of embargoes on the exchange rate is neutral
  • Imports & demand for foreign currency ↓, exports & supply of foreign currency ↓
  • $s \leftrightarrow$

✓ $H_0 \ #4$: Asset freezes weaken the exchange rate
  • supply of foreign currency ↓
  • $s \uparrow$
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Estimates
Basic estimates on full sample

Notes: Full sample panel local projection estimates by OLS controlling for year fixed effects, week fixed effects, currency fixed effects and dummies for coincidental war outbreaks and endings. 1 (1.65) standard-deviation confidence bands are shown as dashed (dotted) lines.
Excluding threats

Notes: Full sample panel local projection estimates by OLS controlling for year fixed effects, week fixed effects, currency fixed effects and dummies for coincidental war outbreaks and endings. 1 (1.65) standard-deviation confidence bands are shown as dashed (dotted) lines.
Controlling for financial openness

Notes: Full sample panel local projection estimates by OLS controlling for year fixed effects, week fixed effects, currency fixed effects and dummy variables for coincidental war outbreaks and endings. 1 (1.65) standard-deviation confidence bands are shown as dashed (dotted) lines.
Robustness exercises

✓ Control for Geopolitical risk
✓ Control for trade openness
✓ Control for trade tariffs
✓ Control for country × year fixed effects
✓ Exclude sanctions imposed by the League of Nations
✓ Consider only currencies under gold standard or part of a currency bloc
✓ Use Swiss black market data for WWI
✓ Control for import and export sanctions simultaneously & test for pre-trends
Mechanisms—Imports and Exports

OLS estimates of the reaction of relevant macro variable to sanctions:

\[ y_{i,t}^l - y_{i,t-1}^l = \alpha_i + \alpha_t + \beta^j Sanction_{i,t-1}^j + \Gamma' X_{i,t-1} + \varepsilon_{i,t} \]  \hspace{1cm} (2)

where:

- \( y_{i,t}^l \): log of macro variable \( l \) in country \( i \) in year \( t \) predicted by theory as transmission channel: imports & exports (Federico and Tena-Junguito (2019))
**Mechanisms—Imports**

Notes: OLS estimates over 1914-1938 controlling for year fixed effects, currency fixed effects, dummies for coincidental war outbreaks and endings (LHS panel), and geopolitical risk (middle panel) or financial openness (RHS panel). 90% confidence intervals are shown as whiskers.
Mechanisms—Exports

Notes: OLS estimates over 1914-1938 controlling for year fixed effects, currency fixed effects, dummies for coincidental war outbreaks and endings (LHS panel), and geopolitical risk (middle panel) or financial openness (RHS panel). 90% confidence intervals are shown as whiskers.
Test if the 1-month depreciation of the exchange rate around asset freeze sanctions correlates with the amount of assets frozen:

\[ y_{i,t_0+4} - y_{i,t_0} = \alpha + \beta \left( \frac{W}{Y} \right)_i + \varepsilon_i \]  \hspace{1cm} (3)

where:

- \( y_{i,t_0+4} - y_{i,t_0} \): log change of the exchange rate of country \( i \) 4 weeks after an asset freeze sanction
- \( \left( \frac{W}{Y} \right)_i \) is the amount of assets frozen as share of GDP according to a US Treasury survey of 1941 on foreign-owned assets in the United States
Mechanisms—Asset freeze

**Notes:** OLS estimates of Equation (2) where the dependent variable is the average 1-month exchange rate depreciation (in percent) of countries sanctioned by US asset freezes in World War II. Alternative asset definitions are considered, taking data from a survey conducted by the US Treasury in 1941 to estimate the value of assets held in the US by the countries sanctioned. 90% confidence intervals are shown as whiskers.
Conclusions

✓ 3 take-home conclusions

- Factual evidence that today’s sanctions on Russia are unprecedented since World War II
- Evidence that the effects of sanctions on exchange rate and mechanisms depends on sanction type
- Evidence on the transmission channel in line with theory

✓ Implications for research and policy

- Recent models of the effects of sanctions on the exchange rate have broader applicability than just today’s Russia episode
- The direction of exchange rate moves not adequate metric of success or failure of sanctions but a reflection of type and scale of measures taken
Appendix


Controlling for geopolitical risk

**Notes:** Full sample panel local projection estimates by OLS controlling for year fixed effects, week fixed effects, currency fixed effects and dummies for coincidental war outbreaks and endings. 1 (1.65) standard-deviation confidence bands are shown as dashed (dotted) lines.
Controlling for trade openness

Notes: Full sample panel local projection estimates by OLS controlling for year fixed effects, week fixed effects, currency fixed effects and dummies for coincidental war outbreaks and endings. 1 (1.65) standard-deviation confidence bands are shown as dashed (dotted) lines.
Controlling for trade tariffs

Notes: Full sample panel local projection estimates by OLS controlling for year fixed effects, week fixed effects, currency fixed effects and dummies for coincidental war outbreaks and endings. 1 (1.65) standard-deviation confidence bands are shown as dashed (dotted) lines.
Controlling for country × year fixed-effects

Notes: Full sample panel local projection estimates by OLS controlling for year fixed effects, week fixed effects, currency fixed effects and dummies for coincidental war outbreaks and endings. 1 (1.65) standard-deviation confidence bands are shown as dashed (dotted) lines.
Exclude sanctions imposed by the League of Nations

Notes: Full sample panel local projection estimates by OLS controlling for year fixed effects, week fixed effects, currency fixed effects and dummies for coincidental war outbreaks and endings. 1 (1.65) standard-deviation confidence bands are shown as dashed (dotted) lines.
Consider only currencies under gold standard or part of a currency bloc

Notes: Full sample panel local projection estimates by OLS controlling for year fixed effects, week fixed effects, currency fixed effects and dummies for coincidental war outbreaks and endings. 1 (1.65) standard-deviation confidence bands are shown as dashed (dotted) lines.
Use black market data for WWI

Notes: Full sample panel local projection estimates by OLS controlling for year fixed effects, week fixed effects, currency fixed effects and dummies for coincidental war outbreaks and endings. 1 (1.65) standard-deviation confidence bands are shown as dashed (dotted) lines.
Control for import and export sanctions simultaneously

Notes: Full sample panel local projection estimates by OLS controlling for year fixed effects, week fixed effects, currency fixed effects and dummies for coincidental war outbreaks and endings. 1 (1.65) standard-deviation confidence bands are shown as dashed (dotted) lines.
Test for pre-trends as in Freyaldenhoven et al. (2019)

Notes: The figure shows the estimated exchange rate changes in weeks around sanction events in the spirit of Freyaldenhoven et al. (2019).
Share of countries in gold standard or within currency blocks
Exchange rate volatility across time

1914-1944

Interquartile range
average

1973-2022

Interquartile range
average