

How Does a Dominant Currency Replace Another? Evidence from European Trade

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Disclaimer: The views expressed are those of the authors and do not necessarily reflect those of the ECB.

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Motivation

Dominance of US dollar is central to understand the global financial system and international propagation of shocks

- Equilibrium with one dominant currency is stable and self-perpetuating (e.g. Boz et al. 2020)
- US dollar indeed continues to reign in global trade and finance

But there is one exception: **euro area's neighborhood**

Motivation

country charts

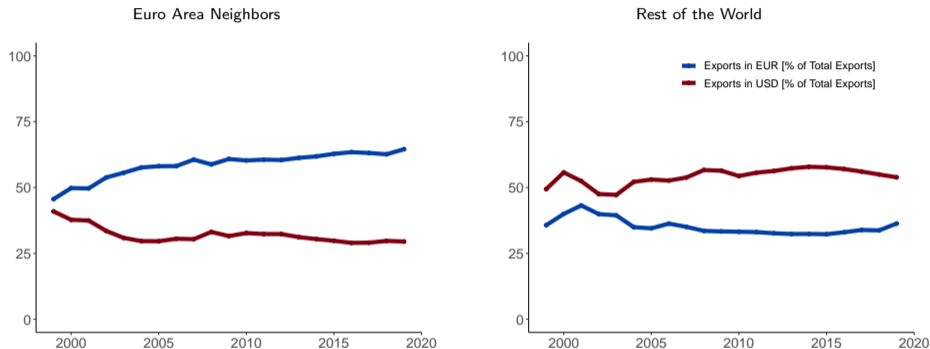


Figure: Invoicing Currency Patterns in Exports

Notes: The figure plots shares of exports invoiced in euros and in US dollars from 1999 to 2019. The left panel reports averages across European countries which are not inaugural members of the EA. The right panel shows averages across the remaining countries. Missing values are imputed using linear interpolation. Data: Boz et al. (2020).

Motivation

How can the equilibrium shift? **Why does one dominant currency replace another?**

Contributions

What we do:

- investigate **empirically** the causes of uniquely observed switch from USD to EUR invoicing
- test recently proposed theories (Gopinath and Stein 2021, Mukhin 2022)...
- ... in a **new model framework** that allows for dynamic and cross-country network interactions

Previous studies:

- focused on *theory* (e.g. Gopinath and Stein 2021, Mukhin 2022)
- relied on *static* panel data regressions (e.g. Kamps 2006, Boz et al. 2022)
- covered *firm-level* dynamics for single country (e.g. Goldberg and Tille 2016, Amiti et al. 2022)

Hypotheses

Two hypotheses in literature on why a dominant currency can replace another (Gopinath and Stein 2021, Mukhin 2022, Amiti et al. 2022):

- **Lower exchange rate volatility**

- Exporters invoice in currency in which desired, flexible price is most stable
- Strategic complementarities in price setting and input-output linkages
- *for example*: widespread pegs to USD explain its central role in world trade

- **Stronger trade**

- First, through intermediate goods trading; input-output linkages
- Second, through financial channel (household deposits and bank lending currency choices)
- *for example*: with imports invoiced in USD, importing firms prefer deposits in USD, loans will be offered in USD, exporters will use USD for export pricing

Importance of **cross-country effects** for these channels

Hypotheses

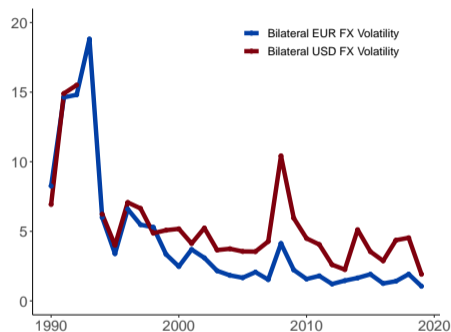
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Figure: Evolution of Cross-Country Averages of Exchange Rate Volatilities and Share of Exports

Notes: shares of exports destined to EA and US, respectively (left panel) and bilateral exchange rate volatilities against the euro and US dollar (right panel), both averaged across countries in the sample.

Prima Facie Evidence

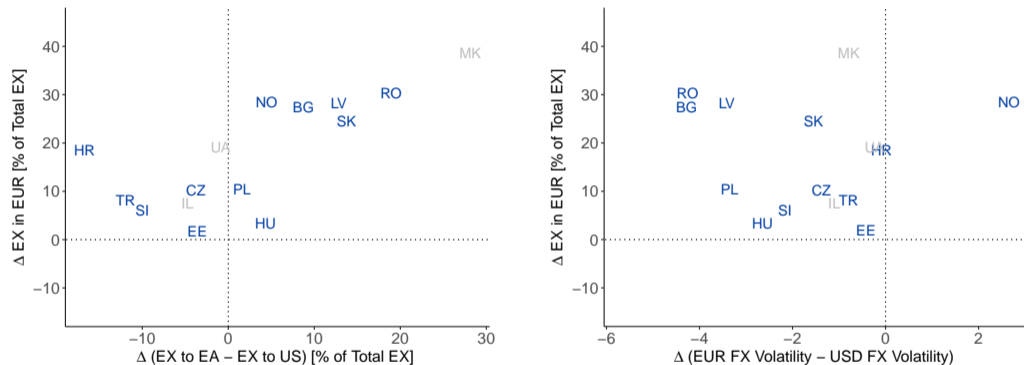


Figure: Changes in Euro Shares of Exports and Potential Determinants

Notes: changes in the euro share of exports from 2000 to 2019 in each country against changes in the share of exports destined to the Euro Area relative to the US (left panel) and against changes in bilateral exchange rate volatility against the euro relative to the US dollar (right panel). The latter two are computed as changes in mean values from 1990-1995 to 2015-2020. Countries in gray are included only in the broader sample.

Empirical Setup

Endogenous variables: $y_{it} = [EX_{it}^{\text{€}}, IM_{it}^{\text{€}}, FX_{it}^{\text{€-\$}}, EX_{it}^{\text{EA-US}}]'$

- $EX_{it}^{\text{€}}$: country i 's euro share of exports
- $IM_{it}^{\text{€}}$: euro share of imports
- $FX_{it}^{\text{€-\$}} = FX_{it}^{\text{€}} - FX_{it}^{\text{\$}}$: difference bilateral euro and US dollar exchange rate volatilities
- $EX_{it}^{\text{EA-US}} = EX_{it}^{\text{EA}} - EX_{it}^{\text{US}}$: difference shares of exports destined to EA and US

Let $y_t = [y'_{1t}, \dots, y'_{nt}]$ be a $4n \times 1$ vector that stacks y_{it} for all n countries in our sample

Data: annual data (Boz et al. 2020), 1999-2019, 13 non-inaugural members of EA with sufficient invoicing data (BG, CZ, EE, HR, HU, LT, LV, NO, PL, RO, SI, SK, TK)

Empirical Model: Setup

Panel-VAR model in structural form:

$$\mathbf{A}_t y_t = \mathbf{k} + \sum_{l=1}^p \mathbf{B}_t^l y_{t-l} + \sum_{l=0}^p \mathbf{C}_l z_{t-l} + \varepsilon_t . \quad (1)$$

- $\mathbf{k} = [k'_1, \dots, k'_n]'$ contains intercepts k_i for each country i
- \mathbf{A}_t and $\{\mathbf{B}_t^l\}_{l=1}^p$ matrices
 - **diagonal** blocks: relation among **same-country variables**
 - **off-diagonal** blocks: time-varying **cross-country effects**
- $\{\mathbf{C}_l\}_{l=0}^p$ impact of countries outside our sample, included in z_t

Cross-Country Network Effects

Allow for **three cross-country linkages** emphasized in theory

Country A's euro share of exports might increase:

- ...when A's euro share of imports rises (its trading partner B invoices a higher share of its exports to country A in euro);
- ...when country B, who competes in the same export market as country A, increases its euro share of exports to that same export market;
- ...when the exchange rate of country B's local currency against the euro becomes less volatile

These links give rise to **higher-order connections** between countries.

Shock identification

Shock identification reached by **limiting country linkages to those of theory** equations

This also implies:

- exchange rate volatility unaffected by exports on impact (exchange rate disconnect)
- exchange rate volatility and export volumes unaffected by euro share of imports and exports (*can be relaxed*)

In addition:

- shocks uncorrelated across countries (conditional on cross-country effects described)
- dynamic relationships same for all countries (but cross-country heterogeneity in levels and shock volatilities)

Estimation: maximum likelihood via numerical optimization, 1 lag, cointegration setup

Which Hypothesis Matters?

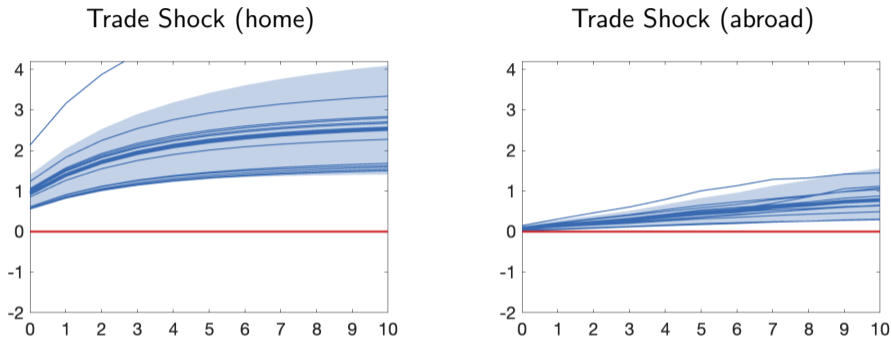


Figure: Impulse Responses of Euro Share of Exports following relative **Trade Shocks**

Notes: The plots show the impulse responses of the euro share of exports to a one-standard deviation increase in the relative export share at home (left column) and abroad (right column) in the year 2000. The foreign shock represents a simultaneous increase in the corresponding series for all other countries except for the home country. The thick blue line shows the average response across countries, whereas the thin lines show country-specific responses. Blue range represents the 95% confidence interval.

Which Hypothesis Matters?

data charts

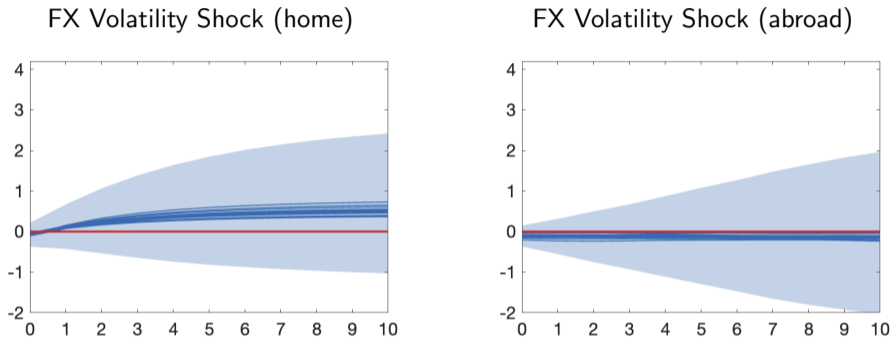


Figure: Impulse Responses of Euro Share of Exports following relative **FX Volatility Shocks**

Notes: The plots show the impulse responses of the euro share of exports to a one-standard deviation increase in relative exchange rate volatility at home (left column) or abroad (right column) in the year 2000. The foreign shock represents a simultaneous increase in the corresponding series for all other countries except for the home country. The thick blue line shows the average response across countries, whereas the thin lines show country-specific responses. Blue range represents the 95% confidence interval.

Recall

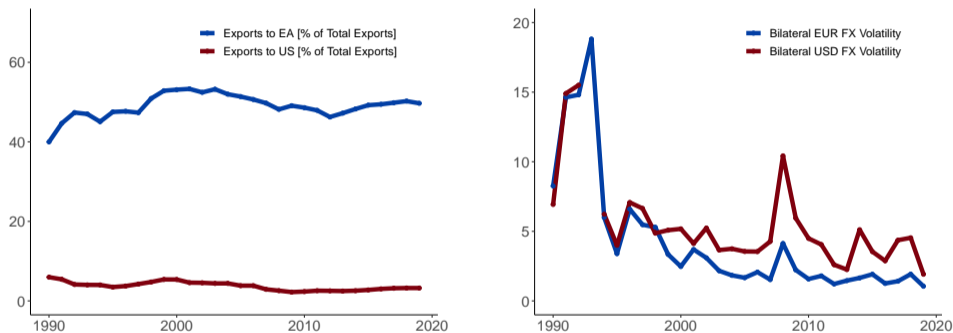


Figure: Evolution of Cross-Country Averages of Exchange Rate Volatilities and Share of Exports

Notes: shares of exports destined to EA and US, respectively (left panel) and bilateral exchange rate volatilities against the euro and US dollar (right panel), both averaged across countries in the sample.

Why Did EUR Invoicing Rise?

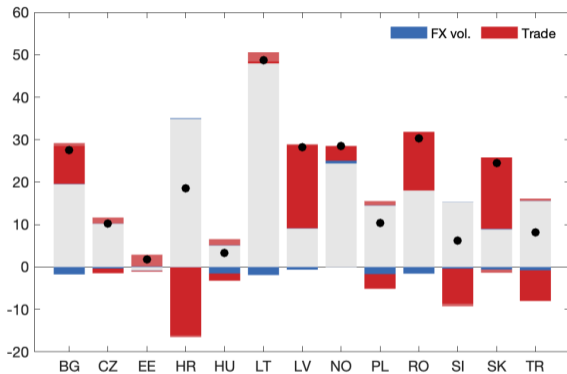


Figure: Historical Decomposition of Euro Share of Exports Increases Across Countries.

Notes: For each country, the black dot indicates the increase in the euro share of exports from 2000 to 2019. The blue and red bars, respectively, show the estimated contributions of shocks to exchange rate volatility and trade which occurred during 1995-2019.

How Do Cross-Country Effects Matter?

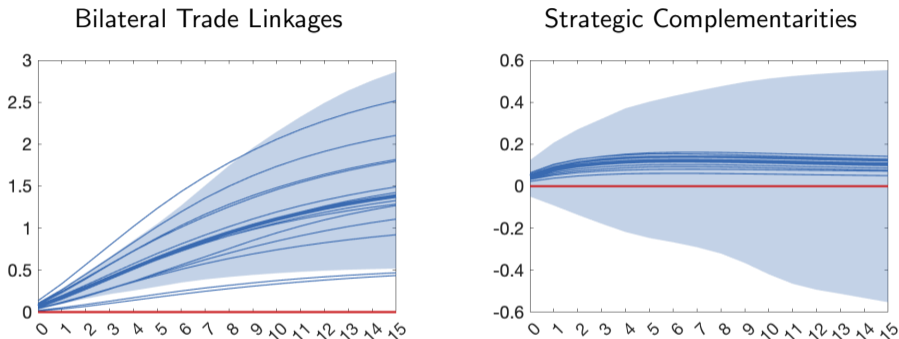


Figure: Euro Share of Exports' Domestic Response to Increases Abroad

Notes: The plots show the impulse responses of the euro share of exports in country i to a simultaneous and persistent increase in the euro share of exports in all countries but country i in the year 2000 by one percentage point. The left plot shows the part of the response due to mechanical trade links, the right part shows the part due to strategic complementarities in currency choice. The thick blue line shows the average response across countries, whereas the thin lines show country-specific responses.

Conclusion

- This paper assesses empirically why a dominant currency can be replaced by another, using a rare episode in Europe during which such a switch happened
- **Trade is a key determinant**
- Cross-country effects are important, operating mainly via bilateral trade linkages
- Findings underscore **importance of input-output linkages** as determinants of invoicing currency patterns
- This implies that **reshoring or friendshoring of production chains could strengthen the role of the euro** for export invoicing due to stronger regional trade on the European continent

Thank you!

Invoicing Currency Patterns in Exports

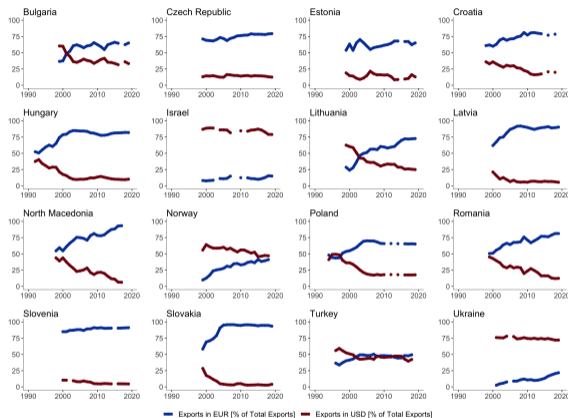
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Figure: Invoicing Currency Shares in Exports

Notes: The figure shows the evolution of the share of exports invoiced in euro (blue lines) and in US dollars (red lines) across countries in our sample. Data: Boz et al. (2020).

Cross-Country Effects and Identification Assumptions [back](#)

$$\mathbf{A}_t \mathbf{y}_t = \mathbf{k} + \sum_{l=1}^p \mathbf{B}_t^l \mathbf{y}_{t-l} + \sum_{l=0}^p \mathbf{C}_l \mathbf{z}_{t-l} + \varepsilon_t \quad (2)$$

$$\mathbf{y}_{it} = [EX_{it}^{\text{€}}, IM_{it}^{\text{€}}, FX_{it}^{\text{€-\$}}, EX_{it}^{\text{EA-US}}] \quad (3)$$

$$A_{ijt} = \begin{bmatrix} -q_0 \chi_{ijt}^0 & 0 & -\gamma_0 \chi_{ijt} & 0 \\ -m_{ijt} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}, \quad B_{ijt}^l = \begin{bmatrix} q_l \chi_{ijt}^l & 0 & \gamma_l \chi_{ijt} & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}, \quad l = 1 : p. \quad (4)$$