

# Dominant Currency Pricing Transition

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# Motivation

## ⇒ **Dominant Currency Paradigm (Gopinath et al., 2020 AER)**

- Crucial to understand FX and international spillovers.
- Winner-takes-all stable equilibrium of currency dominance, underpinned by network externalities and strategic complementarities.
- Consistent with:
  - ① Cross-country evidence of pervasive USD dominance.
  - ② A burgeoning literature relying on micro-data.
- **Under-explored question:** *"Which forces help preserve existing dominant currency equilibria and what it will take for new currency equilibria to emerge"* (Gopinath and Itskhoki, NBER 2021)

# Contribution

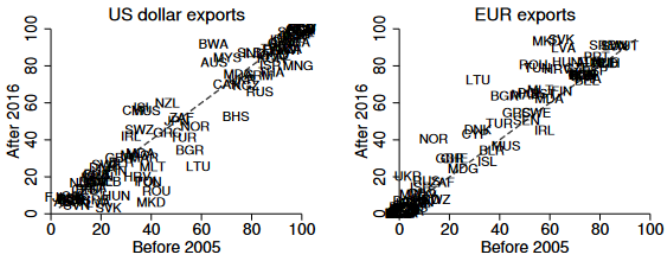
We study the emergence of a new currency equilibrium in the UK: the **sudden dollarisation of UK exports** in the aftermath of the Brexit referendum.

Three contributions

- 1 We uncover and document a **unique episode of aggregate transition to dominant currency pricing** using firm-level data.
- 2 Determinants: **hedging motives**, driven by operational FX-mismatches and a large FX shock, generated an aggregate transition to a dollar invoicing, over and above strategic complementarities and market power.
- 3 Macroeconomic implications: **export pass-through**  $\Rightarrow$  USD appreciation depresses demand for UK exports by twice as much than before Brexit.

# Dollar dominance is empirically static (Boz et al., 2022) ...

Figure 8: Evolution of invoicing currency shares at the country level



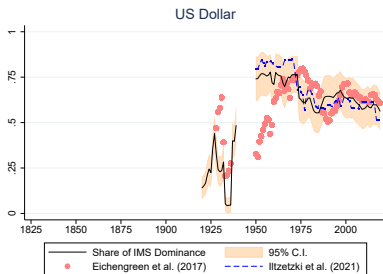
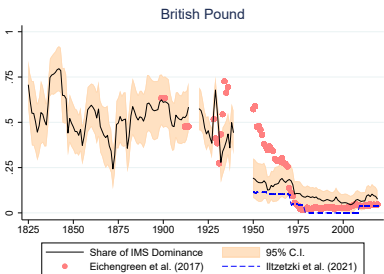
*Note:* The figure presents scatter plots of the shares of countries' exports invoiced in US dollars (left panel) and euros (right panel) both early and late in the sample period.

## ... including in firm-level evidence ...

- Amiti et al. (2022 QJE), Belgium - “large cross-firm heterogeneity in currency choice combined with the **persistence** of dominant currencies over time”
- Barbiero (2022), France
- Auer et al. (2021 AER), Switzerland
- Corsetti et al. (2022 JIE), UK

... but dominant currencies are historically dynamic!

Three measures of global currency dominance, 1825-2020 (Vicquéry, 2023)



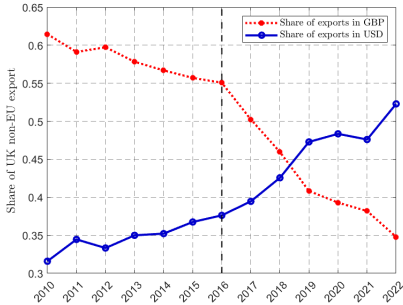
- Shifts from one dominant currency to another have occurred in the past, despite network effects.
- Discontinuities were typically rapid rather than slow-moving.

# Potential Theoretical Channels of Pricing Paradigm Transition

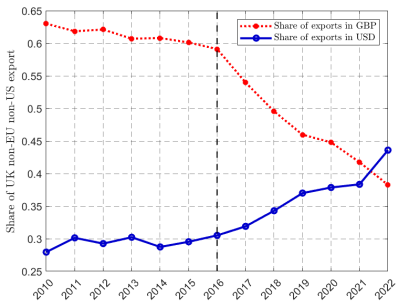
- **Coordination** towards vehicle currencies
  - "Coalescing" (herding) effect (Goldberg and Tille, 2008).
  - Strategic complementarities (Gopinath et al. 2020).
- **Hedging motive**
  - Role of imported inputs (Novy, 2006; Amiti et al., 2022).
  - FX level co-movement with marginal costs/revenues (Goldberg and Tille, 2008).
- **Market Power**
  - Bargaining between exporter and importer (Goldberg and Tille, 2013; 2016).



# Contribution 1 - The Brexit Dollarisation



(a) Including exports to US.



(b) Excluding exports to US.

Source: HMRC administrative datasets, UK non-EU exports, 2010–2022.

- Documenting strong dynamic shift in response to shock: post-2016 non-EU non-US export invoicing fall in **GBP (60% to 40%)** and increase in **USD (30% to 45%)**.

## Contribution 2 - Currency-mismatch Valuation Channel

- Most UK firms were **operationally "long" GBP**.
- The Brexit depreciation implied large **valuation effects**.
- Shift-share and event-study empirical identification strategies.  
⇒ Dominant Currency Pricing Transition.
- **Key finding:** currency-mismatch valuation channel accounts for most of the transition away from producer currency pricing, above and beyond effects from strategic complementarities and market power.

## Contribution 3 - Quantification of Macroeconomic Implications

$$\underbrace{\Delta p_{ij}}_{\text{for UK exports into Japan}} = \begin{cases} \Delta e_{\text{£¥}} & \text{if invoiced in £} \\ \Delta e_{\text{\$¥}} & \text{if invoiced in \$} \end{cases}$$

- Has this shift changed how the aggregate economy responds to exchange rate movements?
- **Key finding:** Export quantities are twice more elastic to USD movements than before this dominant currency pricing transition.

# Data and key mechanism

## Data

- HMRC (His Majesty's Revenue and Customs) data on the universe of UK non-EU exports and imports (Freeman et al, 2023):
  - Day
  - UK trader identifier
  - Combined Nomenclature (CN) 8-digits product
  - country of destination or origin
  - value in Sterling
  - quantity
  - currency of invoicing (only for non-EU)

- From January 2010 up to and including December 2022 but we limit our scope to the period until 2019 (pre-Covid).

**GENERAL DECLARATION**  
(Outward/Inward)  
AGRICULTURE, CUSTOMS, IMMIGRATION, AND PUBLIC HEALTH

Owner or Operator NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mark of Nationality and Registration U.S.A. Flight No. APOLLO 11 Date JULY 24, 1969

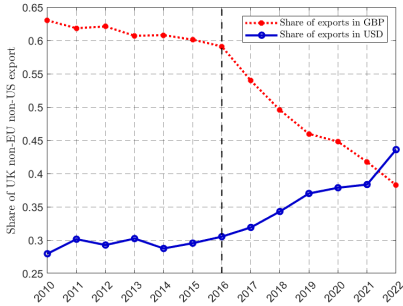
Departure from MOON (Place and Country) Arrival at HONOLULU, HAWAII, U.S.A. (Place and Country)

FLIGHT ROUTING  
(\*Place\* Column always to list origin, every en-route stop and destination)

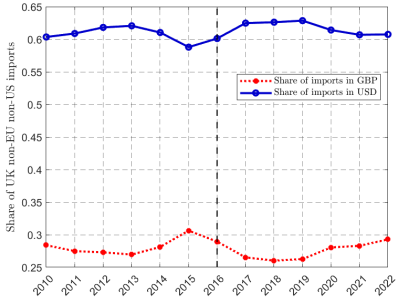
| PLACE         | TOTAL NUMBER OF CREW            | NUMBER OF PASSENGERS ON THIS STAGE             | CARGO  |
|---------------|---------------------------------|--|--|
| CAPE KENNEDY  | COMMANDER<br>NEIL A. ARMSTRONG  |  |  |
| MOON          |                                 | Departure Place:                               |  |
| JULY 24, 1969 | COLOREL<br>EDWIN E. ALDRIN, JR. | Embarking: NTL<br>Through en route flight: NTL | MOON ROCK AND<br>MOON DUST<br>SAMPLES - Cargo<br>Manifest Attached |
| HONOLULU      |                                 |  |  |

A famous example of customs form

# Aggregate operational mismatch of UK trade



(a) Exports



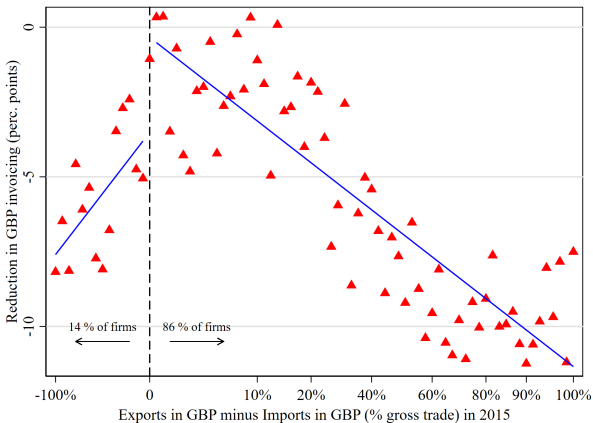
(b) Imports

Source: HMRC administrative datasets, UK non-EU non-US exports and imports, 2010–2022.

► Incl. US

# Pre-2016 "Long" GBP Exposure and Reduction in GBP Invoicing

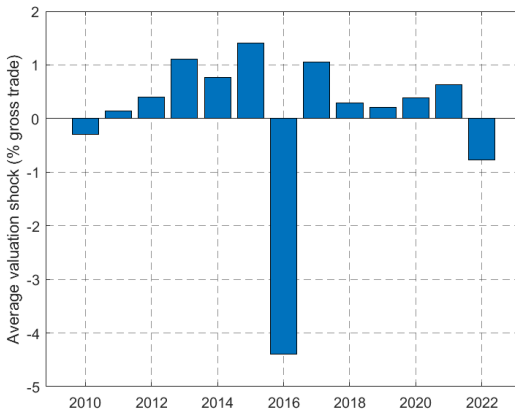
**Mismatch** :  $Exposure_{f,2015} = \frac{\sum_j (Exports_{fj,2015}^{\pounds} - Imports_{fj,2015}^{\pounds})}{Total\ Trade_{f,2015}}$



**Source:** HMRC administrative datasets, UK non-EU non-US exports, 2010–2022.

# Valuation effects of firms' currency mismatches

**FX-mismatch valuation shock** :  $s_{f,t}^{\pounds} = \frac{\sum_j [(Exports_{fj,2015}^{\pounds} - Imports_{fj,2015}^{\pounds}) \times \Delta e_{j,t}^{\pounds/j}]}{Total\ Trade_f,2015}$



Source: HMRC administrative datasets, UK non-EU non-US exports, 2010–2022.



# Transaction-level empirical analysis

## Two empirical approaches

- 1 **Static** regression setting using valuation shock series
- 2 Unpacking **dynamic** effects of 2016 shock through event-study approach

## Static Regression Analysis: Empirical Specification

$$y_{f,t}^h = \beta s_{f,t} + \text{Controls}_{f,t} + \alpha_f + \delta_t \times \Delta_t + u_{f,t} \quad \text{for } h = \{\$, \€, \£\}$$

- $y_{f,t}^h$  share of exports of firm  $f$  in quarter  $t$  invoiced in currency  $h$ .
- $s_{f,t}$  currency-mismatch valuation shock.
- $\alpha_f$  firm FE.
- $\delta_t \times \Delta_t$  quarter FE interacted with measure of the gap since the firm last exported (controlling for potential informativeness of the trade patterns).
- Standard errors clustered at the firm level.
- $\text{Controls}_{f,t}$ 
  - 1 Strategic complementarities: (a.) the average share of exports invoiced in currency  $h$  in that specific HS4 sector in quarter  $t$  and (b.) the share of exports invoiced in  $h$  at  $t$  for the largest firm in the sector.
  - 2 Product-destination firm-level market share as a further control. (More on this later.)
  - 3 Additional measures of net (USD and Local) currency mismatch exposure at the firm level.

## Static Regression Analysis: Identification

The key orthogonality condition needed for identification is

$$\text{Cov}[I_{ft}, u_{ft}] = \sum_j \text{Exposure}_{jt} \Delta e_{jt} \phi_{jt} \rightarrow 0$$

where

- $\text{Exposure}_{jt} = \mathbb{E}[\text{Exposure}_{fjt}]$  is the expected exposure to destination country  $j$
- $\phi_{jt} = \mathbb{E}[\text{Exposure}_{fjt} u_{ft}] / \mathbb{E}[\text{Exposure}_{fjt}]$  exposure-weighted expectation of unobserved drivers of currency choice.

Even if  $\phi_{jp} \neq 0$ , exclusion restriction holds if

- ①  $\mathbb{E}[\Delta e_{jt} | \phi_{jt}] = \mu \quad \forall t$  (*Quasi-random shock assignment*)
- ②  $\mathbb{E}[\Delta e_{jt} \Delta e_{jt-l} | \phi_{jt}, \phi_{jt-l}] = 0 \quad \forall l$  (*Many independent shocks*)

# Static Regression Analysis: Results

|   | Value share of exports in |                     |                    |                    |                    |                    |
|---|---------------------------|---------------------|--------------------|--------------------|--------------------|--------------------|
|   | GBP                       | GBP                 | USD                | USD                | EUR                | EUR                |
|   | (1)                       | (2)                 | (1)                | (2)                | (1)                | (2)                |
| <i>Panel a. Baseline specification</i>      |                           |                     |                    |                    |                    |                    |
| Valuation shock $s_{f,t}$                   | -0.01***<br>(-6.37)       | -0.01***<br>(-6.02) | 0.007***<br>(4.73) | 0.01***<br>(4.82)  | 0.003***<br>(3.85) | 0.003**<br>(3.13)  |
| <i>Panel b. Strategic complementarities</i> |                           |                     |                    |                    |                    |                    |
| Invoicing of largest firm in HS4            |                           | 0.02***<br>(16.79)  |                    | 0.02***<br>(17.06) |                    | 0.02***<br>(12.60) |
| Average invoicing in HS4                    |                           | 0.09***<br>(10.64)  |                    | 0.09***<br>(17.06) |                    | 0.15***<br>(8.94)  |
| Additional valuation controls               | Yes                       | Yes                 | Yes                | Yes                | Yes                | Yes                |
| Firm FE                                     | Yes                       | Yes                 | Yes                | Yes                | Yes                | Yes                |
| Time x Gap FE                               | Yes                       | Yes                 | Yes                | Yes                | Yes                | Yes                |
| Observations                                | 1,322,378                 | 724,482             | 1,322,378          | 724,482            | 1,322,378          | 724,482            |

Note. – Panel a.  $\beta_s$  from  $y_{f,t}^h = \beta s_{f,t} + Controls_{f,t} + \alpha_f + \delta_t \times \Delta_t + u_{f,t}$ . Panel b. coefficients on the strategic complementarities controls.

Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2019.

## Dynamic Event-Study Analysis: Empirical Specification

$$y_{fpj,t} = \alpha_{fpj} + \delta_t + \sum_{m \neq \text{Jan 2016}} [\beta_m (s_{f,2016}) \times \mathbf{1}_{m=t}] + \epsilon_{fpj,t}$$

- $y_{fpj,t}$  share of exports by firm  $f$  of product  $p$  to destination  $j$  invoiced in GBP
- $\delta_t$  time FE
- $\alpha_{fpj}$  firm-product-destination FE
- $\mathbf{1}_{m=t}$  indicator equal to 1 in month  $m$  and 0 otherwise.
- $s_{f,2016}$  special case of the more general  $s_{f,t}$ :

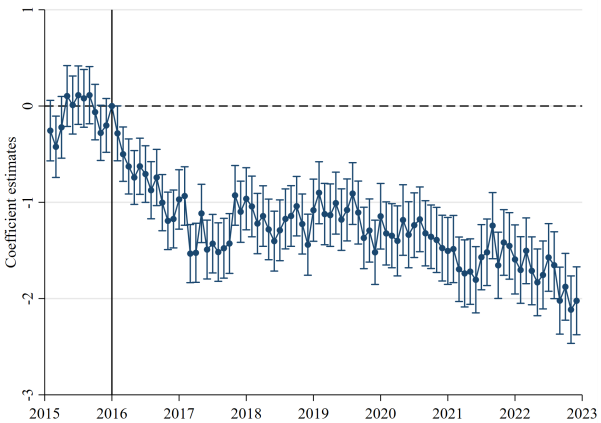
$$s_{f,2016} = \frac{\sum_j \left[ (\text{Exports}_{fj,2015}^{\pounds} - \text{Imports}_{fj,2015}^{\pounds}) \times \Delta e_{j,2016}^{\pounds/j} \right]}{\text{Total Trade}_{f,2015}}$$

- Exposure at the 2015 (pre-shock) level
- $\Delta e_{j,2016}^{\pounds/j}$  the average of monthly movements between January 2016 and June 2016 — results robust to using only June 2016.

## Dynamic Event-Study Analysis: Identification

- **Objective:** isolating the potential effects of the Brexit-related depreciation in 2016 through the mismatch FX channel.
- Unexpected nature of the referendum's outcome, exogenous FX shock
- (Continuous) treatment by the heterogeneous shock incidence on firms based on  $s_{f,2016}$ .
- Sharpening identification:
  - Saturating regression with firm-product-destination and time FEs
  - Focusing on a narrow window for FX change from January to June in 2016.
  - $\Rightarrow$  Checked for pre-trend and anticipation effects (Brexit largely unexpected outcome)

# Dynamic Event-study Analysis: Results



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

- ▶ Exports only
- ▶ Imports only
- ▶ Quarterly
- ▶ Other curr.

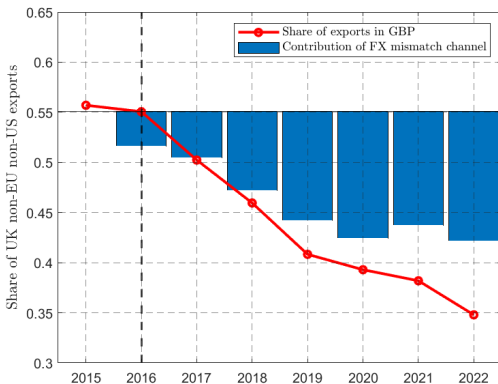


## Back-of-the-envelope Exercise: Currency-mismatch FX Channel Accounts for Most of Transition (1/2)

- Purposely partial equilibrium approach to keep analysis simple and parsimonious (full assessment would need GE model)
- Step 1: multiply estimates for interaction terms between month FEs and GBP exposure pre-2016 with contemporaneous exposure.
- First month of 2016 as reference point: estimate of firm-level GBP invoicing share change since Jan 2016 for every month after.
- Step 2: add those changes to Jan 2016 GBP share  $\Rightarrow$  counterfactual share reflecting identified channel.
- Step 3: multiply counterfactual shares by total firm-level exports  $\Rightarrow$  counterfactual *level* of GBP. Add everything up and compare with actual data.

# Back-of-the-envelope Exercise: Currency-mismatch FX Channel Accounts for Most of Transition (2/2)

▶ Monthly



Note. – Red line = aggregate share of exports invoiced in GBP. Blue bars = how much of red line explained by mismatch FX channel.

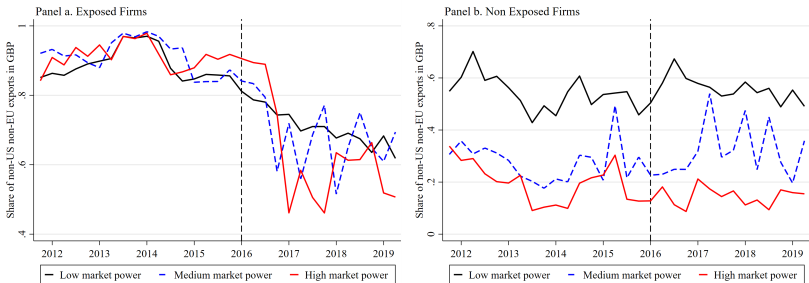
Source: HMRC administrative datasets, UK non-EU exports, 2010–2022.

## Robustness: Market Power

- Literature: invoicing decision typically belongs to exporter, although one could well imagine a bargaining process (Goldberg and Tille, 2013).
- Desire of foreign importer ambiguous:
  - ① Convenience of vehicle currency given network of international trade
  - ② GBP depreciation → discount on the importer's purchases
- Are UK exporters better able to increase exposure to the depreciating GBP when they enjoy high market power in the destination country?
- Common measure in international trade  $\omega_{fpj,t}$ : firm  $f$ 's market share for product  $p$  in country  $j$ , i.e.  $f$ 's exports of  $p$  to  $j$  divided by  $j$ 's total imports from all countries incl. UK (UN Comtrade 6-digit product imports).
- **Results:** mixed evidence, not consistently supporting additional channel over and above currency-mismatch FX motive.

# GBP Invoicing by GBP Exposure and Market power

► Distr. mkt share



Note. – Firms are divided into low (<75p), medium (75p-90p) and high (>90p) market power quantiles based on their market share  $\omega_{fpi,t}$ . Then, aggregate GBP share of exports are plotted for each quantile. In red are firms with high market shares, in dashed blue medium, and in red firms with low market shares. This exercise is conducted separately, considering only firms with above the median (Panel a.) and below the median (Panel b.)  $Exposure_{f,t}$ .

Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

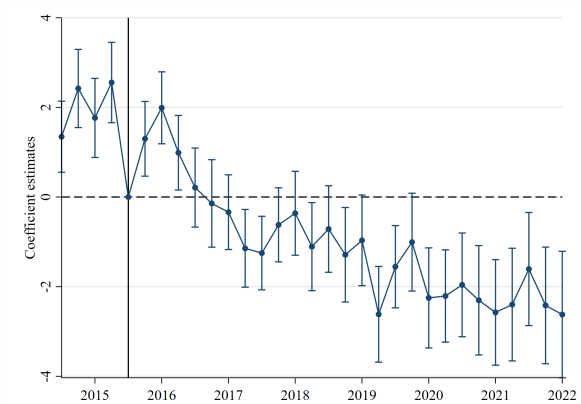
# Testing Market Power: Static Regression

|   | Value share of exports in |                     |                    |                     |                    |                    |
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|   | (1)                       | (2)                 | (1)                | (2)                 | (1)                | (2)                |
| <i>Panel a. Baseline specification</i>      |                           |                     |                    |                     |                    |                    |
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| <i>Panel b. Strategic complementarities</i> |                           |                     |                    |                     |                    |                    |
| Invoicing of largest firm in HS4            |                           | 0.02***<br>(16.79)  |                    | 0.02***<br>(17.06)  |                    | 0.02***<br>(12.60) |
| Average invoicing in HS4                    |                           | 0.09***<br>(10.64)  |                    | 0.09***<br>(17.06)  |                    | 0.15***<br>(8.94)  |
| <i>Panel c. Firm Market Power</i>           |                           |                     |                    |                     |                    |                    |
| Market Power                                |                           | 0.04***<br>(5.33)   |                    | -0.05***<br>(-7.67) |                    | 0.01<br>(1.95)     |
| Market power × valuation shock              |                           | 0.03<br>(0.46)      |                    | -0.04<br>(-0.75)    |                    | 0.03<br>(1.16)     |
| Additional valuation controls               | Yes                       | Yes                 | Yes                | Yes                 | Yes                | Yes                |
| Firm FE                                     | Yes                       | Yes                 | Yes                | Yes                 | Yes                | Yes                |
| Time × Gap FE                               | Yes                       | Yes                 | Yes                | Yes                 | Yes                | Yes                |
| Observations                                | 1,322,378                 | 724,482             | 1,322,378          | 724,482             | 1,322,378          | 724,482            |

**Source:** HMRC administrative datasets, UK non-EU exports and imports, 2010–2019.

# Testing Market Power: Event Study

$$y_{fpj,t}^h = \alpha_{fpj} + \delta_t + \omega_{fpj,t} + \sum_{m \neq \text{Jan 2016}} \gamma_m \omega_{fpj,t} \times \mathbf{1}_{m=t} + [\beta_m (\omega_{fpj,t} \times S_{f,t}) \times \mathbf{1}_{m=t}] + \epsilon_{fpj,t}$$



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

## Taking Stock on Contribution # 2

- Hedging determinants generated a large shift to a new pricing equilibrium.
- Raises the question of:
  - ① What exactly pushed firms to put more weight on hedging vs. network effect channels in 2016.
  - ② External validity.
- Some corroborating evidence (IN PROGRESS)
  - ① How was the 2016 devaluation different to 2008 (in progress). [▶ GBP EER](#)
  - ② Brexit was a unique shock to economic uncertainty, even compared to GFC.  
[▶ Economic Policy Uncertainty](#)
  - ③ The UK pre-Brexit invoicing paradigm was an outlier but not a unique case in a cross country perspective. [▶ PCP vs Short-USD Scatter \(2012-2015\)](#)
    - High share of PCP + "Short" USD aggregate operational exposure
    - Also the case for Japan and Switzerland, although with lower "short" USD exposure.
  - ④ Has a similar transition happened before? Maybe. Japan exporters massively de-dollarised in tandem with the post-Nixon shock appreciation of the yen. [▶ Yen Invoicing After the Nixon Shock](#)

[▶ Skip to Contribution #3 - Macro Implications](#)

# GBP depreciation 2016 vs 2008

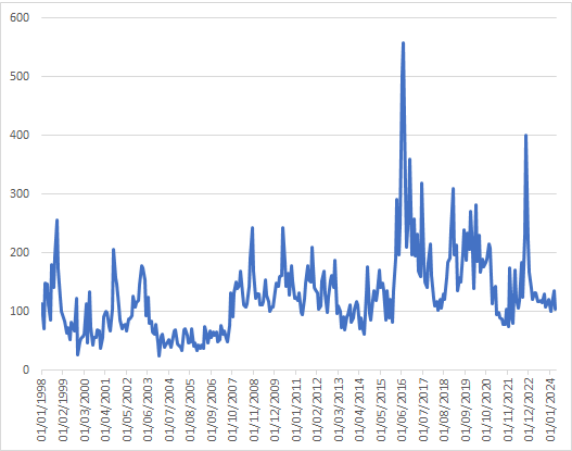


Source: ONS

▶ Back



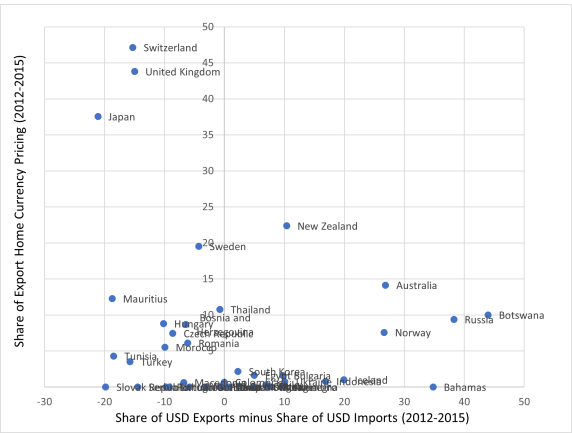
# Economic Policy Uncertainty Index - UK



Source: Monthly EPU Index for the UK.

▶ Back

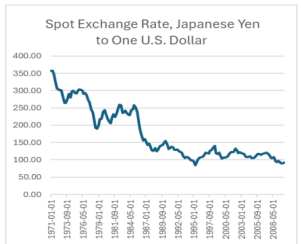
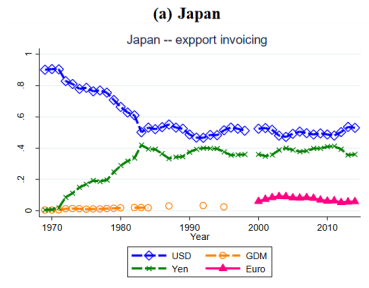
# External Validity - UK invoicing patterns in international perspective (2012-2015)



Source: Boz et al. 2020, authors' calculations.

▶ Back

# External Validity - Historical Precedent?



Source: Ito and Kawai (2016), FRED.

▶ Back

# Macroeconomic Implications

# Why does invoicing matter? - A practical example

## Recall framework at the beginning ...

We have observed a transition from this:

$$\underbrace{\Delta p_{ij}}_{\text{from UK into Japan}} = \Delta e_{\text{£¥}} \quad \text{if invoiced in £}$$

to this:

$$\underbrace{\Delta p_{ij}}_{\text{from UK into Japan}} = \Delta e_{\text{₹¥}} \quad \text{if invoiced in \$}$$

⇒ **How do quantities react?** Quantity pass-through changes as the basket of invoicing currency changes.

## Sensitivity to USD FX of quantities before/after 2016

Empirical strategy is 2 stage procedure (Amiti et al 2022), pre and post shift

- **1st stage: exchange rate → prices**

$$p_{fpj,t+h}^* - p_{fpj,t-1}^* = \beta^h \Delta e_t^{\$/j} + \alpha_f + \delta_{pj} + \nu_t + u_{fpj,t}$$

- LHS is change in log unit prices in foreign currency btw  $t + h$  and  $t - 1$  for firm  $f$  selling product  $p$  to destination  $j$
- $\Delta e_t^{\$/j}$  is change in log exchange rate between USD and  $j$
- $\alpha_j$ ,  $\nu_{pj}$  and  $\delta_t$  are firm, time, and product-destination fixed effects.

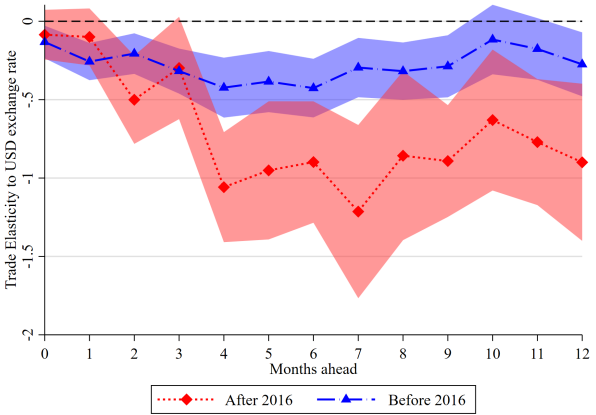
- **2nd stage: fitted prices → quantities**

$$q_{fpj,t+h} - q_{fpj,t-1} = \theta^h \Delta_{t-1} \hat{p}_{fpj,t+h}^* + \alpha_f + \delta_{pj} + \nu_t + u_{fpj,t}$$

- LHS is change in log quantities btw  $t + h$  and  $t - 1$  for firm  $f$  selling product  $p$  to destination  $j$
- $\Delta_{t-1} \hat{p}_{fpj,t+h}^*$  is the fitted value from the first stage
- $\alpha_j$ ,  $\nu_{pj}$  and  $\delta_t$  are firm, time, and product-destination fixed effects.

# Change in elasticity of quantities to USD exchange rate movements

► Incl. 2020-22



Note. – Dynamic elasticities of UK export quantities to movements in USD FX, in blue for the pre-2016 (pre transition) period and in red for post-2016.  
 Source: HMRC administrative datasets, UK non-EU exports, 2010–2019.

# Conclusion

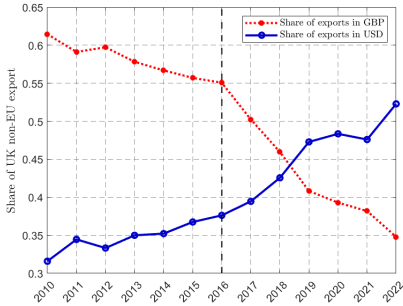


## Conclusion

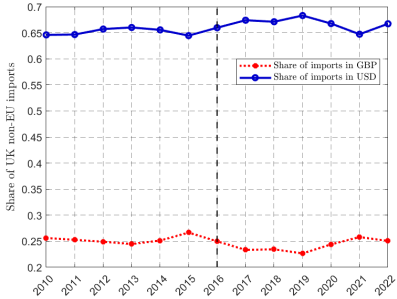
- We document a unique episode of aggregate shifting to dominant currency pricing - the Brexit dollarisation - shedding light on dynamic behaviour as well as micro-heterogeneity.
- We highlight the role of currency-mismatches and hedging motives in driving a shift from an equilibrium in pricing patterns to another.
- We quantify the macroeconomic implications of dominant currency pricing transition.
- Implications for global dollar dominance.
- Implications for monetary policy FX channel.

# Appendix

# Pre-Brexit depreciation large GBP mismatch at aggregate ...



(a) Exports



(b) Imports

Source: HMRC administrative datasets, UK non-EU (incl. US) exports and imports, 2010–2022.

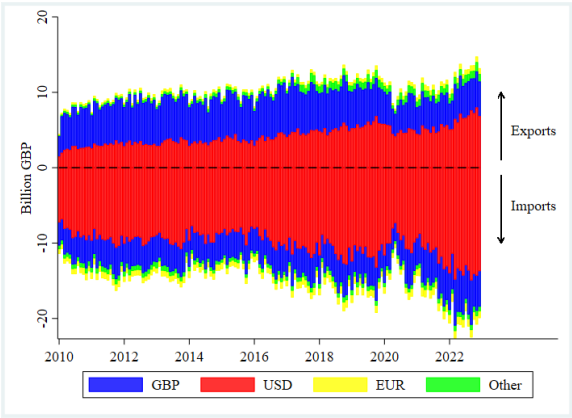
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## Summary statistics (Count)

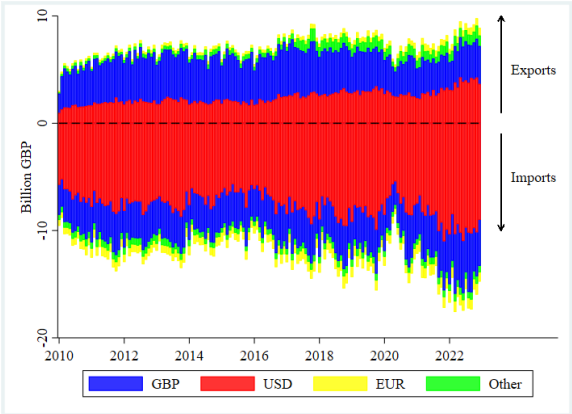
| Year | Firms | Products | Countries | Firm-Product | Firm-Country | Product-Country | Firm-Product-Country |
|------|-------|----------|-----------|--------------|--------------|-----------------|----------------------|
| 2010 | 48274 | 7953     | 192       | 263542       | 198888       | 149652          | 477489               |
| 2011 | 48985 | 7842     | 190       | 258510       | 202327       | 149463          | 474933               |
| 2012 | 48967 | 7837     | 190       | 266872       | 206190       | 153695          | 498471               |
| 2013 | 50241 | 7882     | 190       | 284149       | 216679       | 162145          | 543557               |
| 2014 | 50203 | 7885     | 189       | 284407       | 216366       | 163106          | 554732               |
| 2015 | 51276 | 7886     | 190       | 293045       | 223708       | 165699          | 577206               |
| 2016 | 53728 | 7943     | 191       | 321708       | 240759       | 172630          | 642223               |
| 2017 | 54627 | 8020     | 190       | 330714       | 245015       | 175787          | 656254               |
| 2018 | 54739 | 8016     | 190       | 336776       | 246450       | 177946          | 674418               |
| 2019 | 52733 | 7976     | 190       | 340441       | 246733       | 180310          | 695218               |
| 2020 | 48647 | 7861     | 189       | 306495       | 227597       | 168088          | 633182               |
| 2021 | 47905 | 7843     | 190       | 306829       | 234998       | 174199          | 657181               |
| 2022 | 47153 | 7993     | 190       | 315648       | 236950       | 179301          | 683218               |

**Source:** HMRC administrative datasets, UK non-EU exports, 2010–2022.

# Export (Positive) and import (negative) values of non-EU trade by currency

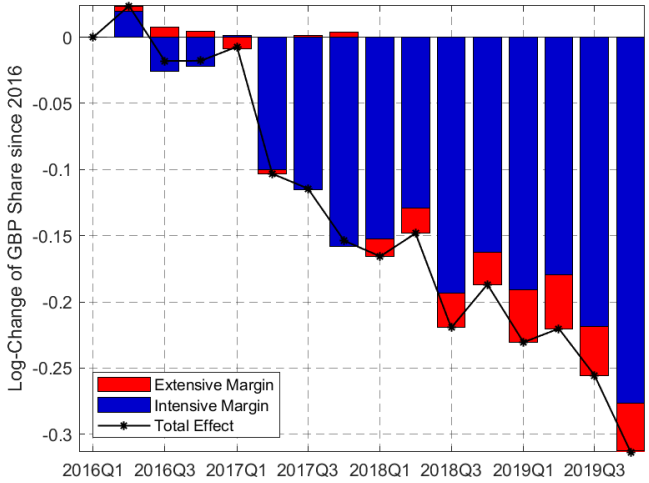


# Export (Positive) and import (negative) values of non-EU non-US trade by currency

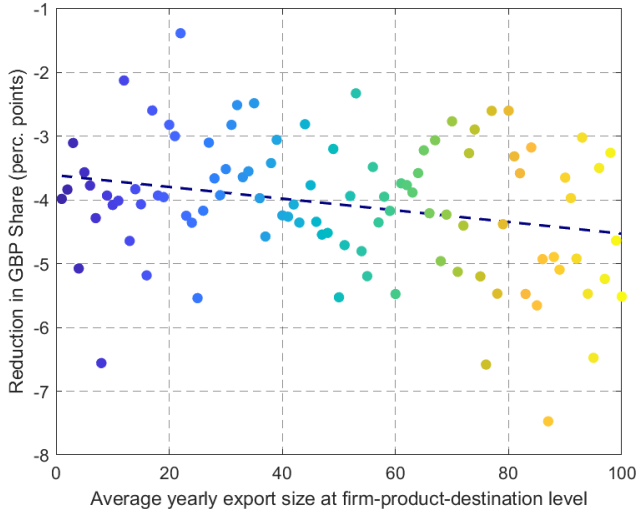


# Additional Fact 1: It's the intensive margin

**Unit of observation:** *firm* × *product* × *destination* “Triplet”



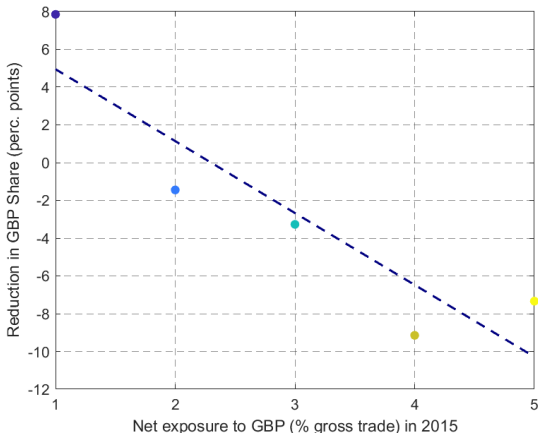
# Additional Fact 2a: Bigger size, larger shift away from GBP



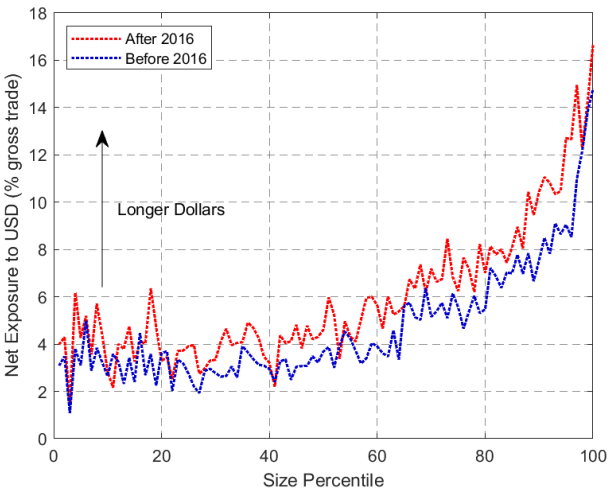


## Additional Fact 2b: Higher GBP exposure, larger shift away from GBP

$$\text{Mismatch} := Exposure_{f,2015} = \frac{\sum_j (Exports_{fj,2015}^{\pounds} - Imports_{fj,2015}^{\pounds})}{Total\ Trade_{f,2015}}$$

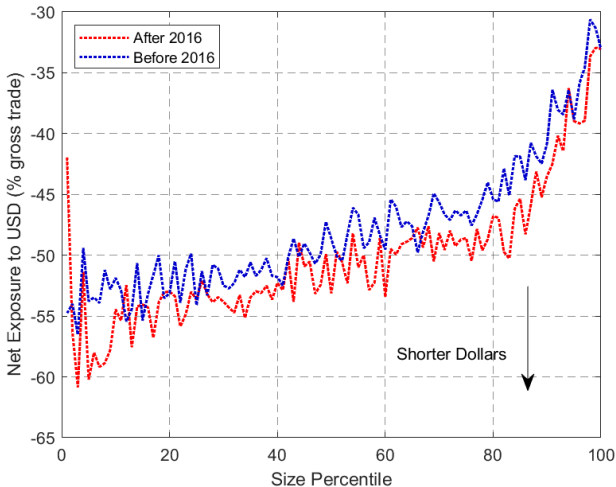


# Additional Fact 3a: Shift to USD exposure occurs across firms' distribution



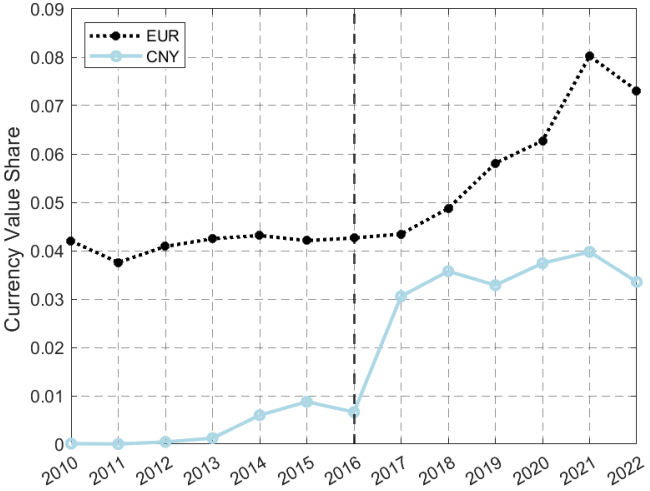
► Including trade with US

# Additional Fact 3b: Non-exporters are unable to increase USD exposure

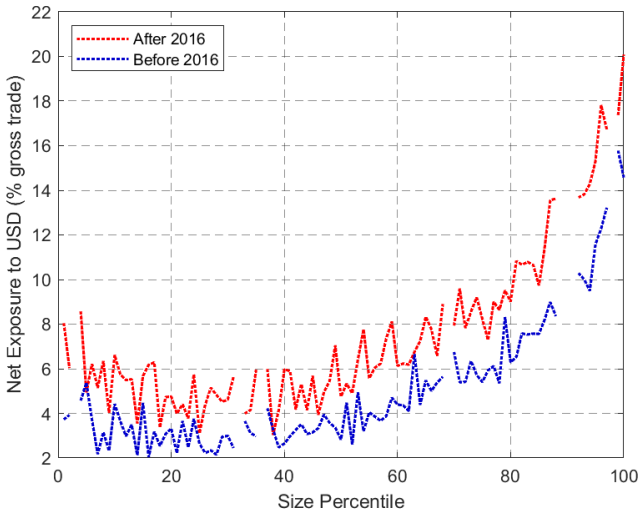


► Including trade with US

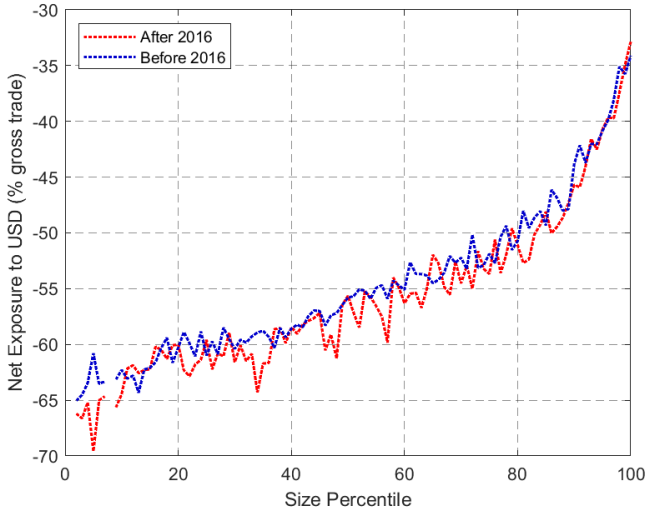
# Additional Fact 4: Euro and Renmibi



# Exposure distribution including trade with US - Exporters



# Exposure distribution including trade with US - non-Exporters



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## Additional indices

$$s_{ft}^j = \frac{\sum_j (\text{exp}_{fj,2015}^j - \text{imp}_{fj,2015}^j) \times \Delta e_t^{\text{£}/j}}{\text{Total Trade}_{f,2015}} \quad (\text{Local Weighted Index})$$

$$s_{ft}^{\$} = \frac{\sum_j (\text{exp}_{fj,2015}^{\$} - \text{imp}_{fj,2015}^{\$}) \times \Delta e_t^{\text{£}/\$}}{\text{Total Trade}_{f,2015}} \quad (\text{Dominant Weighted Index})$$

$$s_{ft}^{\$/j} = \frac{\sum_j (\text{exp}_{fj,2015}^{\$} - \text{imp}_{fj,2015}^{\$}) \times \Delta e_t^{\$/j}}{\text{Total Trade}_{f,2015}} \quad (\text{Dominant-Local Weighted Index})$$

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# Static regression analysis: results - all coefficients

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|   | Value share of exports in |                     |                    |                    |                    |                    |
|---|---------------------------|---------------------|--------------------|--------------------|--------------------|--------------------|
|   | GBP                       |                     | USD                |                    | EUR                |                    |
|   | (1)                       | (2)                 | (1)                | (2)                | (1)                | (2)                |
| <i>Panel a. Baseline specification</i>      |                           |                     |                    |                    |                    |                    |
| Valuation shock $s_{f,t}$                   | -0.01***<br>(-6.37)       | -0.01***<br>(-6.02) | 0.007***<br>(4.73) | 0.01***<br>(4.82)  | 0.003***<br>(3.85) | 0.003**<br>(3.13)  |
| <i>Panel b. Strategic complementarities</i> |                           |                     |                    |                    |                    |                    |
| Invoicing of largest firm in HS4            |                           | 0.02***<br>(16.79)  |                    | 0.02***<br>(17.06) |                    | 0.02***<br>(12.60) |
| Average invoicing in HS4                    |                           | 0.09***<br>(10.64)  |                    | 0.09***<br>(17.06) |                    | 0.15***<br>(8.94)  |

Continues next page



# Static regression analysis: results - all coefficients (ctd.)

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|                                      | Value share of exports in |                     |                   |                   |                    |                   |
|--------------------------------------|---------------------------|---------------------|-------------------|-------------------|--------------------|-------------------|
|                                      | GBP                       |                     | USD               |                   | EUR                |                   |
|                                      | (1)                       | (2)                 | (1)               | (2)               | (1)                | (2)               |
| <i>Panel c. Firm Market Power</i>    |                           |                     |                   |                   |                    |                   |
| Market power × valuation shock       |                           | 0.03<br>(0.46)      |                   | -0.04<br>(-0.75)  |                    | 0.03<br>(1.16)    |
| <i>Additional valuation controls</i> |                           |                     |                   |                   |                    |                   |
| Destination-weighted                 | 0.04**<br>(2.92)          | 0.03<br>(1.44)      | -0.01<br>(-0.89)  | 0.001<br>(-0.04)  | 0.002<br>(0.29)    | 0.006<br>(0.74)   |
| Dominant-weighted                    | -0.03***<br>(-5.04)       | -0.03***<br>(-4.71) | 0.04***<br>(6.68) | 0.04***<br>(5.80) | -0.005*<br>(-2.32) | -0.004<br>(-1.23) |
| Dominant-destination weighted        | -0.04***<br>(-8.08)       | -0.04***<br>(-6.60) | 0.04***<br>(7.14) | 0.05***<br>(6.18) | -0.001<br>(-0.57)  | -0.001<br>(-0.73) |
| Firm FE                              | Yes                       | Yes                 | Yes               | Yes               | Yes                | Yes               |
| Time x Gap FE                        | Yes                       | Yes                 | Yes               | Yes               | Yes                | Yes               |
| Observations                         | 1,322,378                 | 724,482             | 1,322,378         | 724,482           | 1,322,378          | 724,482           |

Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2019.

# Static regression analysis: results - including 2020-2022

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|   | Value share of exports in |                     |                    |                     |                 |                    |
|---|---------------------------|---------------------|--------------------|---------------------|-----------------|--------------------|
|   | GBP                       |                     | USD                |                     | EUR             |                    |
|   | (1)                       | (2)                 | (1)                | (2)                 | (1)             | (2)                |
| <i>Panel a. Baseline specification</i>      |                           |                     |                    |                     |                 |                    |
| Valuation shock $s_{f,t}$                   | -0.01***<br>(-4.76)       | -0.01***<br>(-5.20) | 0.007***<br>(4.99) | 0.01***<br>(4.82)   | 0.001<br>(3.85) | 0.0006<br>(0.60)   |
| <i>Panel b. Strategic complementarities</i> |                           |                     |                    |                     |                 |                    |
| Invoicing of largest firm in HS4            |                           | 0.02***<br>(20.16)  |                    | 0.02***<br>(20.74)  |                 | 0.02***<br>(15.82) |
| Average invoicing in HS4                    |                           | 0.10***<br>(12.03)  |                    | 0.09***<br>(12.92)  |                 | 0.15***<br>(9.82)  |
| <i>Panel c. Firm Market Power</i>           |                           |                     |                    |                     |                 |                    |
| Market Power                                |                           | 0.05***<br>(5.33)   |                    | -0.06***<br>(-7.67) |                 | 0.01*<br>(1.95)    |
| Market power × valuation shock              |                           | -0.001<br>(-0.02)   |                    | -0.01*<br>(-0.34)   |                 | 0.03<br>(1.02)     |
| Additional valuation controls               | Yes                       | Yes                 | Yes                | Yes                 | Yes             | Yes                |
| Firm FE                                     | Yes                       | Yes                 | Yes                | Yes                 | Yes             | Yes                |
| Time × Gap FE                               | Yes                       | Yes                 | Yes                | Yes                 | Yes             | Yes                |
| Observations                                | 1,751,049                 | 1,015,652           | 1,751,049          | 1,015,652           | 1,751,049       | 1,015,652          |

Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

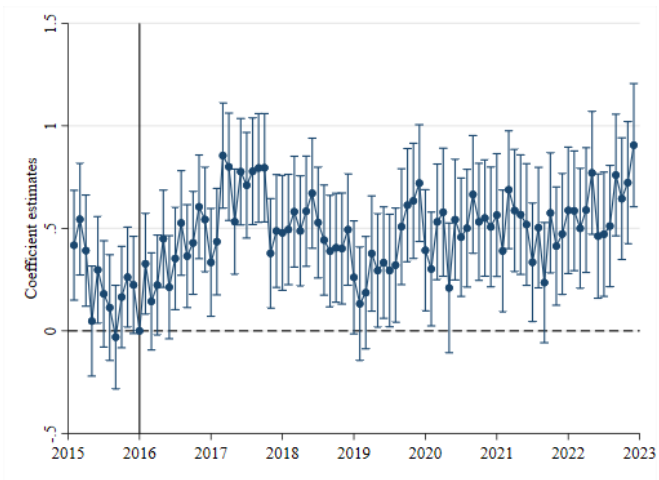
# Static regression analysis: results - quantities

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|   | Value share of exports in |                     |                    |                     |                    |                    |
|---|---------------------------|---------------------|--------------------|---------------------|--------------------|--------------------|
|   | GBP                       |                     | USD                |                     | EUR                |                    |
|   | (1)                       | (2)                 | (1)                | (2)                 | (1)                | (2)                |
| <i>Panel a. Baseline specification</i>      |                           |                     |                    |                     |                    |                    |
| Valuation shock $s_{f,t}$                   | -0.01***<br>(-4.44)       | -0.01***<br>(-5.20) | 0.004***<br>(2.71) | 0.01***<br>(4.82)   | 0.003***<br>(3.95) | 0.0006<br>(0.60)   |
| <i>Panel b. Strategic complementarities</i> |                           |                     |                    |                     |                    |                    |
| Invoicing of largest firm in HS4            |                           | 0.02***<br>(14.92)  |                    | 0.02***<br>(14.99)  |                    | 0.02***<br>(11.74) |
| Average invoicing in HS4                    |                           | 0.09***<br>(10.79)  |                    | 0.10***<br>(11.70)  |                    | 0.14***<br>(8.26)  |
| <i>Panel c. Firm Market Power</i>           |                           |                     |                    |                     |                    |                    |
| Market Power                                |                           | 0.04***<br>(5.22)   |                    | -0.05***<br>(-7.43) |                    | 0.01<br>(1.74)     |
| Market power × valuation shock              |                           | 0.03<br>(0.43)      |                    | 0.02<br>(-0.34)     |                    | 0.01<br>(0.44)     |
| Additional valuation controls               | Yes                       | Yes                 | Yes                | Yes                 | Yes                | Yes                |
| Firm FE                                     | Yes                       | Yes                 | Yes                | Yes                 | Yes                | Yes                |
| Time × Gap FE                               | Yes                       | Yes                 | Yes                | Yes                 | Yes                | Yes                |
| Observations                                | 1,301,000                 | 714,229             | 1,301,000          | 714,229             | 1,751,049          | 714,229            |

Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2019.

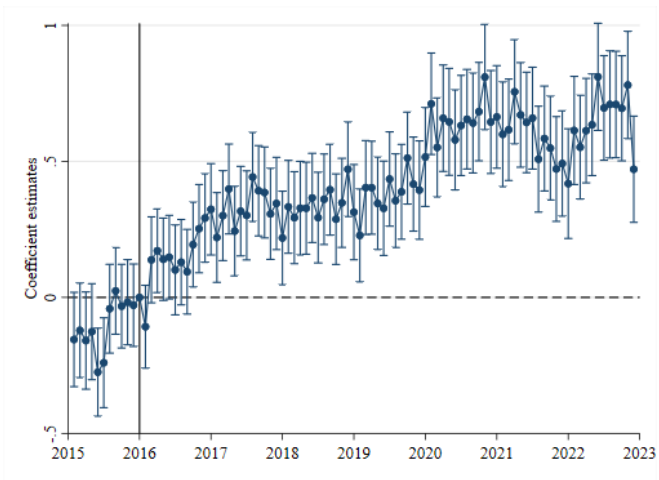
# Dynamic event-study analysis: results - USD



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

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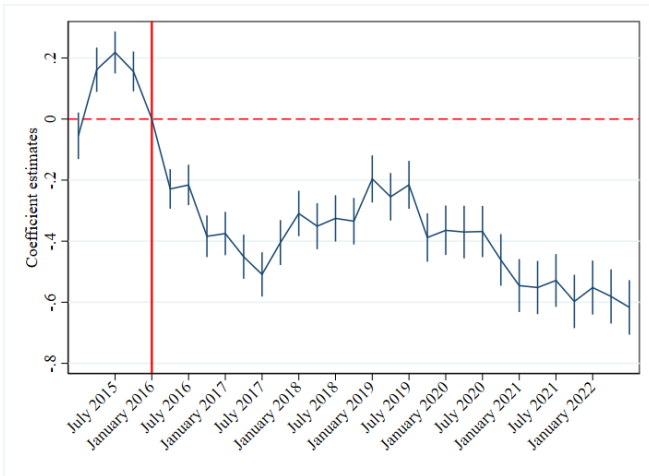
# Dynamic event-study analysis: results - EUR



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

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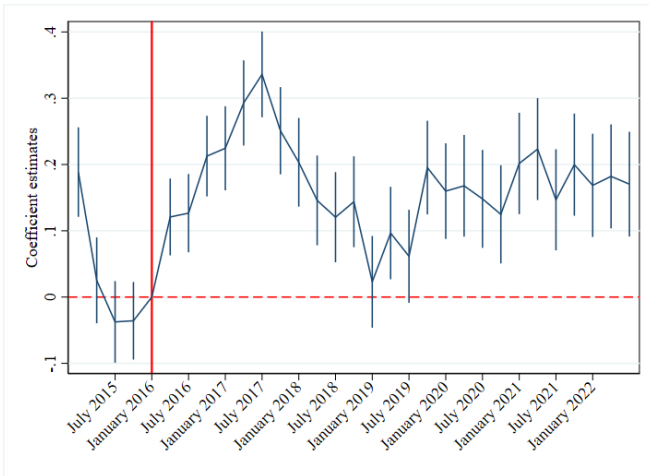
# Dynamic event-study analysis: results - GBP quarterly



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

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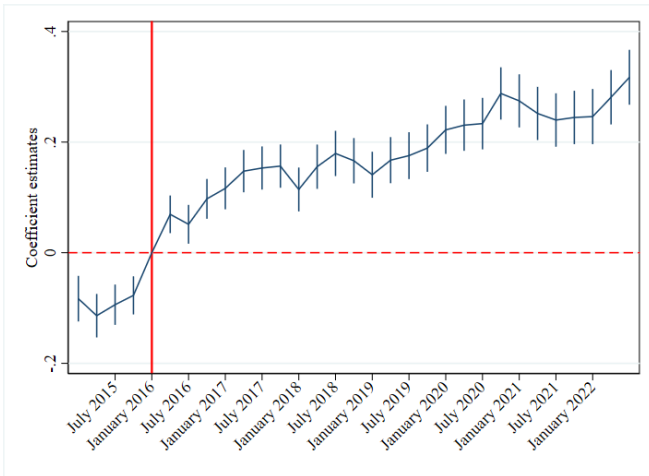
# Dynamic event-study analysis: results - USD quarterly



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

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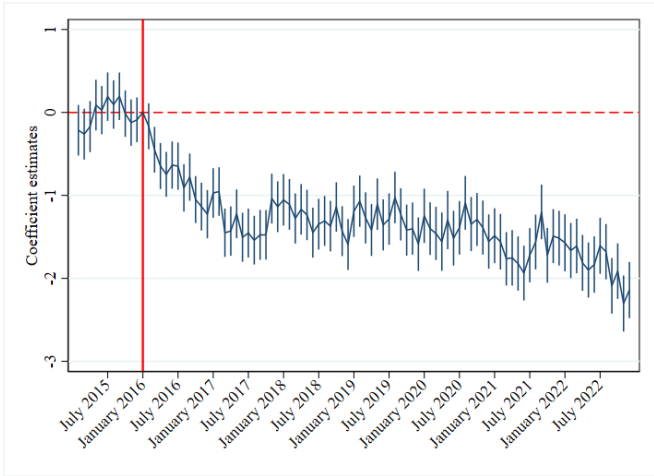
# Dynamic event-study analysis: results - EUR quarterly



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.



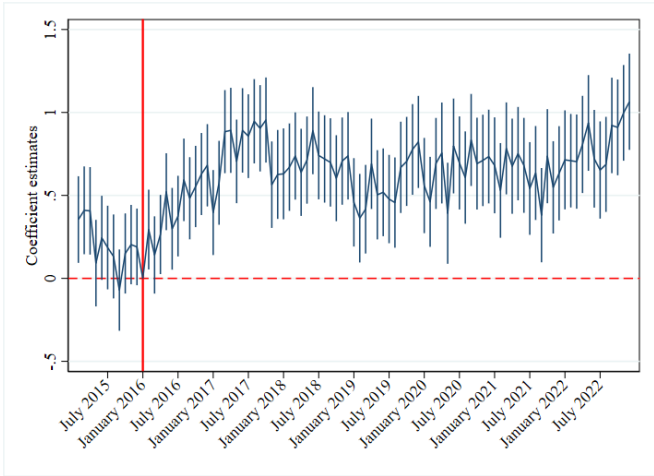
# Dynamic event-study analysis: results - GBP Exports only



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

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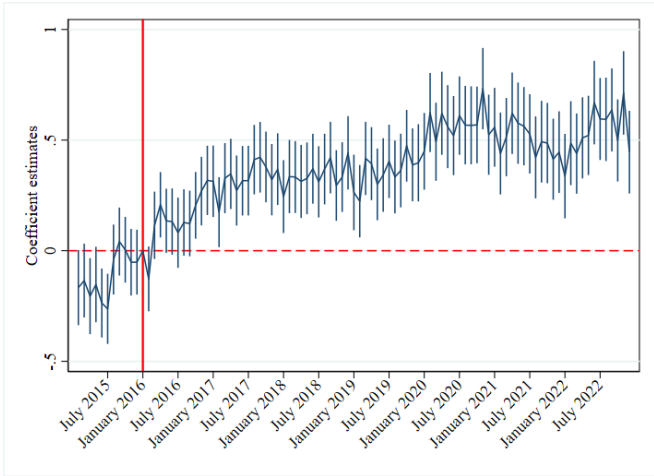
# Dynamic event-study analysis: results - USD Exports only



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

▶ Go Back

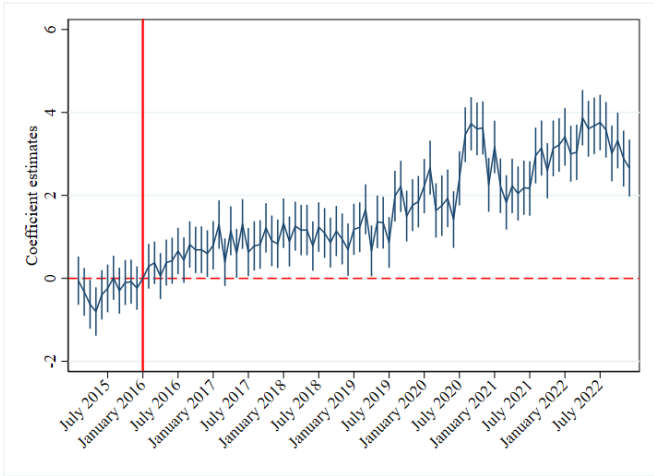
# Dynamic event-study analysis: results - EUR Exports only



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

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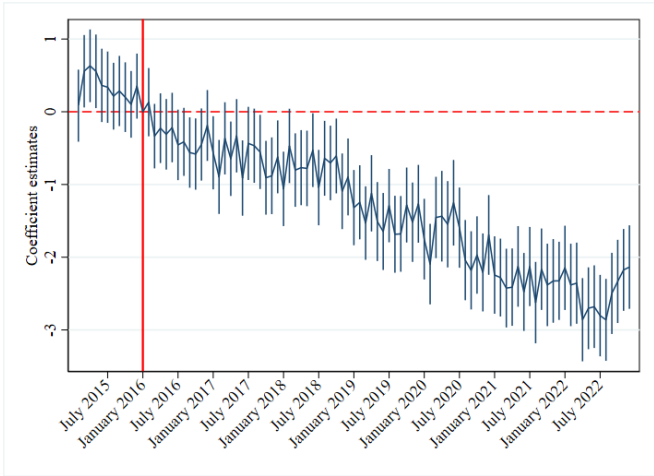
# Dynamic event-study analysis: results - GBP Imports only



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

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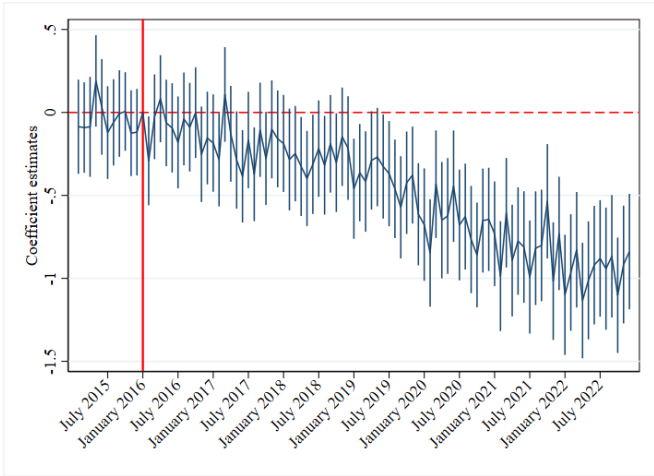
# Dynamic event-study analysis: results - USD Imports only



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

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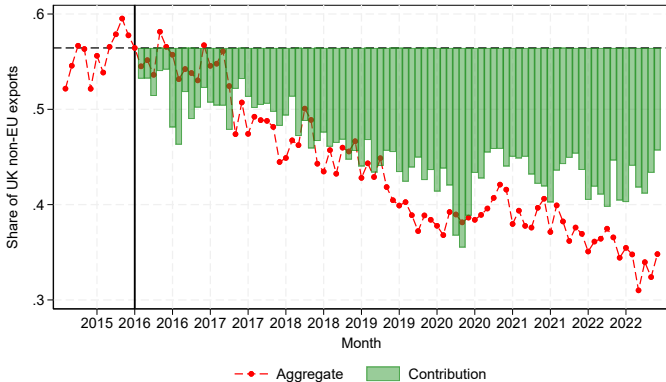
# Dynamic event-study analysis: results - EUR Imports only



Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

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# Mismatch FX channel: contribution to aggregate shift in GBP - monthly

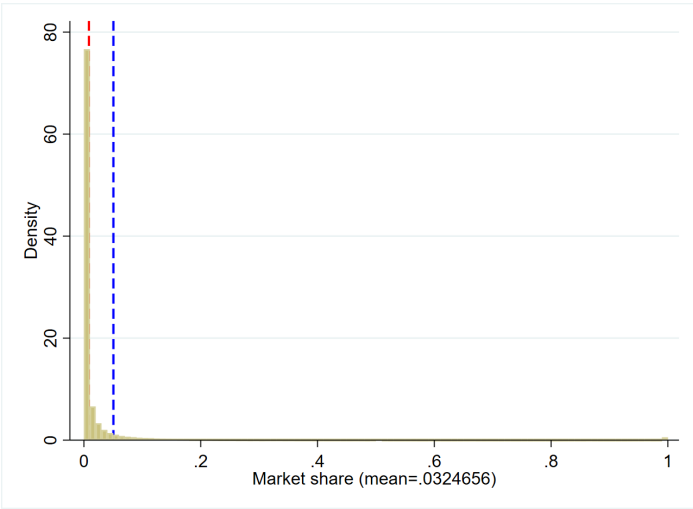


Note. – Red line = aggregate share of exports invoiced in GBP. Green bars = how much of red line explained by mismatch FX channel.

Source: HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.

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# Distribution of market shares [▶ Go Back](#)



Source: UN Comtrade and HMRC administrative datasets, UK non-EU exports and imports, 2010–2022.



# Granularity of destinations

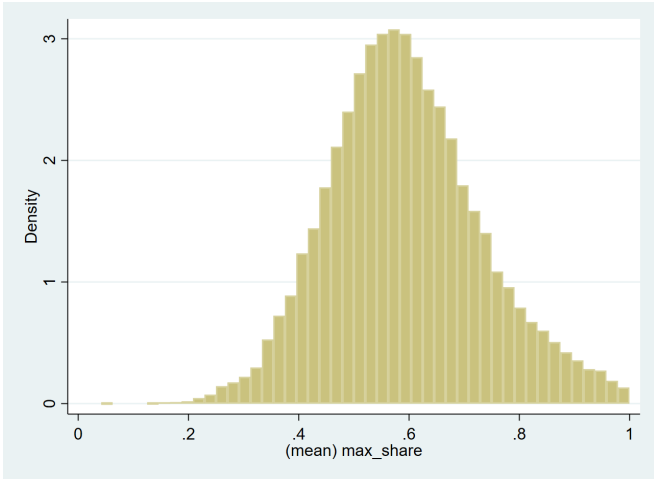
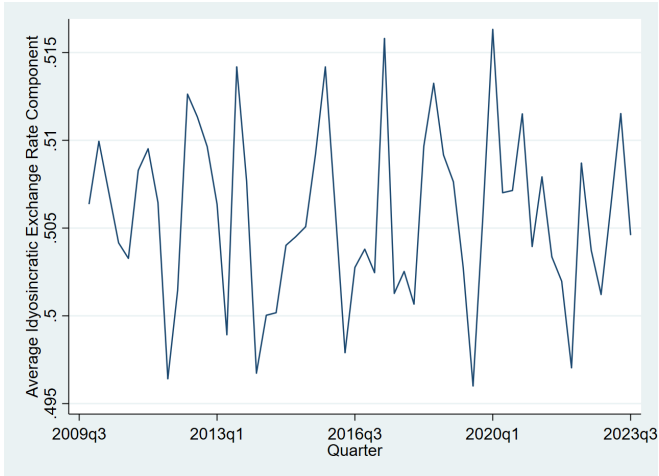


Figure: Share of more important destination across time for a firm.

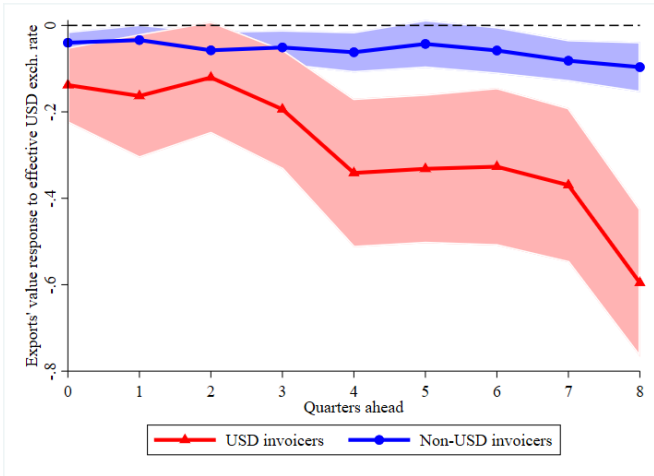
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# Idiosyncratic exchange rate fluctuations



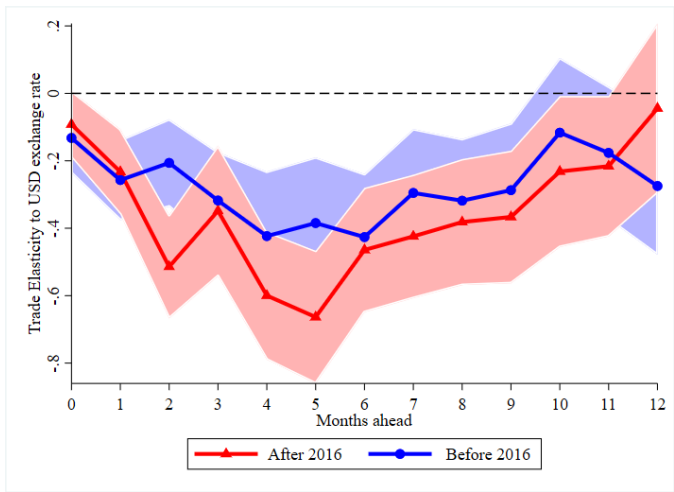
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# Aggregate differential response of export values by invoicer type [▶ Go Back](#)



Note. – Response of UK export values to granular firm-level USD FX, in blue for non-USD invoicers (<50% of exports in USD) and in red for USD invoicers (>50%). Shaded areas are 95% CIs.  
Source: HMRC administrative datasets, UK non-EU exports, 2010–2022.

# Change in elasticity of quantities to USD exchange rate movements ▶ Go Back



Note. –Dynamic elasticities of UK export quantities to movements in USD FX, in blue for the pre-2016 (pre transition) period and in red for post-2016.  
 Source: HMRC administrative datasets, UK non-EU exports, 2010–2022.