US Monetary Spillovers, Foreign Exchange, and Gold Reserves at Times of Geopolitical Fragmentation

Joshua Aizenman[1] **Jamel Saadaoui**[2,3]
Gazi Salah Uddin[4,5] Naoki Yago[6]

[1]University of Southern California [2]Paris 8 University [3]CAMA, Australian National University
[4]Linköping University [5]Norwegian University of Life Sciences [6]University of Reading

The Central Bank
of the Republic of Uzbekistan

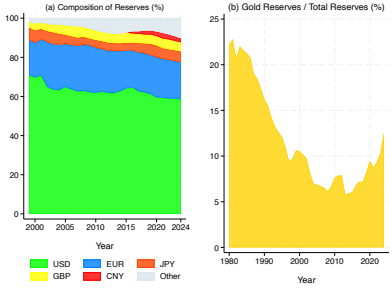
5 September 2026
Research Webinar — The Central Bank of the Republic of Uzbekistan

Roadmap

1. Motivation and contribution
2. Data and high-frequency identification
3. Baseline reserve-buffer estimates
4. Dollar liquidity facilities
5. Cross-country heterogeneity
6. Weekly reserve dynamics
7. Robustness and policy implications

Core question: does the central-bank reserve balance sheet change the exchange-rate transmission of a common US monetary shock?

The International Reserve System Is Changing



Panel (a): allocated FX reserve composition. Panel (b): market-valued gold share of total reserves. Sources: IMF COFER, IMF IFS, and World Bank.

- The dollar remains the dominant reserve currency, but its allocated share has declined.
- Gold's share has recovered from its post-global-financial-crisis trough.
- Reserve managers must insure against both **dollar-funding stress** and the **accessibility of reserve assets**.

Diversification away from the dollar occurs while dollar liquidity remains central to international trade and finance.

The Policy Puzzle

US monetary tightening

- Raises global dollar returns
- Tightens financial conditions
- Induces portfolio rebalancing
- Tends to appreciate the US dollar

Reserve-management choices

- Dollar reserves: direct liquidity
- Non-dollar reserves: diversification
- Gold: collateral, valuation, convertibility
- Swap/repo lines: official backstop

The relevant comparison is not simply "de-dollarization versus dollar dominance." It is how different reserve assets protect the exchange rate against a *dollar-specific* monetary shock.

Research Questions and Contributions

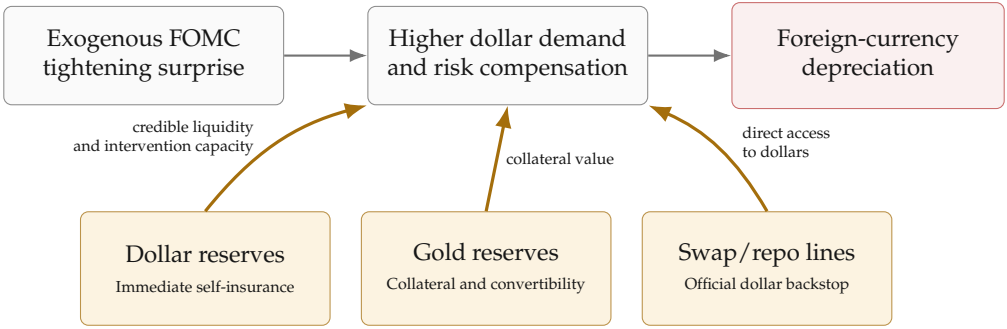
Questions

1. Do larger reserve buffers attenuate the immediate exchange-rate response to US monetary surprises?
2. Does **currency and asset composition** matter?
3. Does access to swap/repo lines alter the marginal value of own reserves?
4. Are buffers more important where dollar exposure is larger?

Contributions

1. Combines high-frequency US monetary identification with recipient-country reserve positions.
2. Separates total FX, dollar, non-dollar, and gold reserves.
3. Links reserve composition to official dollar-liquidity facilities.
4. Connects the central-bank balance sheet to private and public dollar exposure.

Reserve Balance-Sheet Channel



The channel can operate through the stock of reserves: markets may price credible future liquidity provision even without contemporaneous reserve sales.

Preview of the Main Findings

0.4 pp

Average foreign-currency depreciation within 20 minutes after a 10 bp surprise tightening.

0.1 pp

Up to 0.1 percentage point less depreciation with a one-SD larger dollar-reserve position.

0.4 pp

About 0.4 percentage point less depreciation in countries without US swap/repo lines.

- The reserve gradient is concentrated in **dollar reserves**; non-dollar reserves have a smaller, statistically insignificant estimate.
- Gold reserves are also associated with smaller depreciation, although less precisely than liquid FX reserves.
- The buffer is strongest without official dollar-liquidity lines and where dollar liabilities are large.

Positioning in the Literature

Four strands

- US monetary spillovers and the global financial cycle
- FX intervention and reserve self-insurance
- Reserve composition and dollar dominance
- Gold, sanctions risk, and central-bank liquidity arrangements

Gap filled by this paper

- Hold the external shock fixed using FOMC event-window surprises.
- Ask whether predetermined reserve portfolios condition the exchange-rate response.
- Treat the central-bank reserve balance sheet as a policy-relevant state variable.

Selected references include Rey (2015), Miranda-Agrippino and Rey (2020), Bauer and Swanson (2023), Arslanalp, Eichengreen, and Simpson-Bell (2022), and Bahaj, Fuchs, and Reis (2026).

Data and Sample

Coverage

- 18 economies, 2009–2023
- 108 FOMC monetary surprises
- Minute-by-minute bilateral exchange rates
- Annual reserve and exposure variables, lagged one year
- March–December 2020 excluded because the orthogonalized shock is unavailable

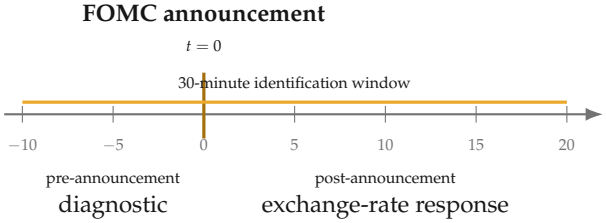
Data sources

- Exchange rates: First Rate Data
- FX and gold reserves: IMF IFS
- Reserve currency composition: Ito–McCauley, Iancu et al., Laser et al.
- Monetary surprises: Bauer–Swanson
- Swap/repo lines: Bahaj–Fuchs–Reis
- Dollar invoicing and external positions: Boz et al.; Bénétrix et al.

Countries: Australia, Brazil, Canada, Chile, Czech Republic, Euro Area, India, Israel, New Zealand, Norway, Peru, Poland, Russia, South Africa, Sweden, Switzerland, Turkey, and United Kingdom.

High-Frequency Event Window

$$e_{i,t+h} - e_{i,t-1}, \quad h \in [-10, 20]$$



- A positive exchange-rate change means foreign-currency depreciation against the US dollar.
- One shock unit is an unexpected 10 bp increase in the federal funds rate.
- The shock is orthogonalized to publicly available macro-financial news.
- Pre-announcement coefficients assess whether exchange rates move before the surprise.

Baseline Local Projection

$$e_{i,t+h} - e_{i,t-1} = \alpha + \beta_h FFR_t + D_i + \epsilon_{i,t}, \quad h \in [-10, 20].$$

Outcome

$e_{i,t+h} - e_{i,t-1}$ is the cumulative percentage change in the bilateral spot exchange rate from the minute before the announcement to horizon h.

Parameter of interest

$\beta_h > 0$ means that a surprise US monetary tightening causes the foreign currency to depreciate against the dollar at horizon h.

The local-projection path directly traces the minute-by-minute exchange-rate response around the FOMC announcement.

Interaction with Reserve Holdings

$$e_{i,t+h} - e_{i,t-1} = \alpha + \beta_h FFR_t + \gamma_h reserves_{i,y-1} + \delta_h \left(FFR_t \times reserves_{i,y-1}\right) + D_i + \epsilon_{i,t},$$
$$h \in [-10, 20].$$

Predetermined reserve position

$reserves_{i,y-1}$ is the previous-year ratio of FX or gold reserves to GDP. The variable is standardized, so one unit corresponds to a one-standard-deviation larger reserve position.

Marginal effect reported in the paper

$$\left.\frac{\partial E[e_{i,t+h} - e_{i,t-1}]}{\partial reserves_{i,y-1}}\right|_{FFR_t=1} = \gamma_h + \delta_h.$$

A negative estimate means that a larger pre-existing reserve position reduces depreciation following the same 10 bp US monetary tightening.

Interaction with Dollar Exposure

$$e_{i,t+h} - e_{i,t-1} = \alpha + \beta_h FFR_t + \gamma_h exposure_{i,y-1} + \delta_h \left(FFR_t \times exposure_{i,y-1}\right) + D_i + \epsilon_{i,t},$$
$$h \in [-10, 20].$$

Marginal effect conditional on tightening

$$\left.\frac{\partial E[e_{i,t+h} - e_{i,t-1}]}{\partial exposure_{i,y-1}}\right|_{FFR_t=1} = \gamma_h + \delta_h.$$

10-pp. exposure difference

$$10\left(\gamma_h + \delta_h\right).$$

$exposure_{i,y-1}$ is the previous-year dollar share of external assets, external liabilities, exports, or imports.

A positive estimate means that greater dollar exposure amplifies depreciation following the same 10 bp US monetary tightening.

Identification, Inference, and Interpretation

Why the design is informative

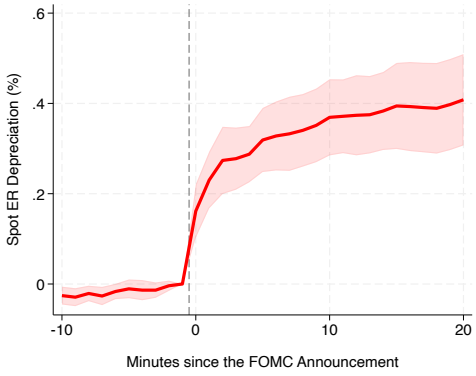
- Narrow event window limits contamination by other news.
- Bauer–Swanson shock addresses the "Fed response to news" concern.
- Reserve positions are predetermined and lagged one year.
- Country fixed effects absorb time-invariant heterogeneity.

Inference and caution

- Standard errors clustered by FOMC date; 95% confidence intervals.
- Joint Wald tests evaluate the post-announcement path.
- Slow-moving omitted fundamentals remain a concern; exposure and macro-PCA controls address it.

Under the maintained assumptions, the interaction identifies a reserve balance-sheet effect. The paper nevertheless emphasizes response gradients and robustness rather than treating annual reserve stocks as randomly assigned.

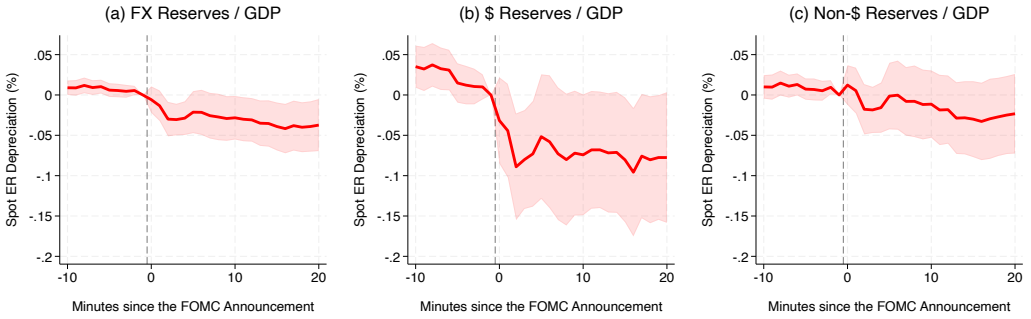
US Monetary Tightening Appreciates the Dollar



Estimated effect of a 10 bp FOMC tightening surprise. Date-clustered standard errors; 95% confidence interval.

A 10 bp surprise tightening produces about 0.4 percentage point of foreign-currency depreciation within 20 minutes, with little pre-announcement movement.

Currency Composition Matters



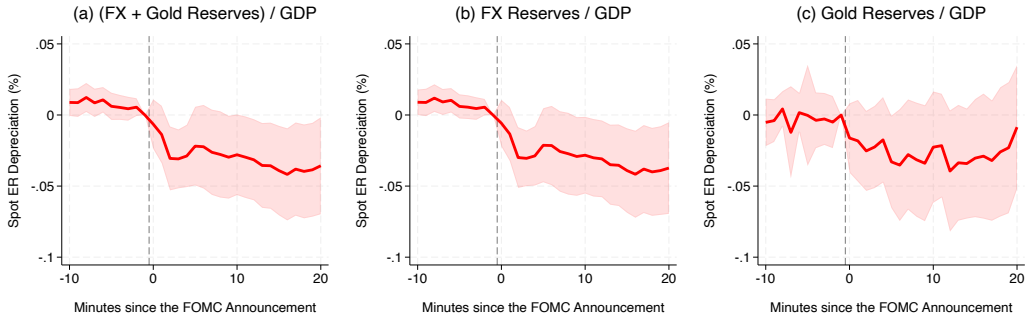
Responses evaluated at a 20.4 percentage-point difference in reserves, equal to one standard deviation of total FX reserves.

Total FX reserves
About 0.04 pp less depreciation.

Dollar reserves
Up to 0.1 pp less depreciation.

Non-dollar reserves
Smaller and statistically insignificant.

FX and Gold Reserves Are Complementary Buffers



One-standard-deviation differences: 20.4 pp of GDP for FX reserves and 1.9 pp for gold reserves.

Both FX and gold reserve positions are associated with smaller depreciations; the FX estimate is more precise, consistent with greater liquidity and immediacy.

Economic Magnitudes at the End of the Window

+0.40 pp
Average depreciation after a 10 bp US tightening surprise.

−0.04 pp
One-SD larger total FX reserves: about 10% of the average response.

−0.10 pp
One-SD larger dollar reserve position: up to 25% of the average response.

−0.04 pp
One-SD larger gold reserve position: similar point magnitude, less precise.

- Dollar reserves are the closest self-insurance asset against a dollar-specific monetary shock.
- Gold is not a one-for-one substitute for liquid dollars, but it can strengthen collateral value and convertibility under stress.
- Aggregate reserve adequacy alone misses economically relevant composition effects.

Why Swap and Repo Lines Matter

Institutional setting

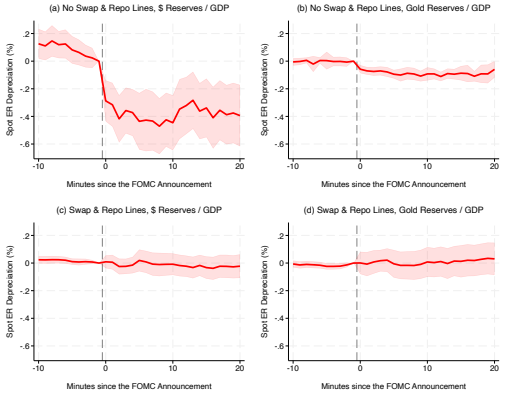
- Federal Reserve swap lines supply dollars to foreign central banks.
- The 2020 FIMA repo facility permits foreign monetary authorities to obtain dollars against US Treasuries.
- Ten of the 18 sample economies have US dollar swap or repo arrangements in the baseline classification.

Testable prediction

- Without a line, own dollar and gold reserves should matter more.
- With a line, an external dollar backstop may reduce the marginal exchange-rate relevance of reserve stocks.
- The comparison distinguishes **self-insurance** from **official liquidity insurance**.

The paper focuses on lines signed with the United States and denominated in US dollars; a broader network definition is reported as robustness.

Reserve Buffers Are Concentrated Where Lines Are Absent

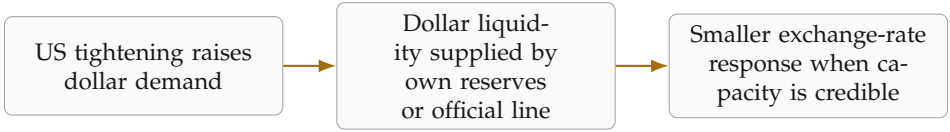


Panels (a)–(b): no US swap/repo line. Panels (c)–(d): access to a US dollar line.

Without a line, one-SD larger dollar reserves are associated with about 0.4 pp less depreciation and one-SD larger gold reserves with about 0.1 pp less depreciation.

Public Backstop versus Own-Reserve Self-Insurance

No liquidity line	With a liquidity line	Interpretation
Dollar reserves and gold are priced as own-balance-sheet protection against dollar funding stress.	Direct public access to dollars reduces the marginal explanatory power of reserve stocks.	Dollar and gold reserves are complementary assets; official lines partly substitute for both.



The mechanism is a balance-sheet and credibility channel; it does not require observed reserve sales in the 30-minute event window.

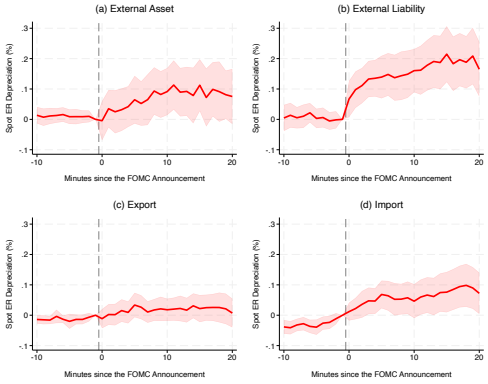
Dollar Exposure Creates Vulnerability

External assets	External liabilities	Dollar exports	Dollar imports
Dollar assets can hedge depreciation, but may still transmit global portfolio shocks.	Depreciation raises local-currency debt burdens and weakens net worth.	Dominant-currency pricing limits the short-run competitiveness gain.	Depreciation raises imported-input and final-goods costs.

Prediction: US monetary shocks and reserve buffers should matter most where dollar liabilities make depreciation especially costly.

Dollar exposure is lagged one year and measured as shares of external assets, external liabilities, exports, and imports denominated or invoiced in US dollars.

External Dollar Liabilities Amplify Spillovers Most

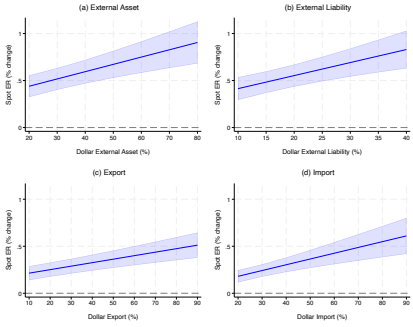


Marginal effect of a 10 percentage-point increase in dollar exposure after a 10 bp FOMC tightening surprise.

A 10 pp larger external-dollar-liability share amplifies depreciation by up to about 0.2 pp; effects are smaller for dollar assets and imports and limited for exports.

Monetary-Policy Response across Dollar Exposure

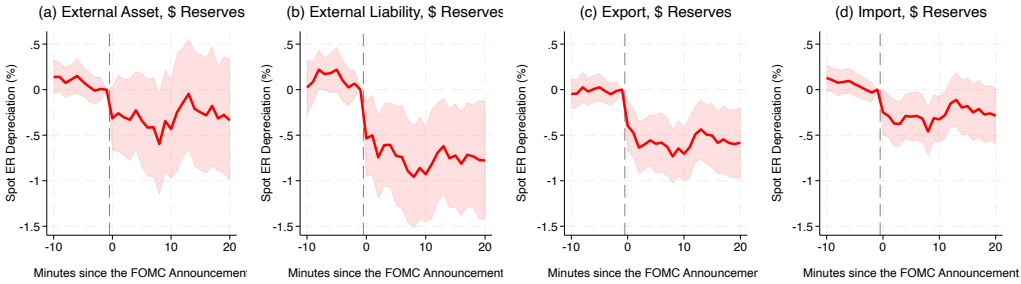
As an alternative exercise, the paper plots the estimated exchange-rate response to a 10 bp increase in the federal funds rate at different observed levels of dollar exposure.



External dollar assets, external dollar liabilities, dollar-invoiced exports, and dollar-invoiced imports. Shaded areas are 95% confidence intervals.

The upward slopes indicate larger depreciation responses at higher dollar exposure, especially for external dollar liabilities.

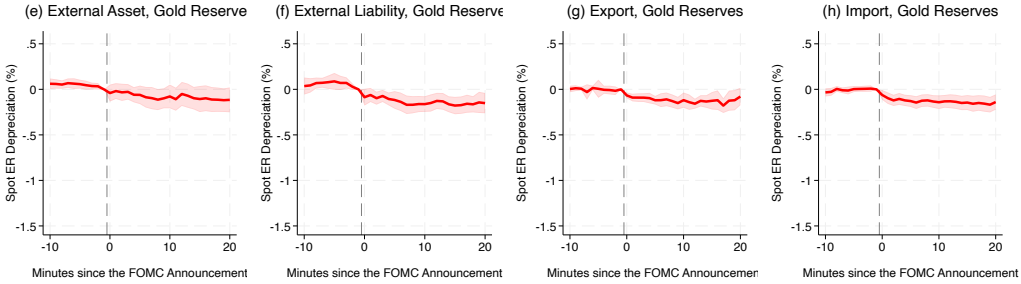
Dollar Reserve Buffers Are Stronger in High-Exposure Economies



Dollar-reserve gradients in samples restricted to countries above the median of each dollar-exposure measure.

The largest estimated buffer occurs where external dollar liabilities are high: dollar reserves are associated with roughly 0.4–0.9 pp less depreciation.

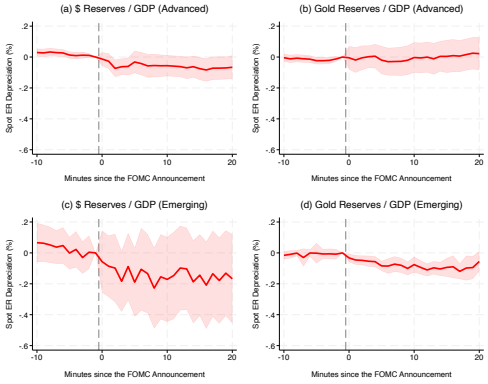
Gold Reserve Buffers in High-Exposure Economies



Gold-reserve gradients in samples restricted to countries above the median of each dollar-exposure measure.

Gold-reserve gradients are generally negative but smaller and less precisely estimated than the corresponding dollar-reserve gradients.

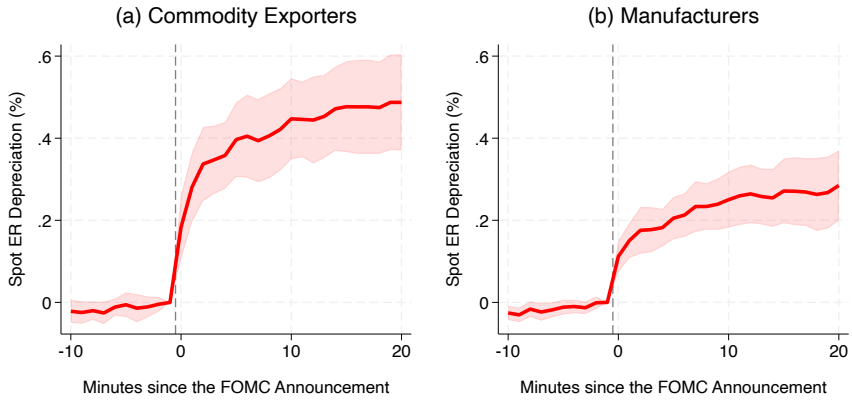
Advanced and Emerging Economies



Panels (a)–(b): advanced economies. Panels (c)–(d): emerging economies.

The reserve-response gradient is stronger in emerging economies, although estimates are less precise because currency-composition data are more limited.

Commodity Exporters Face Larger Monetary Spillovers

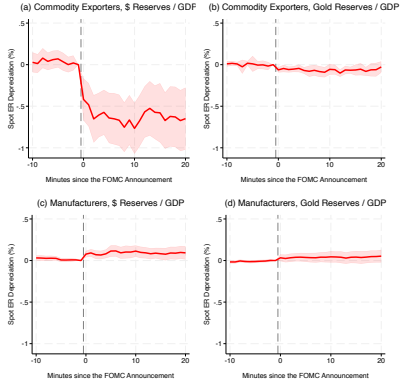


Commodity exporters and manufacturers are defined by whether the commodity-export share is above or below the sample median.

Commodity exporters
About 0.5 pp depreciation after a 10 bp tightening surprise.

Manufacturers
About 0.3 pp depreciation after the same shock.

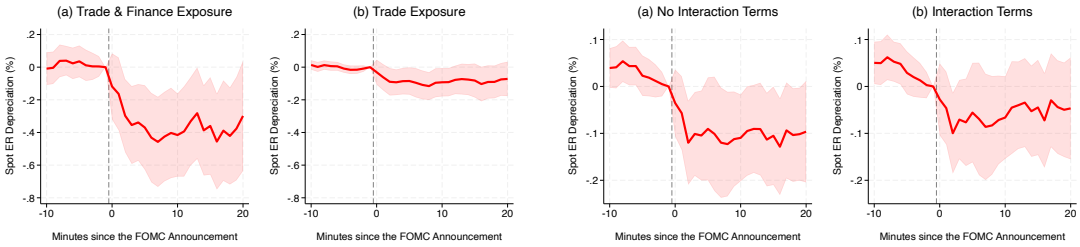
Reserve Buffers Are Stronger for Commodity Exporters



Panels (a)–(b): commodity exporters. Panels (c)–(d): manufacturers.

For commodity exporters, one-SD larger dollar reserves are associated with up to about 0.7 pp less depreciation; reserve gradients are weak among manufacturers.

Robustness to Dollar Exposure and Macro Fundamentals



Dollar-liability and dollar-import controls, including their interactions with the FOMC shock.

First principal component of nine lagged macro fundamentals, entered in levels and interacted with the shock.

- The dollar-reserve gradient remains negative with interacted exposure controls; joint post-announcement tests give $p < 0.0001$ and $p = 0.0448$ across the two specifications.
- With the interacted macro-PCA factor, the joint post-announcement test gives $p = 0.0025$.

Why Add Weekly Case Studies?

What the event study identifies

Cross-country differences in the immediate exchange-rate response to the same exogenous US monetary surprise, conditional on predetermined reserve stocks.

What weekly data add

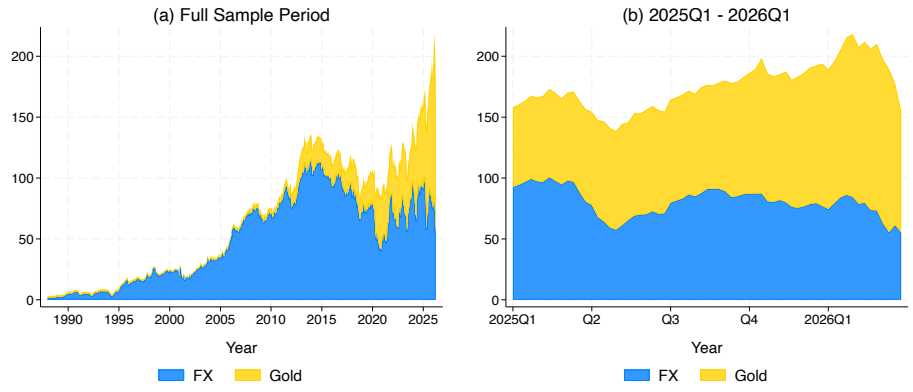
Observed reserve drawdowns in Turkey, India, and Thailand during 2025Q1–2026Q1, including quantity-adjusted gold movements that remove valuation effects.

Interpretive boundary

The weekly exercise is descriptive. Reserve changes can reflect intervention, valuation, accounting, income flows, or other balance-sheet operations, and the no-intervention counterfactual exchange rate is unobserved.

The exercise is a magnitude check: are observed drawdowns large enough, when mapped through the estimated gradients, to explain a meaningful share of depreciation pressure?

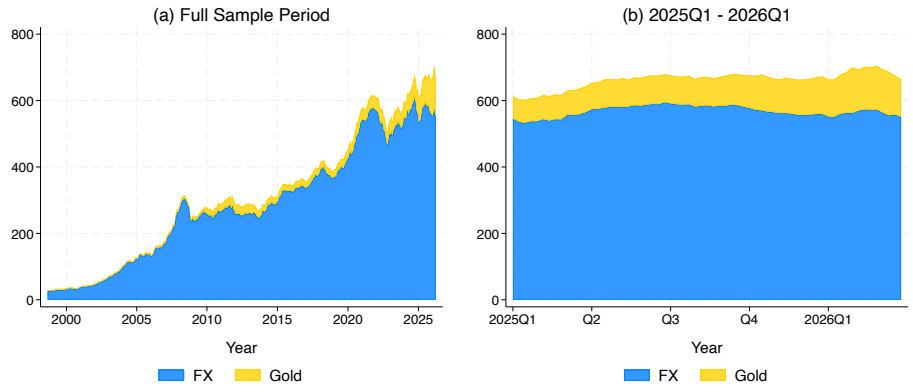
Turkey: Large FX and Gold Reserve Movements



Weekly FX and market-valued gold reserves. Panel (a): full sample. Panel (b): 2025Q1–2026Q1.

Turkey records the largest observed deployment: USD 103.15 billion of FX drawdowns and USD 20.46 billion of quantity-adjusted gold drawdowns in depreciation weeks.

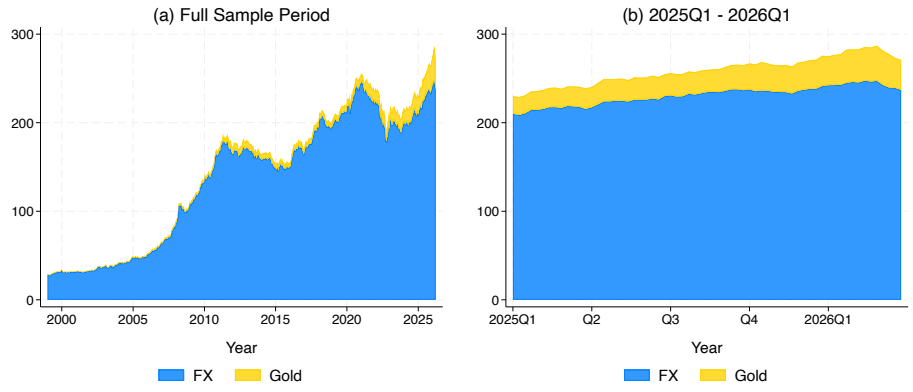
India: Large Diversified Reserve Portfolio



Weekly FX and market-valued gold reserves. Panel (a): full sample. Panel (b): 2025Q1–2026Q1.

India records USD 72.02 billion of FX drawdowns and USD 23.76 billion of quantity-adjusted gold drawdowns during depreciation weeks.

Thailand: Large Deployment Relative to GDP



Weekly FX and market-valued gold reserves. Panel (a): full sample. Panel (b): 2025Q1–2026Q1.

Thailand's FX and gold drawdowns equal 5.10% and 1.10% of GDP, respectively, even though the baht appreciates on net over the full window.

Observed Drawdowns and Calibrated Buffers

Country	Gross depreciation pressure (%)	FX drawdown (USD bn)	Gold drawdown (USD bn)	Implied buffer baseline / no line (pp)	Stabilization ratio baseline / no line (%)
Turkey	23.75	103.15	20.46	0.048 / 0.234	0.201 / 0.977
India	21.91	72.02	23.76	0.016 / 0.068	0.075 / 0.310
Thailand	21.42	26.84	5.78	0.033 / 0.158	0.154 / 0.731

- The no-line calibration uses the larger response gradients estimated for countries without swap/repo access.
- Even the larger calibration accounts for less than 1% of estimated pre-buffer gross depreciation pressure in each case.
- The calculation is deliberately conservative because realized exchange rates are observed after any policy response.

Source: manuscript's weekly reserve magnitude exercise for 2025Q1–2026Q1.

What the Weekly Evidence Does – and Does Not – Show

What it shows

- Reserve drawdowns are large in dollar terms.
- Gold quantities can decline even when market values are supported by rising gold prices.
- Turkey displays especially pronounced use of both reserve classes.

What it does not identify

- A causal weekly intervention effect
- The counterfactual exchange rate without reserve use
- The full contribution of credibility, deterrence, and intraperiod operations

The weekly data are consistent with the buffer mechanism, but observed drawdowns alone do not explain most exchange-rate stabilization in these cases.

Conclusions

1. A surprise US monetary tightening causes a rapid and economically meaningful appreciation of the dollar.
2. Countries with larger reserve buffers exhibit smaller estimated depreciation responses, but **composition matters**: the gradient is concentrated in dollar reserves.
3. Gold provides a complementary buffer through collateral value, valuation gains, and convertibility, but is less liquid than dollar reserves.
4. Own-reserve buffers matter most when US swap/repo lines are absent and where external dollar liabilities or commodity exposure are high.
5. Exposure and macro-PCA controls leave the central dollar-reserve result intact.

The central-bank reserve balance sheet is a state variable shaping the exchange-rate transmission of US monetary shocks.

Policy Implications for Reserve Management

Adequacy is multidimensional

Reserve evaluation should consider currency, asset type, liquidity, collateral value, and operational accessibility – not only the aggregate stock.

Architecture matters

Access to official dollar-liquidity facilities changes the marginal insurance value of own dollar and gold reserves.

Country exposure matters

Dollar liabilities and commodity dependence raise the potential value of credible reserve-backed liquidity capacity.

Gold should not be interpreted as a one-for-one replacement for dollar liquidity. Its contribution is complementary: collateral, conversion capacity, diversification, and valuation support under stress.

Thank you

Questions and comments

The Central Bank
of the Republic of Uzbekistan

Jamel Saadaoui jamelsaadaoui@gmail.com

Appendix: Summary Statistics

	Obs	Mean	Median	SD	Min	p10	p25	p75	p90	Max
US Monetary Shock (bp)	108	0.66	0.23	3.58	-8.49	-4.03	-1.07	2.14	6.30	11.84
FX Reserves / GDP (%)	1944	18.2	13.7	20.4	0.4	2.6	7.0	21.5	33.1	136.5
$ Reserves / GDP (%)	1758	8.7	6.2	8.7	0.1	0.4	2.3	10.5	21.0	47.9
Gold Reserves / GDP (%)	1919	1.1	0.4	1.9	0.0	0.0	0.0	1.2	2.7	9.3
External $ Asset (%)	1122	43.2	42.1	10.8	15.5	25.8	31.5	54.9	61.2	84.5
External $ Liability (%)	1122	22.9	24.5	9.4	1.4	7.4	17.6	29.5	33.0	44.7
$ Export (%)	1424	55.5	53.5	29.1	7.9	17.3	27.0	84.8	94.1	97.4
$ Import (%)	1466	53.1	50.7	24.0	16.2	23.9	30.7	80.7	88.7	94.2

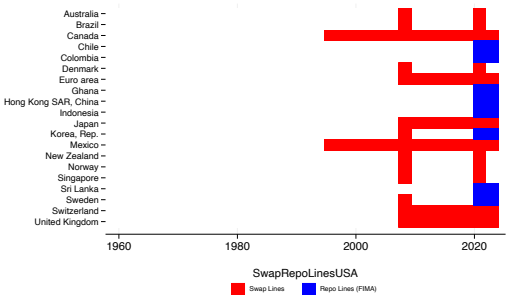
Reserve variables are ratios to GDP. Dollar-exposure variables are percentage shares. The monetary shock is measured in basis points.

Appendix: Country-Level Reserve and Exposure Averages

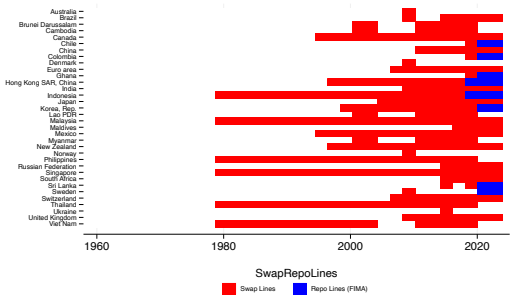
	FX Reserves	$ Reserves	Gold Reserves	$ Asset	$ Liability	$ Export	$ Import
Australia	3.0	1.5	0.2	41.1	27.4	84.4	55.4
Brazil	16.6	14.1	0.2	57.5	31.9	94.0	82.3
Canada	3.7	2.5	0.0	58.9	25.3	-	-
Chile	14.2	8.9	0.0	55.2	32.0	94.7	86.0
Czech Republic	37.7	7.3	0.2	13.2	2.4	13.1	21.3
Euro Area	0.4	0.3	0.2	-	-	-	-
India	15.8	8.6	1.1	50.1	18.5	86.6	86.6
Israel	31.0	20.7	0.0	59.4	26.5	83.3	70.2
New Zealand	7.9	1.7	0.0	36.3	27.8	59.4	50.0
Norway	13.0	6.6	0.0	34.4	26.8	48.7	24.9
Peru	29.6	24.4	0.8	76.2	23.7	97.3	92.8
Poland	19.4	7.9	1.1	29.6	7.4	17.4	28.7
Russia	23.5	9.9	4.1	43.7	33.3	71.1	39.4
South Africa	10.6	6.5	1.5	32.1	13.9	42.1	-
Sweden	8.5	4.4	1.0	25.5	16.4	26.5	29.9
Switzerland	79.7	26.0	6.7	32.0	18.8	20.5	35.6
Turkey	9.7	6.2	2.6	49.8	29.4	45.8	62.0
United Kingdom	3.3	0.4	0.5	39.4	27.6	29.5	39.3
All Countries	18.2	8.7	1.1	43.2	22.9	55.5	53.1

Sample-period averages. Dashes denote unavailable observations.

Appendix: Countries with US Dollar Swap or Repo Lines

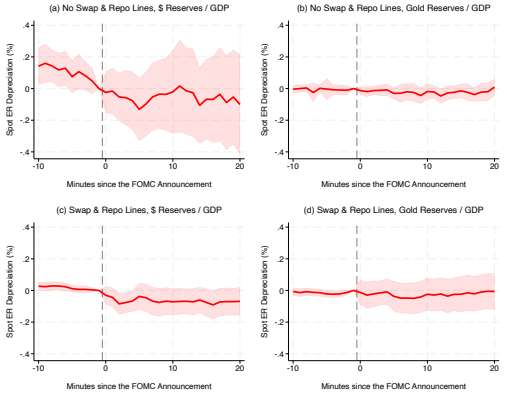


Source country: United States.



Lines with any source country, denominated in US dollars.

Appendix: Broader Swap/Repo-Line Definition



Classification includes US-dollar lines signed with any source country.

The qualitative result is unchanged: own dollar and gold reserves matter more where official dollar-liquidity lines are absent.

Appendix: Triple Interaction Specification

$$
\begin{aligned}
e_{i,t+h} - e_{i,t-1} = \alpha &+ \beta_h^1 FFR_t + \beta_h^2 reserve_{i,y-1} + \beta_h^3 exposure_{i,y-1} \\
&+ \beta_h^4 \left(FFR_t \times reserve_{i,y-1} \right) + \beta_h^5 \left(FFR_t \times exposure_{i,y-1} \right) \\
&+ \beta_h^6 \left(reserve_{i,y-1} \times exposure_{i,y-1} \right) \\
&+ \beta_h^7 \left(FFR_t \times reserve_{i,y-1} \times exposure_{i,y-1} \right) + D_i + \epsilon_{i,t}, \\
&\qquad h \in [-10, 20].
\end{aligned}
$$

Marginal effect of reserves implied by the specification

$$
\frac{\partial E[e_{i,t+h} - e_{i,t-1}]}{\partial reserve_{i,y-1}} = \beta_h^2 + \beta_h^4 FFR_t + \beta_h^6 exposure_{i,y-1} + \beta_h^7 \left(FFR_t \times exposure_{i,y-1} \right).
$$

β_h^7 captures how dollar exposure changes the shock-contingent reserve gradient.

Appendix: Formulas Used for the Marginal Plots

For a 10 bp tightening, $FFR_t = 1$. At a given dollar-exposure level x, the paper evaluates

$$\left.\frac{\partial E[e_{i,t+h} - e_{i,t-1}]}{\partial reserve_{i,y-1}}\right|_{FFR_t=1,\, exposure_{i,y-1}=x} = \beta_h^2 + \beta_h^4 + \beta_h^6 x + \beta_h^7 x = \beta_h^2 + \beta_h^4 + \left(\beta_h^6 + \beta_h^7\right) x.$$

Evaluation at the 90th percentile of dollar exposure

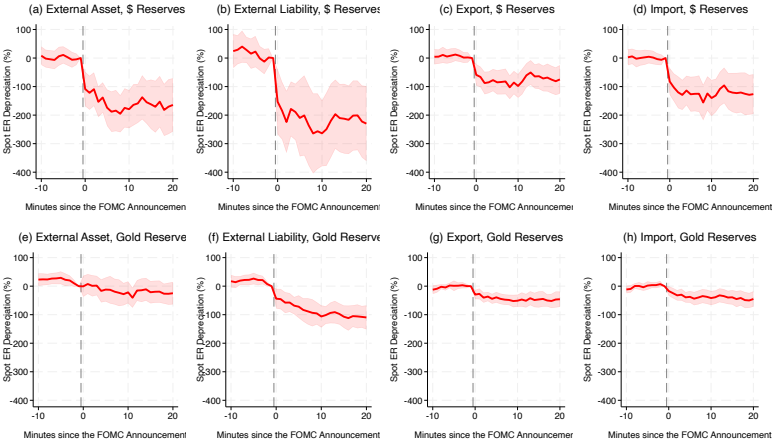
$$\beta_h^2 + \beta_h^4 + \left(\beta_h^6 + \beta_h^7\right) x^{90}.$$

The paper uses $x^{90} = 61.2\%$ for external dollar assets, 33.0% for external dollar liabilities, 94.1% for dollar-invoiced exports, and 88.7% for dollar-invoiced imports. Reserve variables are standardized, so the object measures the response difference associated with a one-standard-deviation larger reserve position.

A negative estimate indicates that larger dollar or gold reserves reduce depreciation at the specified exposure level.

Appendix: Conditional Reserve Effect at High Dollar Exposure

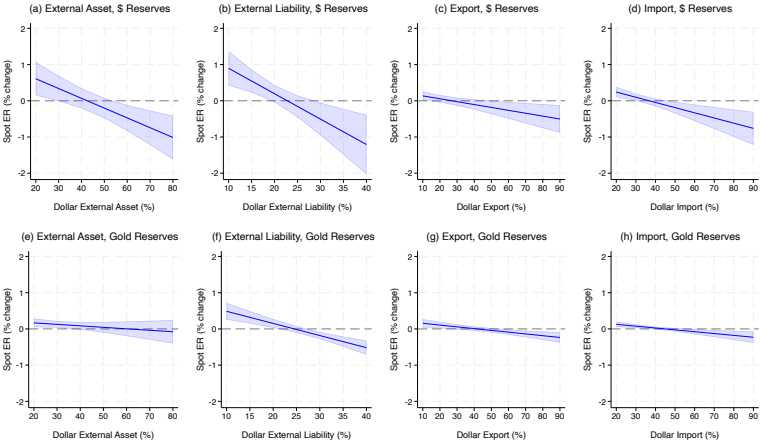
$$\beta_h^2 + \beta_h^4 + \left(\beta_h^6 + \beta_h^7\right) x^{90}.$$



Reserve-response paths after a 10 bp tightening, evaluated at the 90th percentile of external dollar assets, liabilities, exports, or imports.

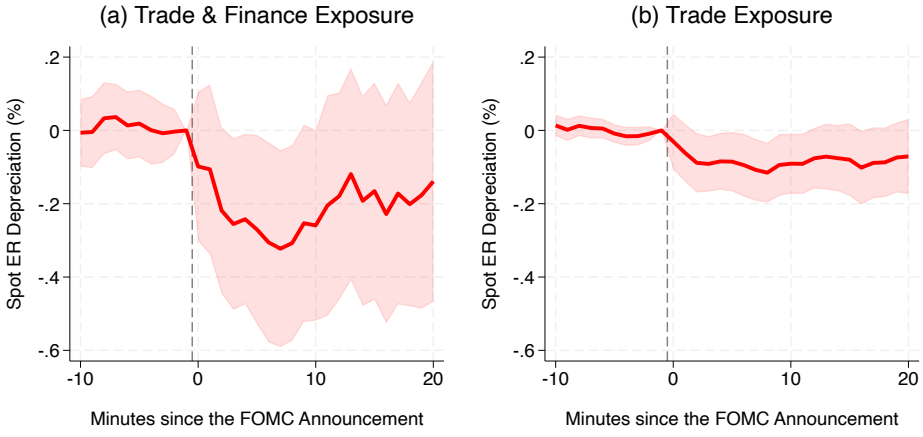
Appendix: Reserve Gradient across Dollar Exposure

$$\beta_h^2 + \beta_h^4 + \left(\beta_h^6 + \beta_h^7\right) x.$$



The continuous marginal plot evaluates the conditional dollar- or gold-reserve effect over the observed support of each dollar-exposure measure.

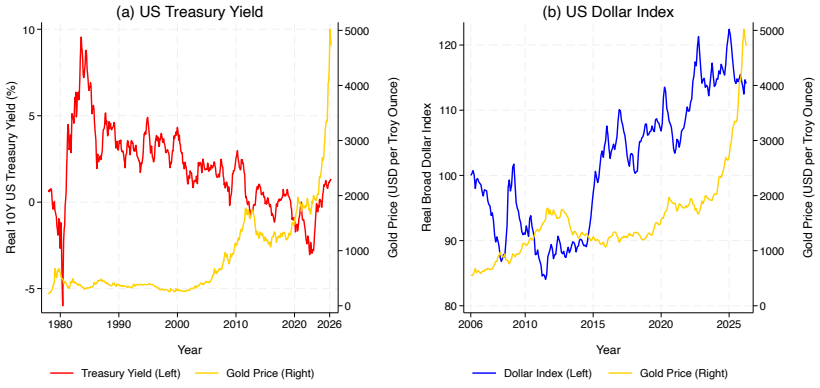
Appendix: Exposure Controls without Interactions



Dollar-reserve gradient after controlling for external dollar liabilities and dollar-invoiced imports in levels.

Joint post-announcement tests: $p = 0.0012$ for finance-and-trade controls and $p = 0.0235$ for trade-only controls.

Appendix: Gold Valuation Context



Source: World Gold Council and FRED, as reported in the manuscript.

Quantity-adjusted weekly gold drawdowns separate portfolio operations from changes in the market value of existing gold holdings.

Appendix: Weekly Measurement

$$
\begin{aligned}
Q^G_{i,w} &= \frac{G_{i,w}}{P^G_w}, \\
D^{FX}_{i,E} &= \sum_{w \in E} \mathbf{1}\{\Delta e_{i,w} > 0\} \max\{-(FX_{i,w} - FX_{i,w-1}), 0\}, \\
D^{G}_{i,E} &= \sum_{w \in E} \mathbf{1}\{\Delta e_{i,w} > 0\} \max\{-P^G_w(Q^G_{i,w} - Q^G_{i,w-1}), 0\}.
\end{aligned}
$$

- Q^G: implied physical gold quantity; P^G: observed gold price.
- Drawdowns are counted only in weeks of currency depreciation.
- Gold quantity adjustment removes valuation changes caused by the gold price.

Selected References I

- Aizenman, J., and J. Lee (2007). "International Reserves: Precautionary Versus Mercantilist Views, Theory and Evidence." *Open Economies Review*, 18(2), 191–214. doi:10.1007/s11079-007-9030-z.
- Aizenman, J., and D. Riera-Crichton (2008). "Real Exchange Rate and International Reserves in the Era of Growing Financial and Trade Integration." *Review of Economics and Statistics*, 90(4), 812–815. doi:10.1162/rest.90.4.812.
- Bauer, M. D., and E. T. Swanson (2023a). "An Alternative Explanation for the 'Fed Information Effect'." *American Economic Review*, 113(3), 664–700. doi:10.1257/aer.20201220.
- Bauer, M. D., and E. T. Swanson (2023b). "A Reassessment of Monetary Policy Surprises and High-Frequency Identification." *NBER Macroeconomics Annual*, 37, 87–155. doi:10.1086/723574.
- Jordà, Ò. (2005). "Estimation and Inference of Impulse Responses by Local Projections." *American Economic Review*, 95(1), 161–182. doi:10.1257/0002828053828518.
- Miranda-Agrippino, S., and H. Rey (2020). "U.S. Monetary Policy and the Global Financial Cycle." *Review of Economic Studies*, 87(6), 2754–2776. doi:10.1093/restud/rdaa019.
- Rey, H. (2015). "Dilemma Not Trilemma: The Global Financial Cycle and Monetary Policy Independence." NBER Working Paper 21162. doi:10.3386/w21162.

Selected References II

- Arslanalp, S., B. Eichengreen, and C. Simpson-Bell (2022). "The Stealth Erosion of Dollar Dominance and the Rise of Nontraditional Reserve Currencies." *Journal of International Economics*, 138, 103656. doi:10.1016/j.jinteco.2022.103656.
- Arslanalp, S., B. Eichengreen, and C. Simpson-Bell (2023). "Gold as International Reserves: A Barbarous Relic No More?" *Journal of International Economics*, 145, 103822. doi:10.1016/j.jinteco.2023.103822.
- Bahaj, S., M. Fuchs, and R. Reis (2026). "The Global Network of Liquidity Lines." *Journal of International Economics*, 161, 104255. doi:10.1016/j.jinteco.2026.104255.
- Bénétrix, A., D. Gautam, L. Juvenal, and M. Schmitz (2020). "Cross-Border Currency Exposures: New Evidence Based on an Enhanced and Updated Dataset." ECB Working Paper 2417.
- Boz, E., C. Casas, G. Georgiadis, G. Gopinath, H. Le Mezo, A. Mehl, and T. Nguyen (2022). "Patterns of Invoicing Currency in Global Trade: New Evidence." *Journal of International Economics*, 136, 103604. doi:10.1016/j.jinteco.2022.103604.
- Gopinath, G., E. Boz, C. Casas, F. Díez, P.-O. Gourinchas, and M. Plagborg-Møller (2020). "Dominant Currency Paradigm." *American Economic Review*, 110(3), 677–719. doi:10.1257/aer.20171201.
- Rodnyansky, A., Y. Timmer, and N. Yago (2026). "Intervening against the Fed." *Journal of Financial Economics*, 179, 104265. doi:10.1016/j.jfineco.2026.104265.