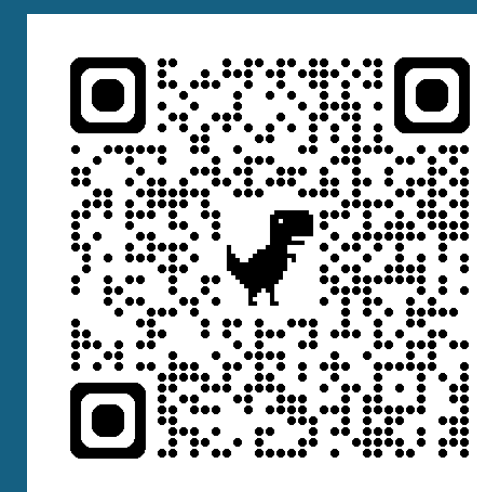


Ample Reserves for Whom?

The Role of Foreign Banks in U.S. Monetary Policy Implementation

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Motivation: Fragility in the Reserves Market

- 2019 repo spike — despite \$1+ trillion in reserves
- Repeated stress at month- and quarter-ends

Puzzle? Are Reserves Scarce?

- Reserves (bank deposit at Fed) at trillions
- Banks hold 30%+ of assets in reserves & Treasuries
- But markets still act like reserves are *scarce*

Quote from Chair Powell, March 2024

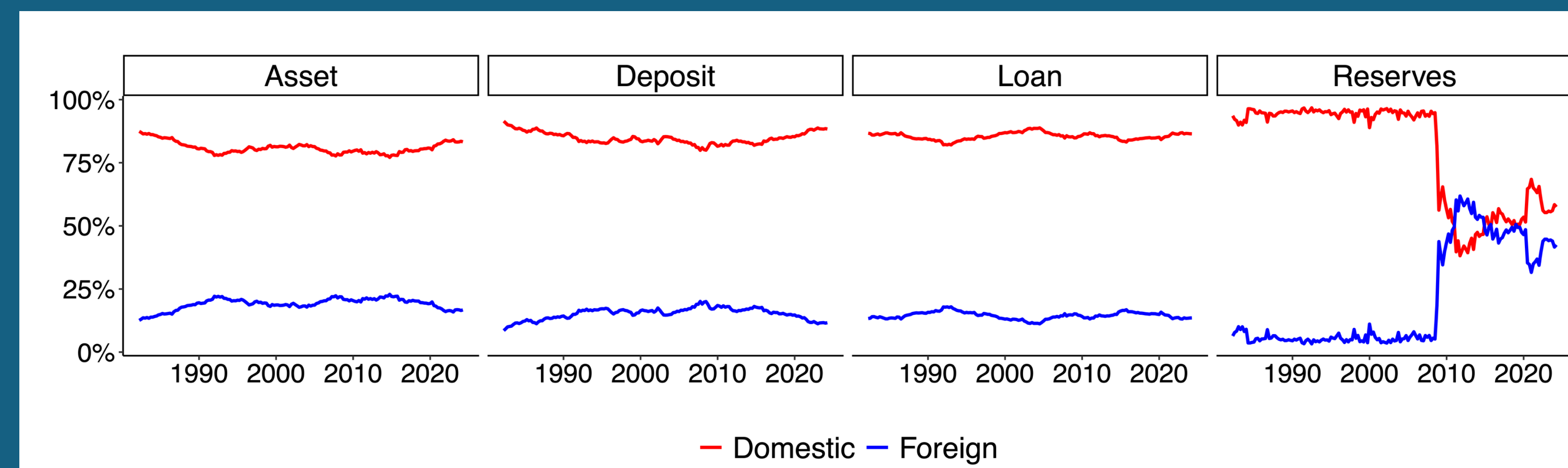


*"Liquidity is not distributed evenly in the system. There can be times when, **in the aggregate, reserves are ample or even abundant, but not in every part. Those parts where they're not ample, there can be stress...** Something like that happened in 2019 perhaps."*

⇒ Not only the aggregate reserves, but **distribution** matter!

Focus: Foreign Banks in the US

Foreign banks hold very large share of reserves (>50%) in the US!



We find...

- Foreign banks are the marginal reserves holders.
- Their elastic, volatile demand pins the kink of the aggregate demand curve, shaping monetary policy transmission and reserve supply needs.

Our findings matter because they...

- Identify marginal reserve holders and the institutional background: foreign banks often sit at the kink of the aggregate demand curve
- Reveal how foreign banks' arbitrage and uncertainty affect the Fed's optimal reserves supply

Empirical: Why & How Foreign Banks Hold Reserves?

① Foreign banks exploit IOR–FF spread arbitrage

- IOR has exceeded FF (avg 8.5bps, 2009–2024), due to GSEs holding non-interest-bearing reserves
- Domestic banks face more balance sheet cost (SLR, FDIC fees), arbitrage less
- Foreign banks exploit IOR-FF spread arbitrage more than domestic

	(1)	$\Delta \log(\text{Reserves})$ (2)	(3)	(4)
$\Delta \text{IOR-FF spread}$	0.7928*** (0.0578)	0.7780*** (0.0583)	0.7624*** (0.0583)	0.7915*** (0.0590)
F	0.0230*** (0.0068)	-0.0397 (0.0282)	-0.0598*** (0.0226)	-0.0651*** (0.0242)
$\Delta \text{IOR-FF spread} \times F$	2.169*** (0.7547)	2.145*** (0.7578)	2.016*** (0.7618)	2.031*** (0.7613)
BHC FE		✓	✓	✓
Balance Sheet Control			✓	✓
Reserve Supply Control				✓
Observations	292,832	292,832	291,234	291,234
R ²	0.00	0.01	0.01	0.01

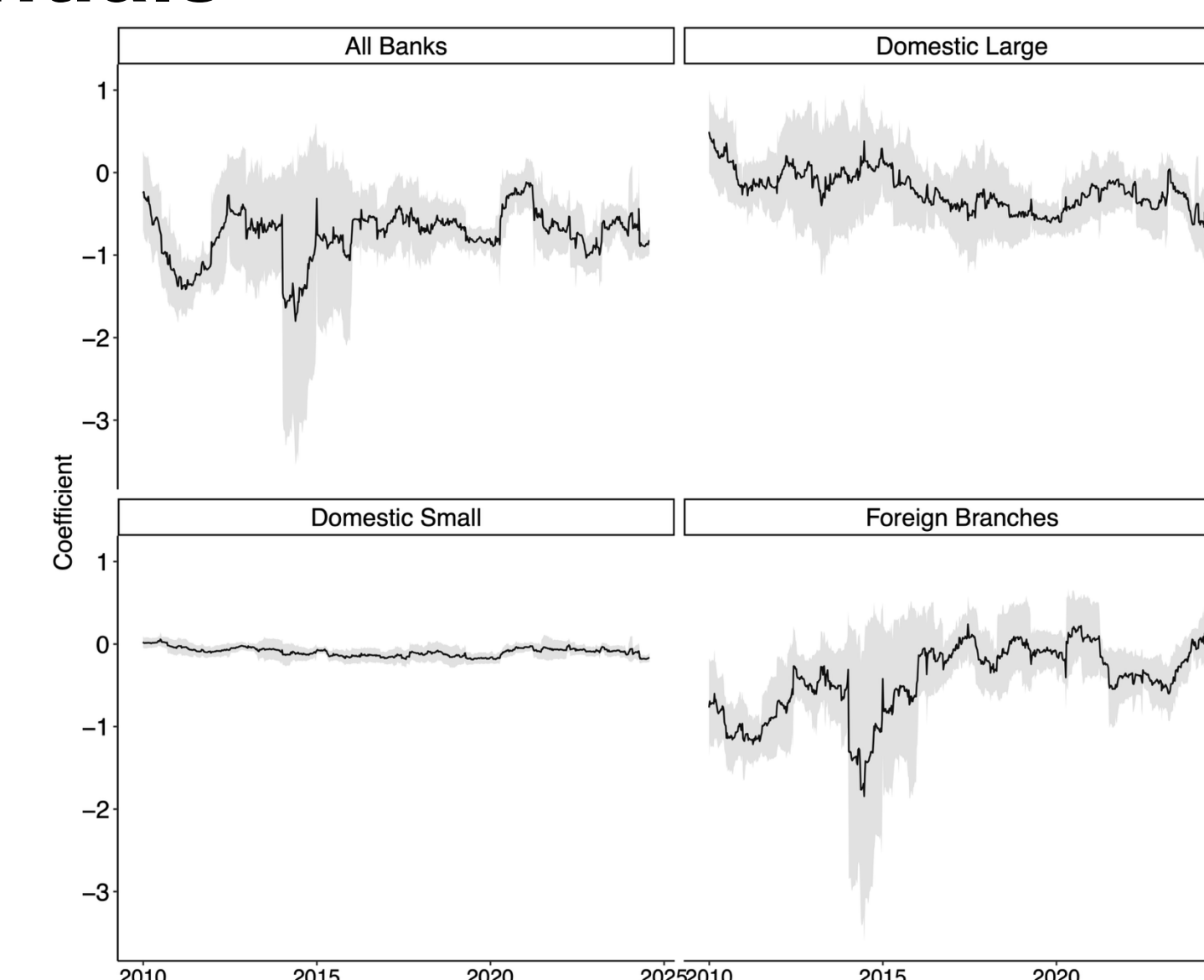
↑ 1pp rise in the IOR–FF spread increase foreign reserves 2pp more than domestic

② Foreign banks also exploit cross-border rate differentials

- Reserve demand rises 4.6pp per 25bps spread between IOR and home rates

③ Branches, the least regulated, hold the reserves

- Foreign banks operate via subsidiaries, branches, or both
- Branches face lighter US regulation: NO capital rules, NO FDIC fees, and flexible HQ transfers
- Fully branch-operated adjust reserves more to US–foreign spreads, funded via HQ transfers



↑ Rolling estimates show that foreign and Top25 domestic banks absorb most reserve shocks, with foreign banks exhibiting the most volatile reserves elasticity over time

④ Foreign Banks Are the Marginal Reserve Holders

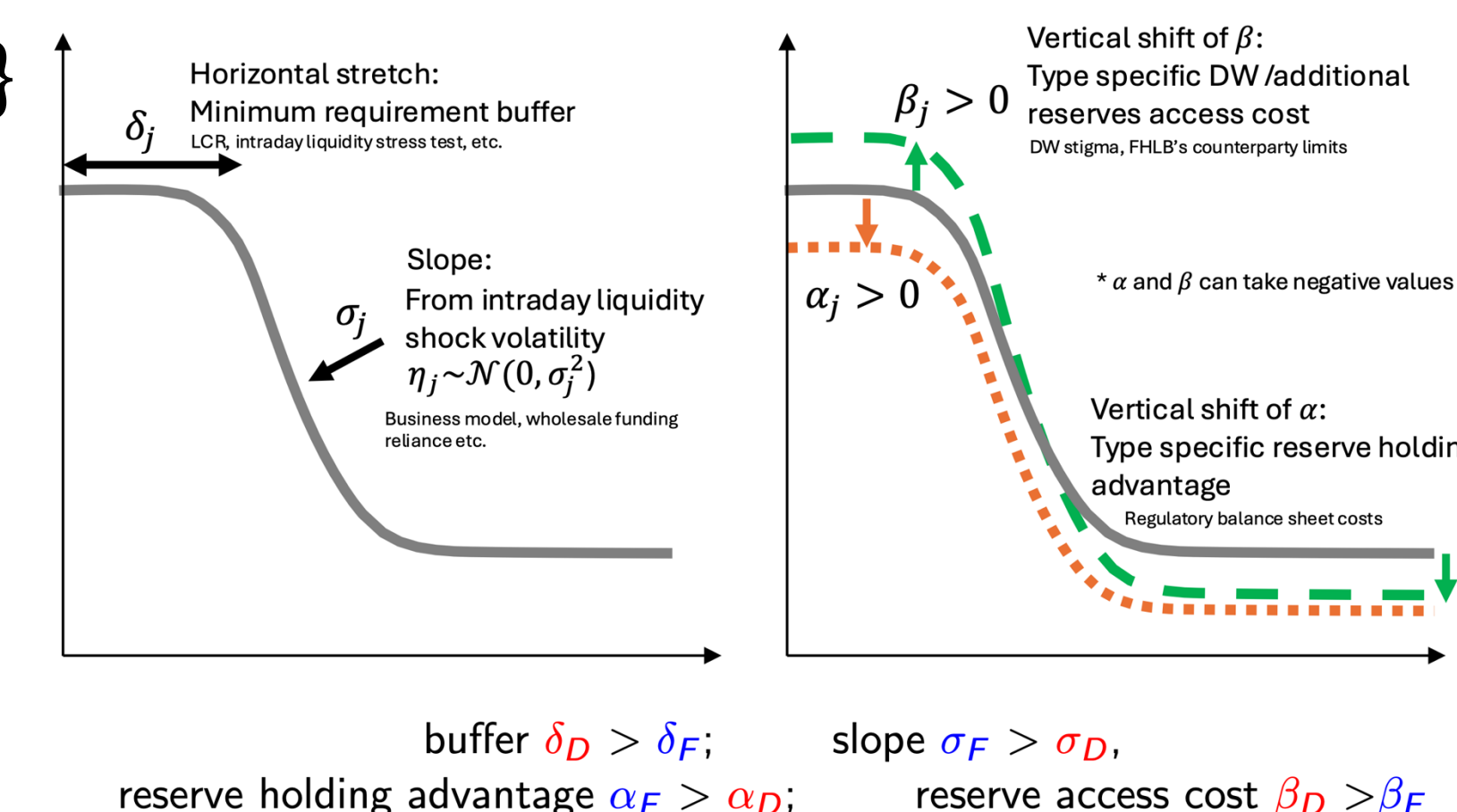
- Foreign branches absorb a large share of reserve fluctuations and reduce holdings sharply at quarter-end for window dressing

Model: How Do Foreign Banks Reserves Holding Affect US Monetary Policy?

Demand

- Two types of banks: domestic and foreign, indexed by $j \in \{D, F\}$
- Bank j chooses reserve holding M_j prior to liquidity shock η_j realization, under optimization of excess reserves X_j and buffer (exogeneous) δ_j : $M_j(i) = \delta_j + X_j(i)$

$$\min_{X_j} \underbrace{\int_{-X_j}^{\infty} (X_j + \eta_j)(i - i_{\text{IOR}} + \alpha_j) dF(\eta_j)}_{\text{Opportunity cost of excess reserves}} + \underbrace{\int_{-\infty}^{-X_j} (-X_j - \eta_j)(i_{\text{DW}} - i + \beta_j) dF(\eta_j)}_{\text{Cost of discount window borrowing}}$$



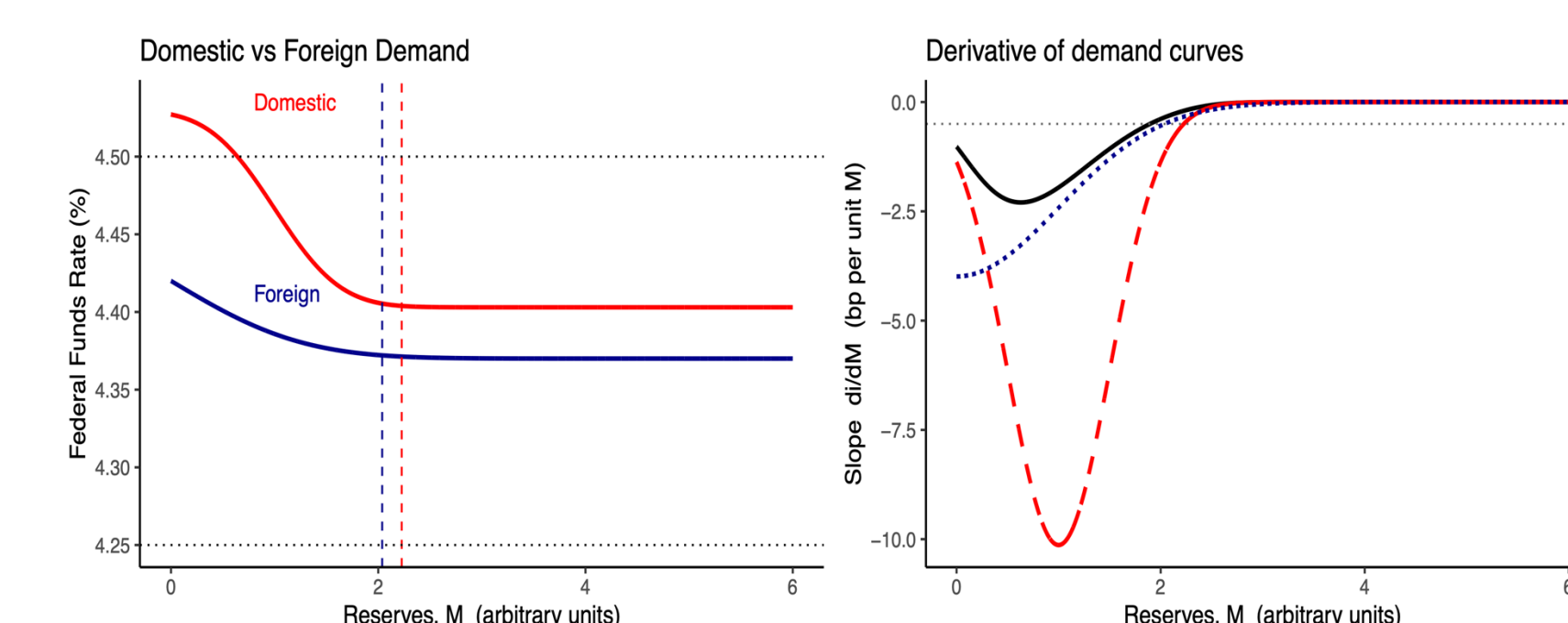
- Bank face liquidity shock and uncertainty shock in minimum buffer δ_j (i.e., foreign banks' quarter-end window dressing)

Supply

- Adapting Afonso et al. (2023) two operational goals model:

$$\min_M \mathcal{L}(M) = \frac{1}{2} \left[(1 - \lambda) (i^*(M) - i_{\text{target}})^2 + \lambda (M - M_{\text{target}})^2 \right]$$

- Fed aims to stabilize policy rate and keep reserves ample



Model takeaway

- Foreign banks shape the aggregate marginal demand: They determine the kink in the aggregate reserve demand curve at quarter-ends.
- Quarter-end jumps from window-dressing force the Fed to *increase* reserve supply to hit policy goals.