

## ***NBER AP Panel - Monetary Policy Innovations: A Critical Review and Potential Paths Forward***

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*The views expressed herein are mine; they do not reflect those of the Federal Reserve Board or the Federal Reserve System.*

These comments are based on public information only. They lay out general questions in need of academic research.

The framework on page 10-17 summarizes a publicly available paper that has been presented externally prior to this event.

# What are the monetary policy innovations?

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Standard monetary policy tool: Short riskfree rate

Monetary policy innovations since pre-GFC: Tools to overcome zero lower bound

1. Quantitative easing (QE): Bond purchases financed with reserves
  - Government bonds, MBS/covered bonds, corporate bonds, muni bonds, PPP loans (even equity in Japan)
  - Variant: Yield curve control -- QE that targets yield, not quantity (Japan, Australia)
2. Forward guidance: Communications (Odyssean) about future short rates to move current long rates
3. Negative interest rates (sometimes tiered)
4. Lending to banks for growth purposes: Funding for lending (BoE), Targeted LTROs (ECB), Main Street Lending Program (Fed)

# The research agenda

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**Step 1.** Do new tools affect **asset prices/interest rates** (“financial conditions”)?

- Multiplier?
- Channels: Expected short rates? Risk premia? Scarcity effects? Liquidity effects? Inflation effects? Cash flow effects?

**Step 2.** Do asset pricing effects translate to effects on **growth/inflation**?

- Multiplier? (e.g., size of consumption-wealth effect)
- Speed?

**Step 3.** **Side effects?**

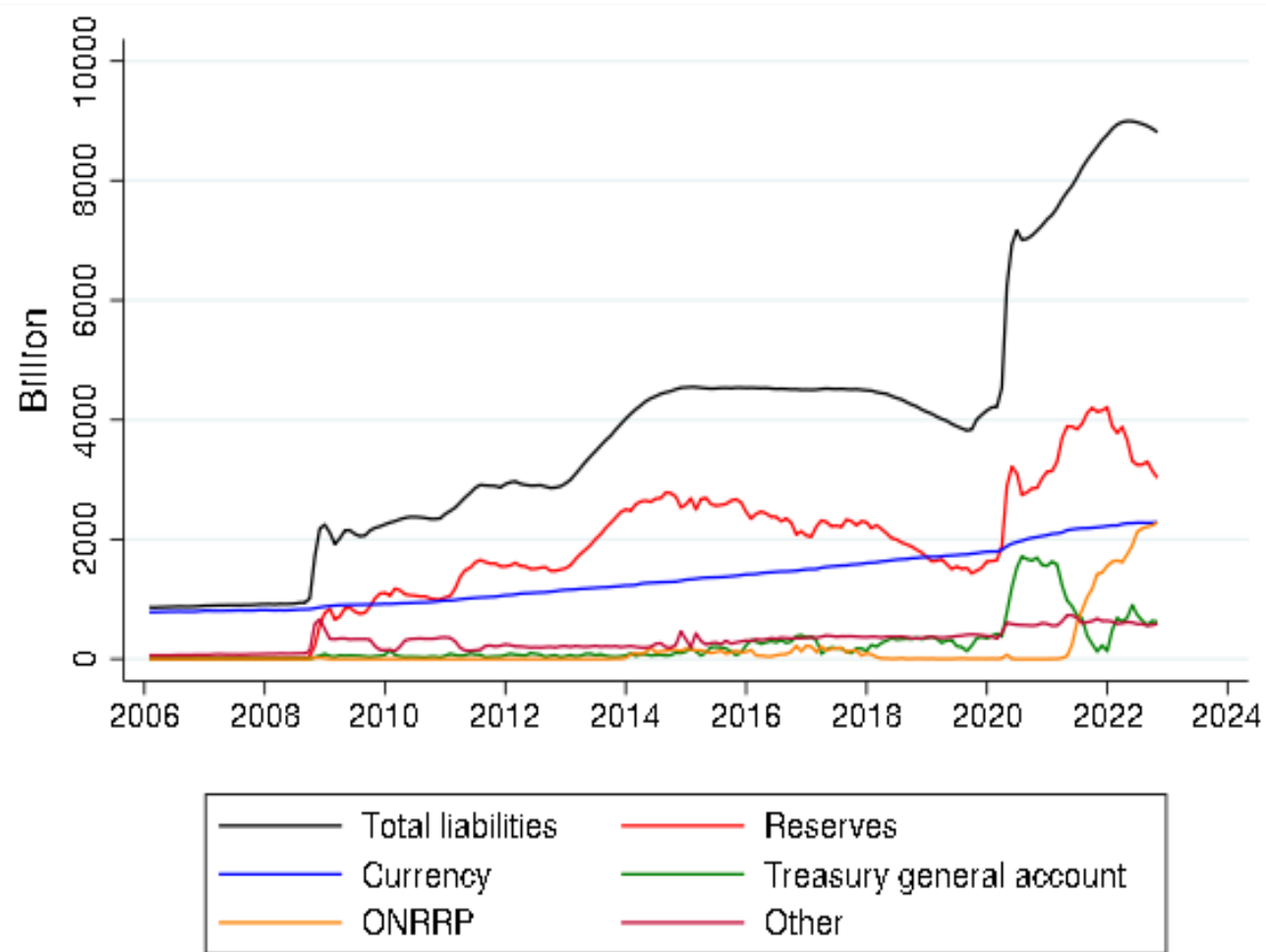
- **Financial instability**: Too much reaching for yield?
- Is **funding distorted** toward what’s purchased?
- Do reserves **crowd out bank lending**? Diamond, Jiang & Ma (2020)
- **Threat to independence** via risk of **central bank losses**? Goncharov, Ioannidou and Schmalz (JF, forth.)

**Step 4.** **What should be done** with all these tools **during tightening**?

- Focusing **exiting QE**: Do you need to exit? Does it matter? How fast? When? How much?  
**Many aspects unresolved – very fruitful area for research!**

(Some [comments on step 1-2 from an earlier panel](#))

# Quantitative tightening: Reduction of balance sheet size via runoff or sales



Latest Fed balance sheet, October 13, 2022, \$B

| Assets     |       | Liabilities              |       |
|------------|-------|--------------------------|-------|
| Treasuries | 5,630 | Reserves                 | 3,088 |
| MBS        | 2,698 | ONRRP                    | 2,230 |
| Other      | 481   | Currency                 | 2,287 |
|            |       | Treasury general account | 608   |
|            |       | Other                    | 596   |
|            | 8,809 |                          | 8,809 |

# I. Do central banks need to do QT?

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## Is QT needed?

- There is **no “upper bound”** on rate *increases* – monetary policy is not constrained on the upside
- As GDP grows, the balance sheet **automatically shrinks relative to GDP**

## Is QT valuable?

- a. **Using only the short rate tool** a lot may lead to additional **financial stability risks**
  - Pension fund losses on interest rate swaps (paying floating) may lead to financial instability
  - Variable rate borrowers may default (remember the ARMs)
- b. Having a **large balance sheet may be undesirable** due to the **negative side effects of QE**
  - Then QT facilitates future QE
- c. QT can be **targeted** (e.g., focus on MBS to slow the housing market)

## Does QT work in affecting yields?

- Announcement of **earlier/more QT** has effects on yields ex-post: Remember the **taper tantrum**

## 2. Does QT have consequences for next QE?

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### Monetary policy QE:

- Your next QE may be less effective if you exit faster than expected this time
- **Theory:** Greenwood, Hanson and Vayanos (2016)
  - Focus on **duration risk**. Vayanos-Vila type model
  - Central bank holdings affect the **instantaneous risk premium** at a given date (via arbitrageur's holdings)
  - Bond price depends on **path for risk premia**
    - ➔ It matters **how long central bank holds** what is purchased: Expected QT is **baked into initial QE announcement effect**
  - Path intuition should carry over to **other QE channels**

### Financial stability QE:

- Works by **addressing steep short-run demand curves** (even multiple equilibria)
- Does it matter for upfront effect if you are **expected to exit soon?**

### 3. Speed: Does ending QE abruptly or doing fast QT carry financial stability risks?

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A lot of focus on “telegraphing” balance sheet changes ahead of time (perhaps due to taper tantrum in 2013 plus Treasury market issues in March 2020)

June 2021 press conference:

NANCY MARSHALL-GENZER. [...] when you’re ready, how will you go about signaling the start of tapering when you do decide to do that?

CHAIR POWELL. So our intention for this process is that it will be orderly, methodical, and transparent. And I can just tell you, we, we, we see real value in communicating well in advance what our thinking is. And we’ll try to be clear. And, as I mentioned, we’ll, we’ll give **advance notice** before **announcing** a decision to **taper**. [...]

### 3. Speed: Does ending QE abruptly or doing fast QT carry financial stability risks?

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What does asset pricing say about this, theoretically/empirically?

- How much does the effect of supply changes depend on how fast you change supply?  
Short-run versus long-run demand elasticities. Related to Duffie (AFA, 2010)
- If you pre-announce enough, do you face the long-run demand elasticity?
- Does it matter what you are tapering/running off? Does capital flow slower for more complex assets?
- Are demand elasticities larger or smaller in boom times?

**Speed and state-dependent demand elasticities!!!**

Answers matter because more policy flexibility is better: Is QE a freight-train that's hard to stop? How should this be dealt with?



## 4. Sequencing

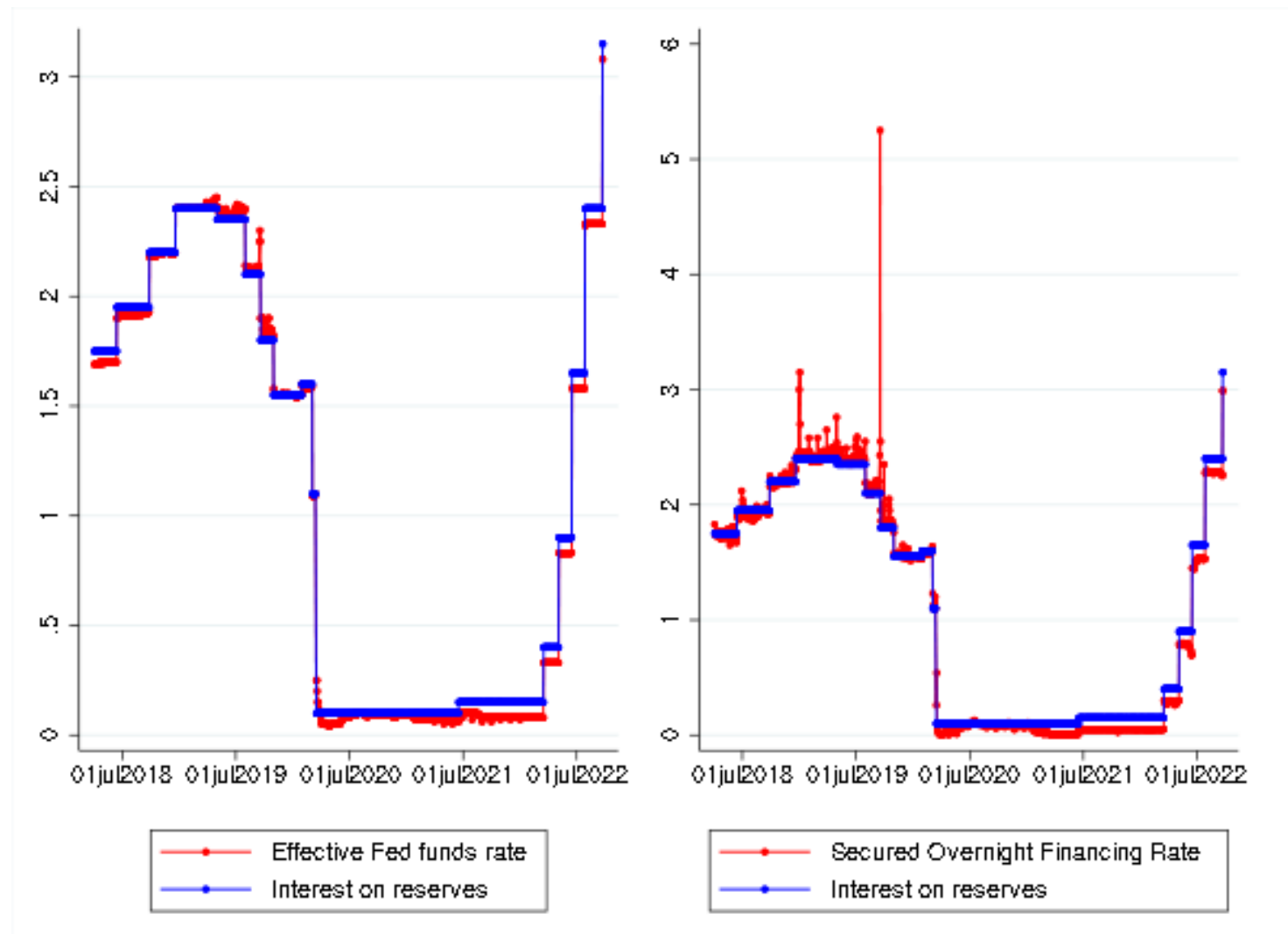
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A typical tightening sequence:

- (1) **Taper** QE purchases (slowly reduce amount purchased)
  - (2) **Hike** rates
  - (3) **Shrink** balance sheet: QT
- **If tapering of QE is needed** to avoid financial instability:
    - **Should central banks proactively start tapering earlier** (at the risk of tapering too early)?
    - **Just get on with liftoff** if it's needed before tapering is finished?
  - **Does a bit of a delay to liftoff matter** if markets understand rate hikes are coming?
    - Court of public opinion: **Behind the curve** → **Central bank credibility**

## 5. Magnitude: What are the constraints on QT?

A too large reserve reduction can lead to a liquidity shortage – September 17, 2019



Market worries that current QT will end abruptly with another yield spike e.g., WSJ 9/3/2022

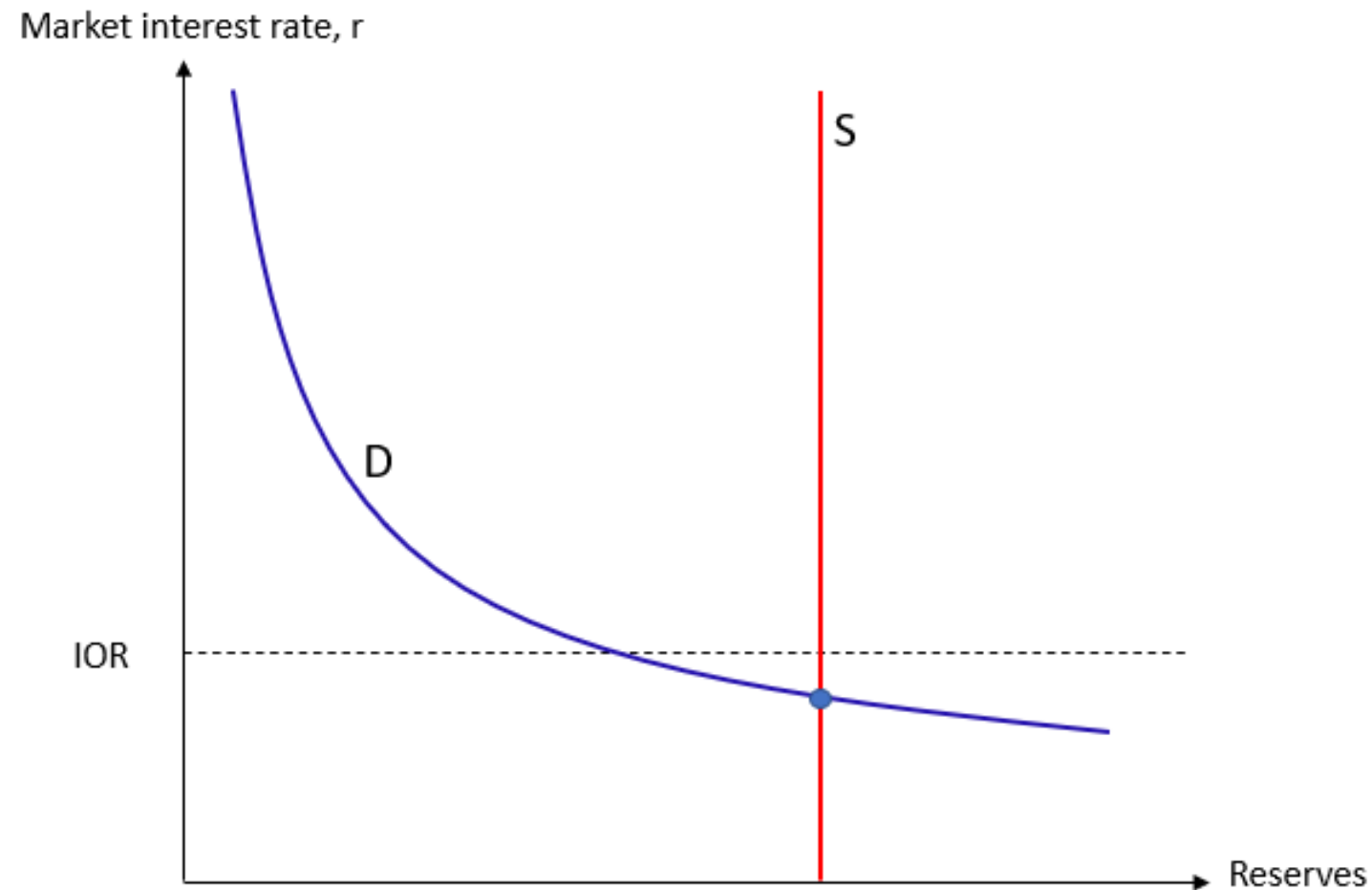
### The Other Doomsday Scenario Looming Over Markets

A U.K. fund manager says the big worry isn't inflation, it's the Fed reversing quantitative easing

## 5. Magnitude: What are the constraints on QT?

Lopez-Salido and Vissing-Jorgensen (2022), [“Reserve Demand and Quantitative Tightening”](#) (publicly available on my google site)

We can think of reserve demand as **money demand for banks**



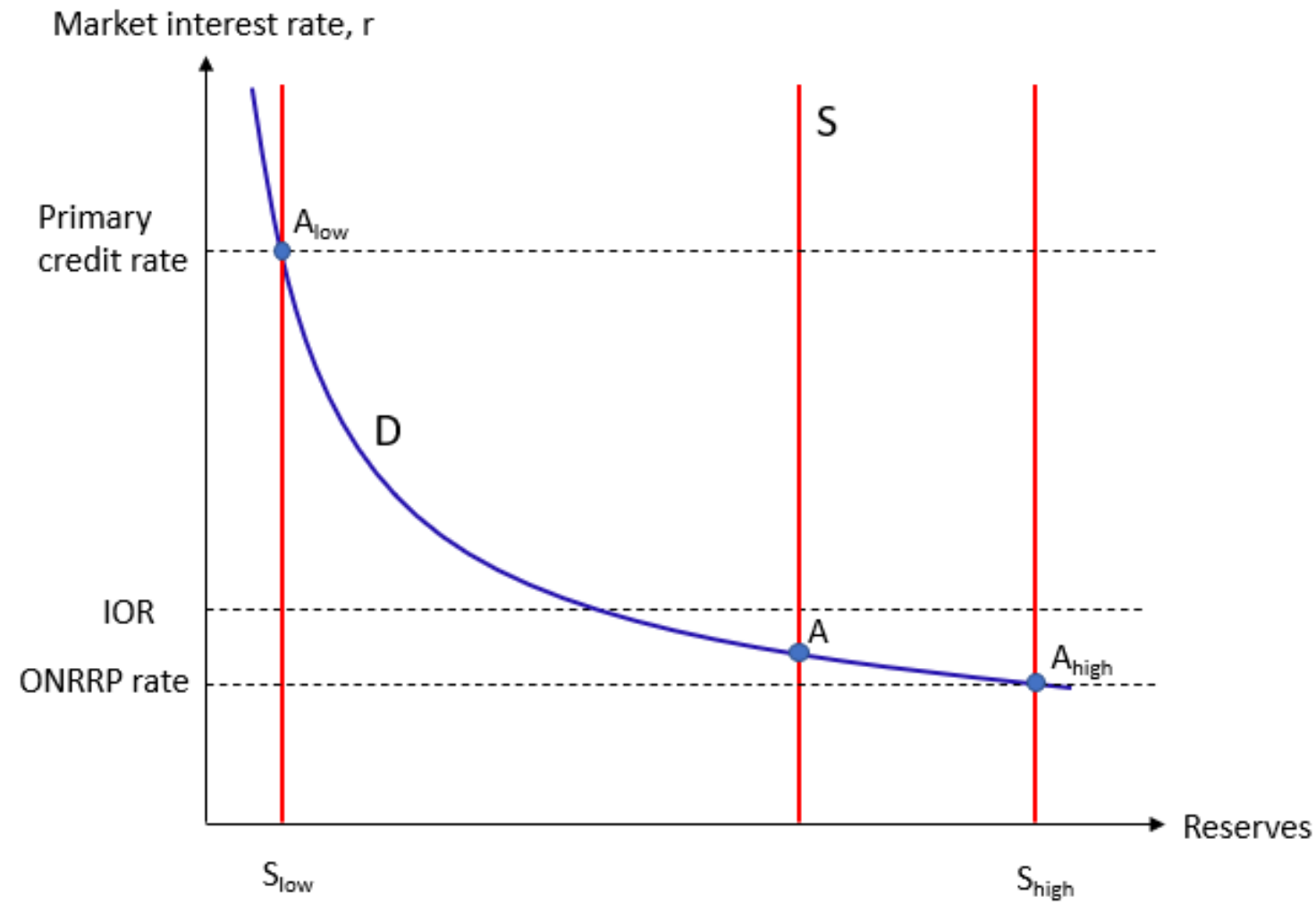
- Demand for currency depends on:
  - Interest rate on money (zero) relative to  $r$
  - GDP  $\rightarrow$  Liquidity benefits of money
- Demand for reserves depends on:
  - Interest on reserves (IOR) relative to  $r$
  - Higher IOR shifts demand up
  - Size of the banking sector:
    - Deposits  $\rightarrow$  Liquidity benefits of reserves
  - Banks' "balance sheet costs" (capital req's)

Market equilibrium can involve  $r < IOR$ :

- banks can earn IOR but others cannot (e.g., GSEs, MMFs), and
- banks have balance sheet costs

## 5. Magnitude: What are the constraints on QT?

The Federal Reserve controls equilibrium  $r$  via IOR and  $S$  as well as rates on discount window and ONRRP facility



Private sector take-up decisions at Fed facilities affect reserve supply to keep  $r$  in the corridor

If  $r < \text{ONRRP rate}$ :

- Investments (by GSEs, MMFs) at ONRRP (for given balance sheet and autonomous factors) decreases reserves, keeping reserves  $\leq S_{high}$

If  $r > \text{primary credit rate}$ :

- Bank borrowing at the discount window increases reserves, keeping reserves  $\geq S_{low}$

## 5. Magnitude: What are the constraints on QT?

| Banks    |               |
|----------|---------------|
| Assets   | Liabilities   |
| Reserves | Deposits      |
| Bonds    | Federal funds |
| Loans    | Private repo  |
|          | Equity        |

- Convenience yield on reserves:

$$v_r(\text{Reserves, Deposits}) \quad v_r'() > 0, \quad v_d'() < 0$$

Transactions cost savings due to not having to sell bonds/loans when faced with deposit outflows

- Balance sheet costs for non-equity liabilities:

$$\phi^*(\text{Deposits} + \text{Federal funds} + \text{Private repo})$$

- Bank's FOC:

Borrowing via federal funds and investing in reserves:  
 $r(\text{FF}) + \phi = r(\text{Reserves}) + v_r'(\text{Reserves, Deposits})$ : Demand

- Assume log functional form:

$$v_r'(\text{Reserves, Deposits}) = \text{constant} + b \cdot \ln(\text{Reserves}) + c \cdot \ln(\text{Deposits})$$

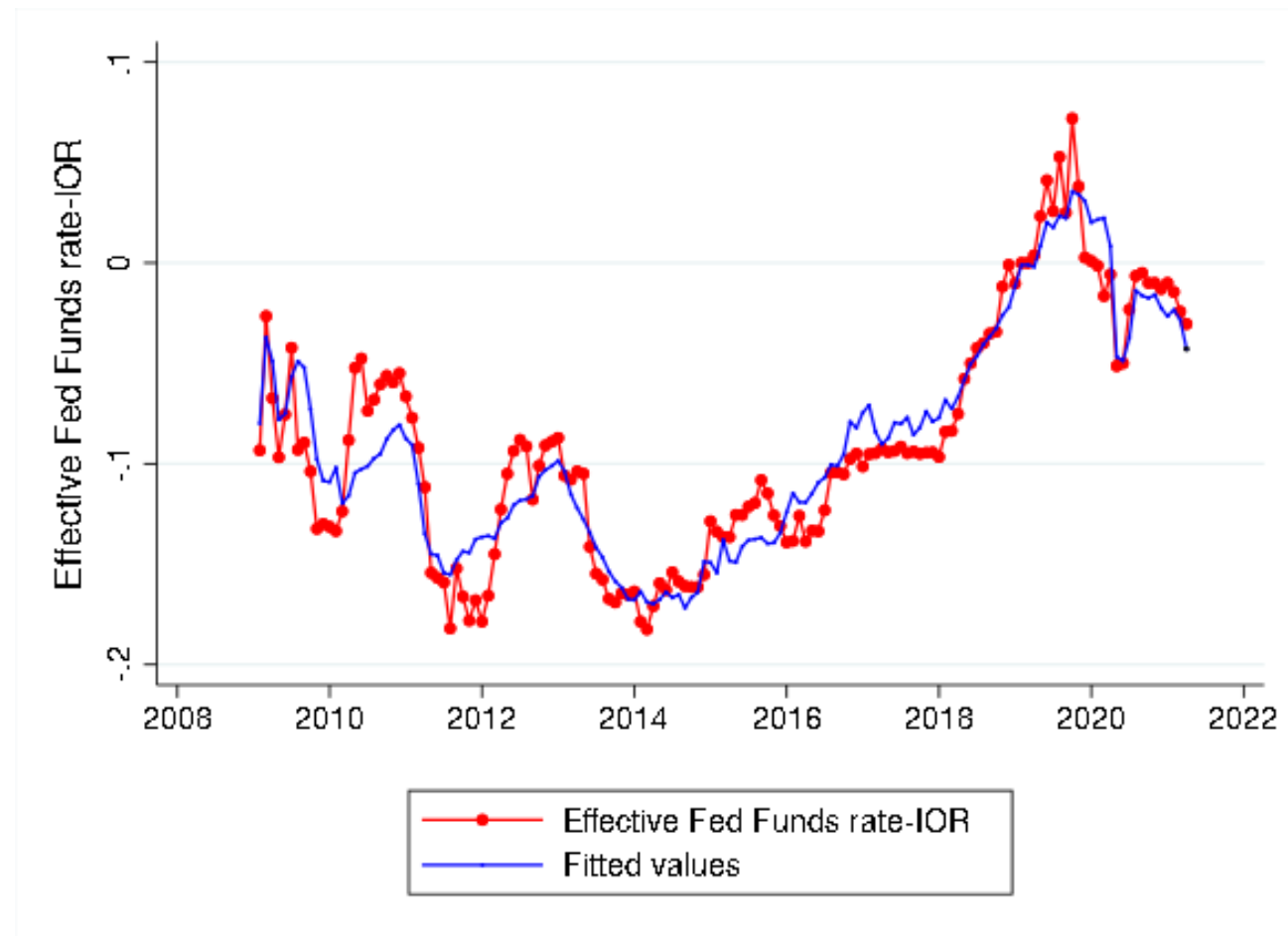
$$r(\text{FF}) - r(\text{Reserves}) = a + b \cdot \ln(\text{Reserves}) + c \cdot \ln(\text{Deposits}) + u$$

## 5. Magnitude: What are the constraints on QT?

$$(Effective\ Fed\ funds\ rate - IOR) = a + b * \ln(Reserves) + c * \ln(Deposits)$$

Monthly data, 2009M1-2021M3. OLS estimation.  
NW(12) t-statistics. \*\*\* means significant at 1%  
level.

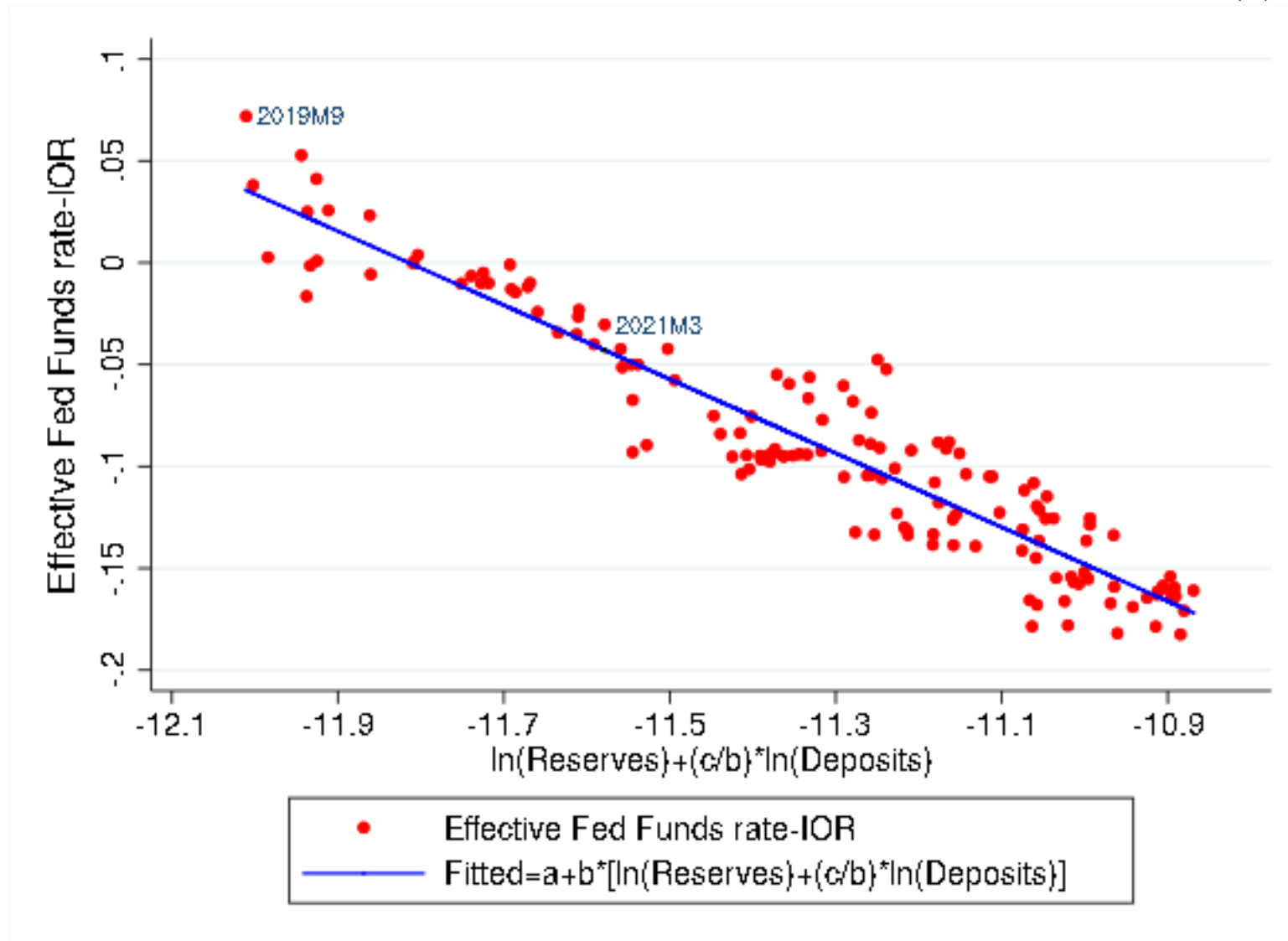
|                | Dependent variable:<br>(Effective fed funds<br>rate-IOR) |
|----------------|--|
| In(Reserves)   | -0.182***<br>(t=-15.71)                                  |
| In(Deposits)   | 0.370***<br>(24.21)                                      |
| Constant       | -2.148***<br>(-16.76)                                    |
| N (months)     | 147  |
| R <sup>2</sup> | 0.894  |



## 5. Magnitude: What are the constraints on QT?

- “Deposit-adjusted reserves” have a stable relation to EFR-IOR spread

$$(Effective\ fed\ funds\ rate - IOR) = a + b * [\ln(Reserves) + \left(\frac{c}{b}\right) * \ln(Deposits)]$$

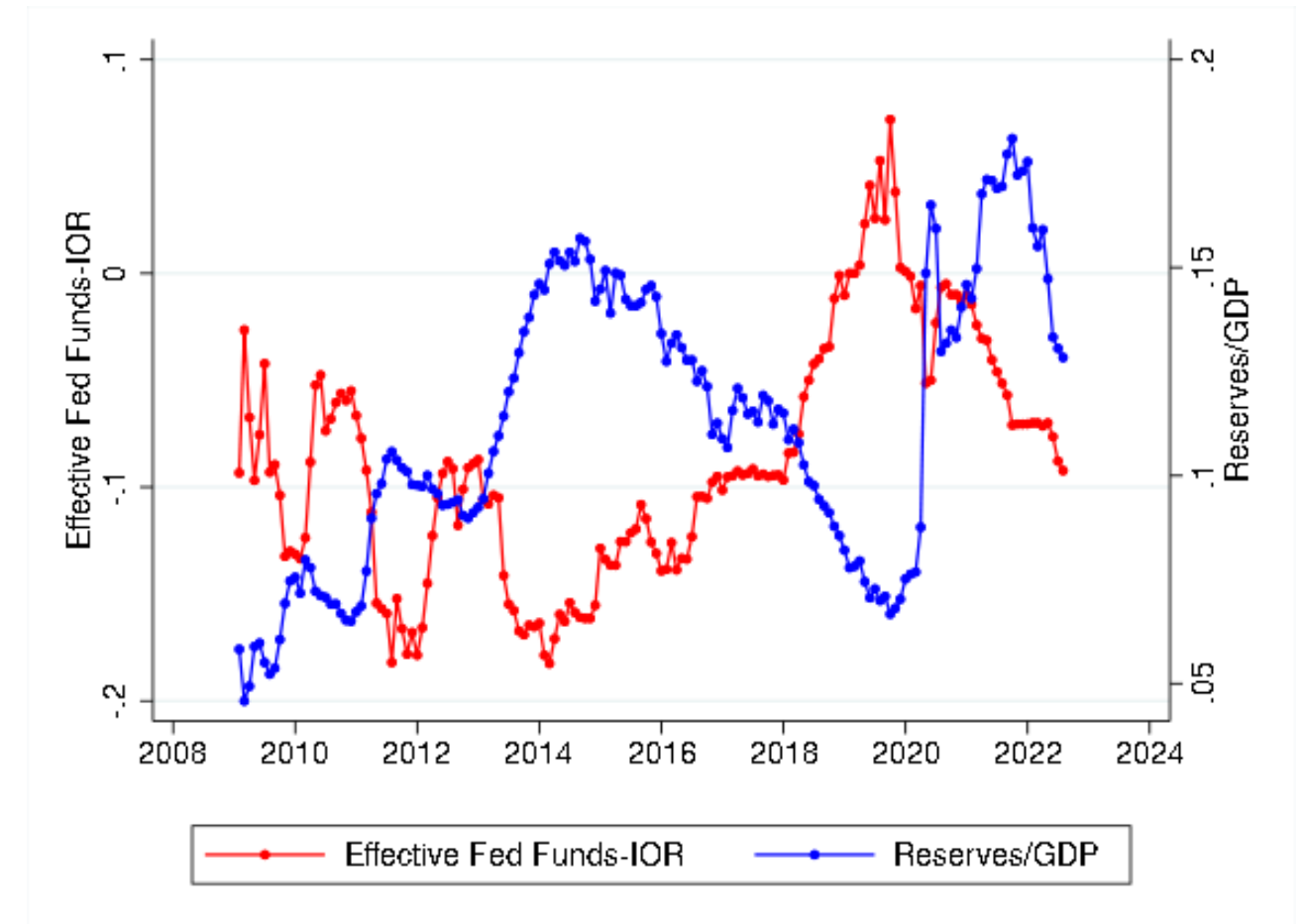
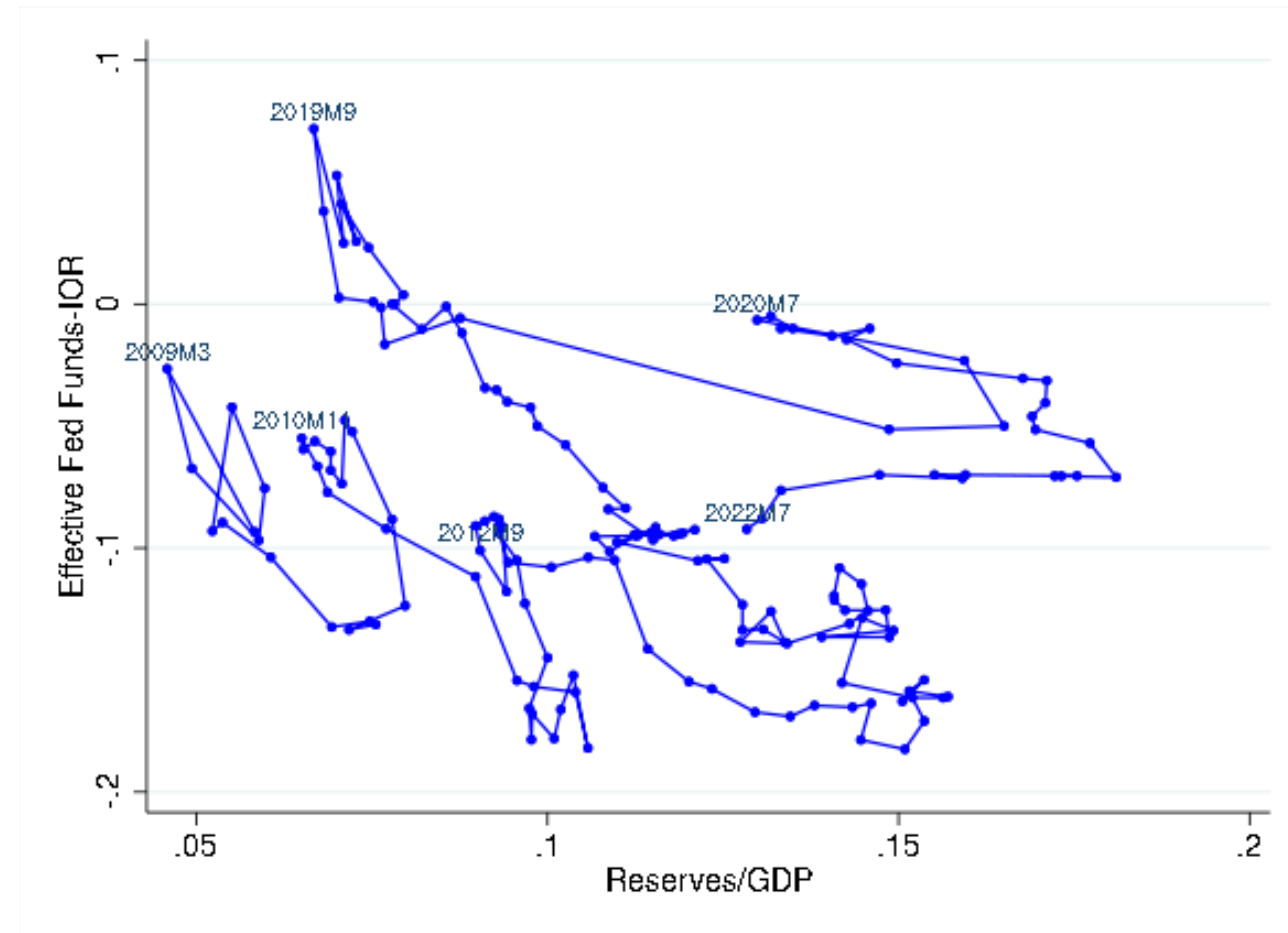


A more [elaborate version](#) of this also accounts for [ONRRP take-up](#) and [instruments for deposits](#)

- ➔ Can calculate predicted  $r(\text{FF}) - r(\text{Reserves})$  for various values of Reserves+ONRRP, given current instruments for deposits
- ➔ When is the reserve market as tight as in Sept. 2019?

## 5. Magnitude: What are the constraints on QT?

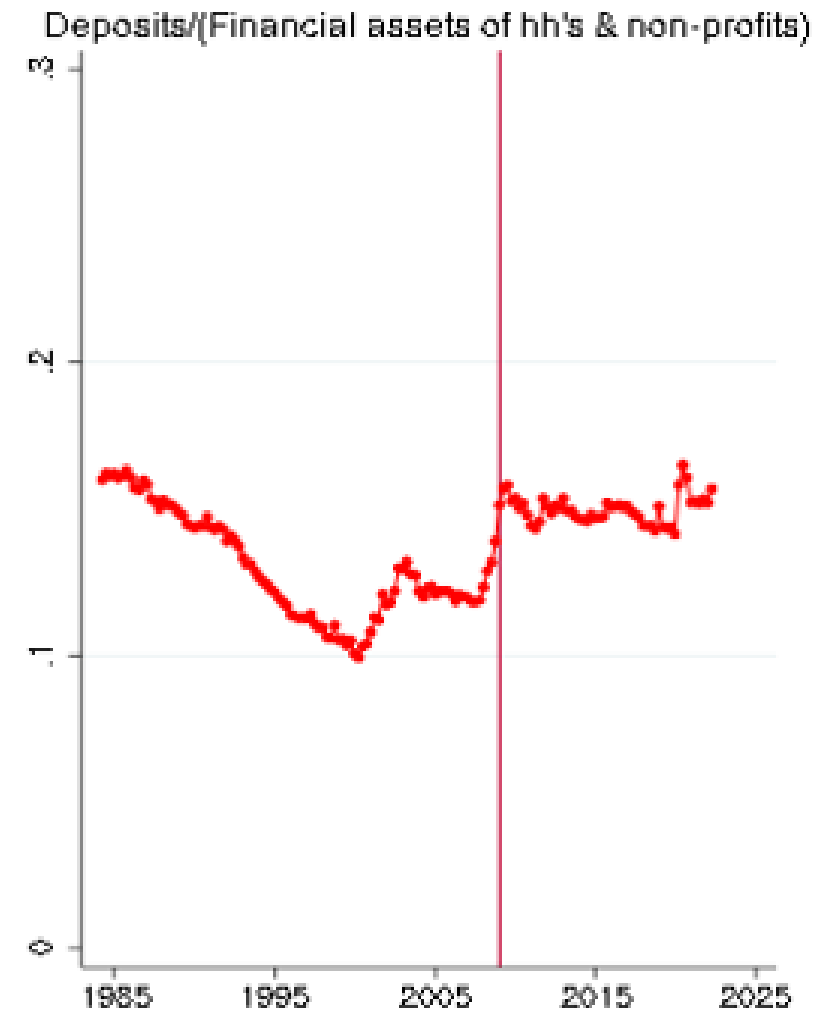
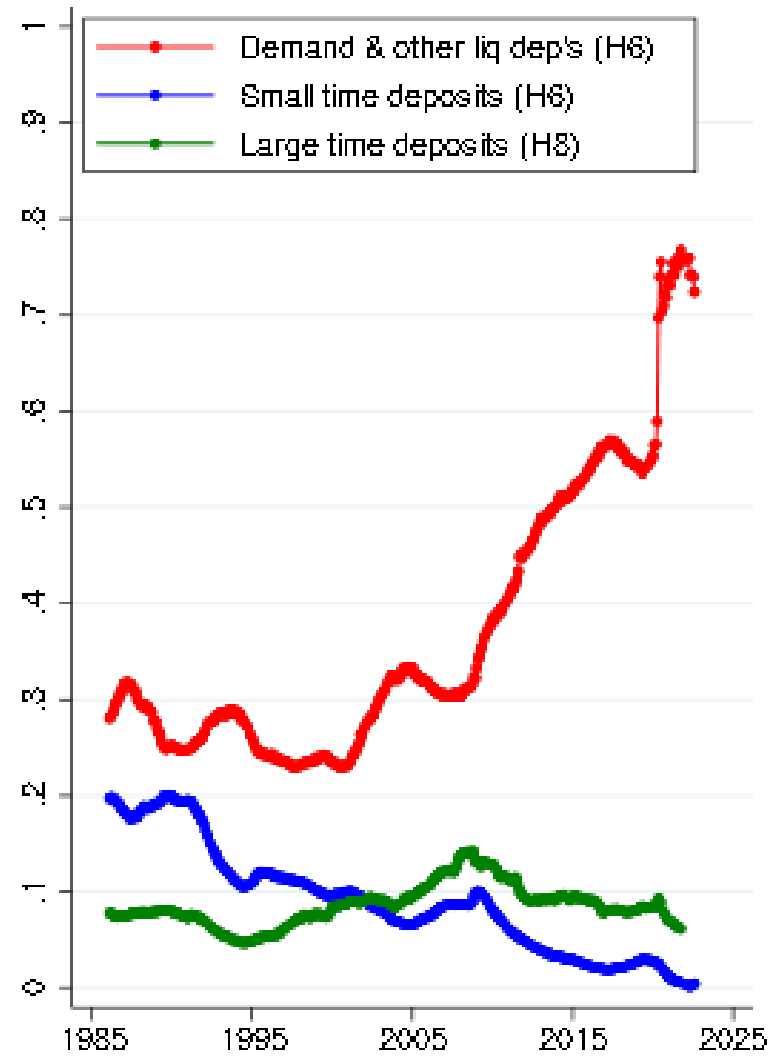
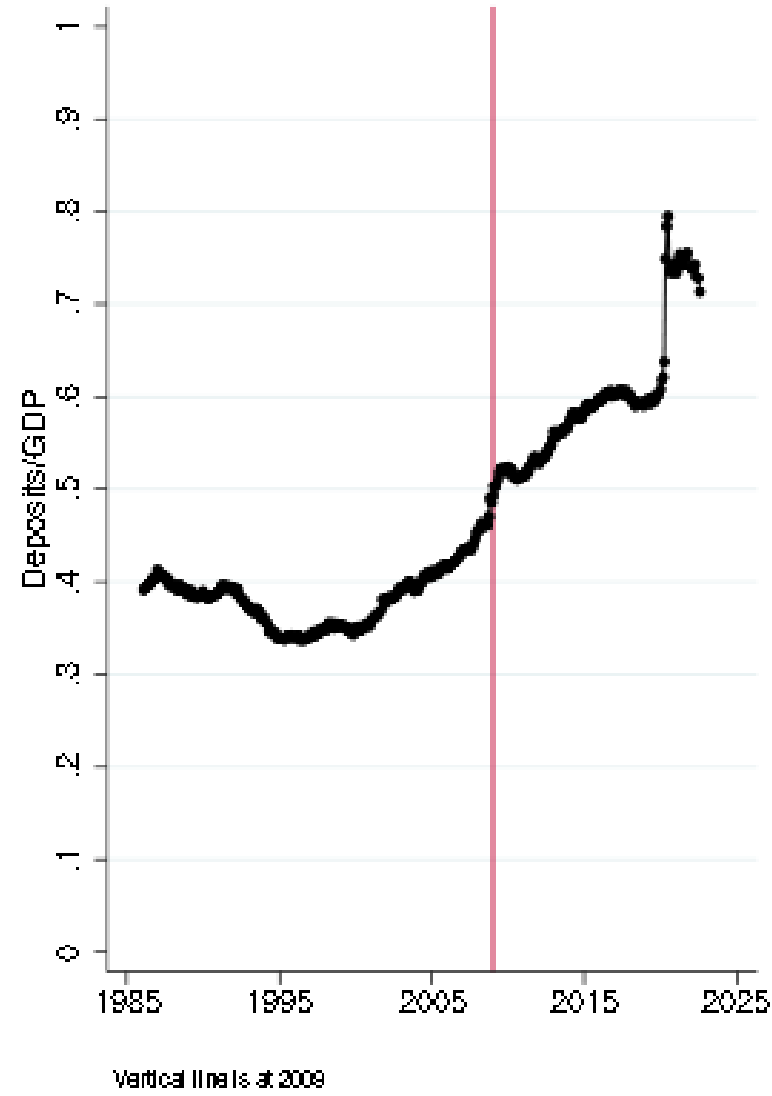
Reserve demand instability if deposits are not controlled for:





## 5. Magnitude: What are the constraints on QT?

Deposits went up materially over the 2009-2022 period:



## Additional slides: What are the financial stability innovations?

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**Standard financial stability tool:** Lender of last resort to solvent banks (depository inst.) to prevent runs (discount window)

### Financial stability innovations since pre-GFC:

- New/stronger macro-prudential policies:
  - **Lenders:** Capital (higher, countercyclical), liquidity
  - **Borrowers:** Loan-to-value, debt-service-to-income
- New tools to deal with larger role for funds and foreigners in funding borrowing
  - And perhaps more constrained intermediaries due to high bond issuance and increased regulation

|  | Old world                          | New world  |
|--|------------------------------------|--|
| Firms, households, even governments borrow via | Banks who are funded with deposits | Funds (mutual funds, MMFs, hedge funds) and foreigners (banks and central banks)   |
| Central bank role                              | Lender-of-last-resort to banks     | <p><b>In crisis: Fund it, stop it, or buy it!</b></p> <p>Expanded lender-of-last-resort to banks, dealers for them to buy of assets sold by others</p> <ul style="list-style-type: none"> <li>• Primary Dealer Credit Facility</li> <li>• Money Market Mutual Fund Liquidity Facility</li> <li>• Term Asset-Backed Securities Loan Facility</li> <li>• Standing Repo Facility</li> </ul> <p>Dollar funding: To prevent selling of dollar assets</p> <ul style="list-style-type: none"> <li>• Dollar swap lines (for central banks who online to banks)</li> <li>• FIMA Repo Facility (for central banks)</li> </ul> <p>Buyer/dealer-of-last-resort of underlying assets:</p> <ul style="list-style-type: none"> <li>• Medium/long maturities: <ul style="list-style-type: none"> <li>• <b>QE for financial stability reasons</b></li> </ul> </li> <li>• Short maturities: Commercial Paper Funding Facility</li> </ul> |