Central Banking, Intermediary Constraints, and the Dollar

Wenxin Du

Chicago Booth and FRBNY

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The views expressed in this presentation are those of the authors and not those of the Federal Reserve Bank of New York or the Federal Reserve System.

Introduction

- Since the GFC, major central banks have adopted unconventional monetary policy, rewriting monetary policy 101.
- Meanwhile, regulatory reforms, such as the Basel III and the Dodd-Frank Act, significantly tightened balance sheet constraints of financial intermediaries.
- The price of the dollar liquidity depends not only on the monetary policy, but also dealers' balance sheet constraints.
- Understanding the "wedges" has important implications for monetary policy implementation and transmission and financial stability.

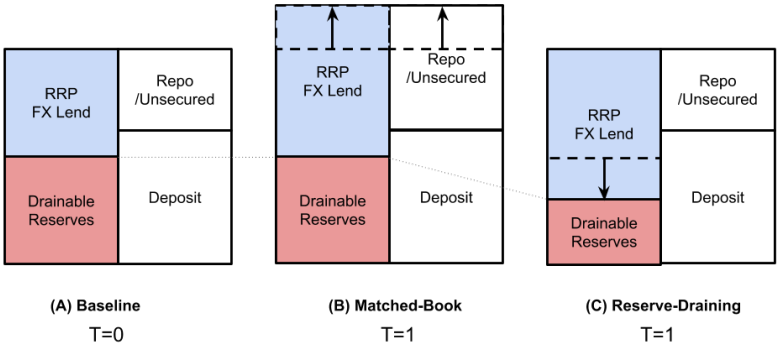
Outline

1. Bank Balance Sheet Constraints and the Supply of Dollar Liquidity
2. Price of Dollar Liquidity Under Ample Reserves
3. Price of Dollar Liquidity Under Scarce Reserves

1. Bank Balance Sheet Constraints and the Supply of Dollar Liquidity

Two types of Dollar Liquidity Provision

- **Matched-book** vs. **Reserve-draining**

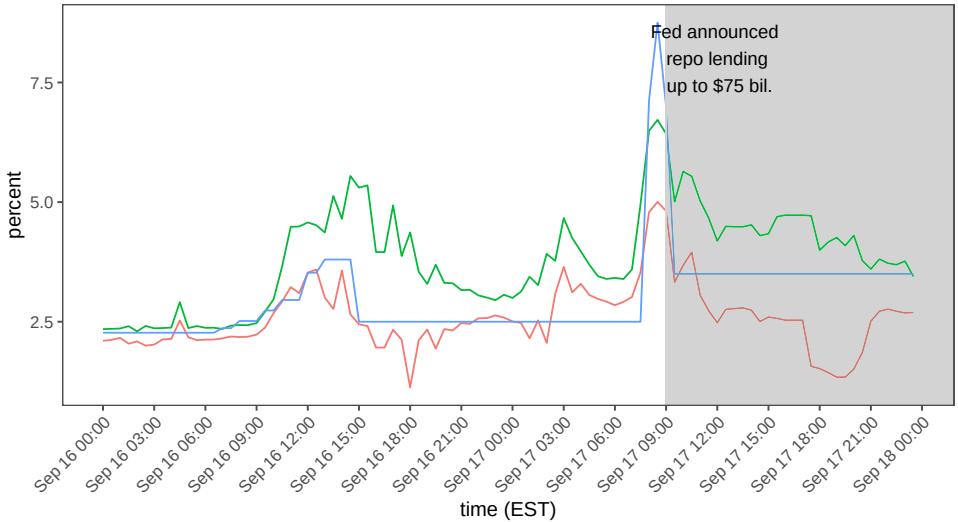


Source: Correa, Du and Liao (2020)

- Matched-book intermediation constrained by total leverage.
- Reserve-based intermediation constrained by considerations regarding balance sheet composition.

Repo and FX Swap Markets Trade Closely

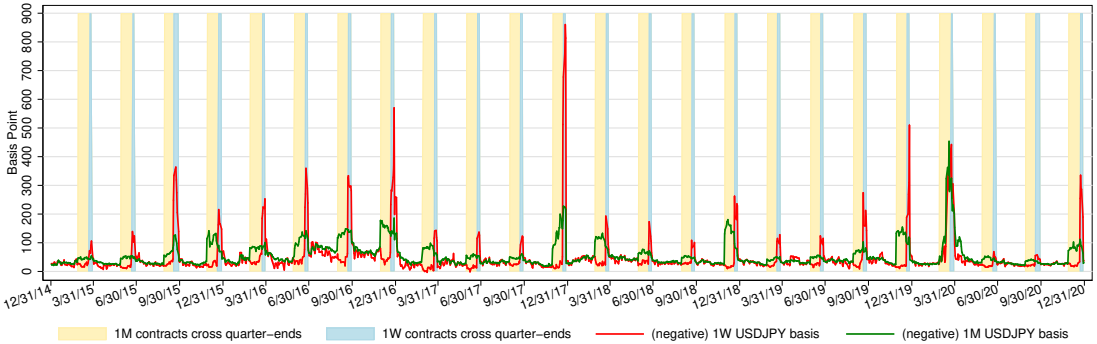
- September 16-17, 2019: repo and FX swap market moved in lockstep (Correa, Du and Liao, 2020)



#1) Constraints on the Size of Bank Balance Sheet:

- Non-risk-weighted capital rules (Basel III LR and the SLR) require banks to maintain capital against all assets, regardless of their risk exposure.
  - Matched book dollar intermediation expand the size of bank balance sheets and make the LR requirement more binding.
- GSIB-capital surcharge: In particular, FX swap activities raise several components of GSIB-score.
- Non-U.S. banks deleverage on quarter-ends, resulting in quarter-end spikes in repo spreads and CIP deviations.
  - Year-end worse than quarter-ends in recent years since the G-SIB surcharge.

Price Evidence of Total Leverage Constraints

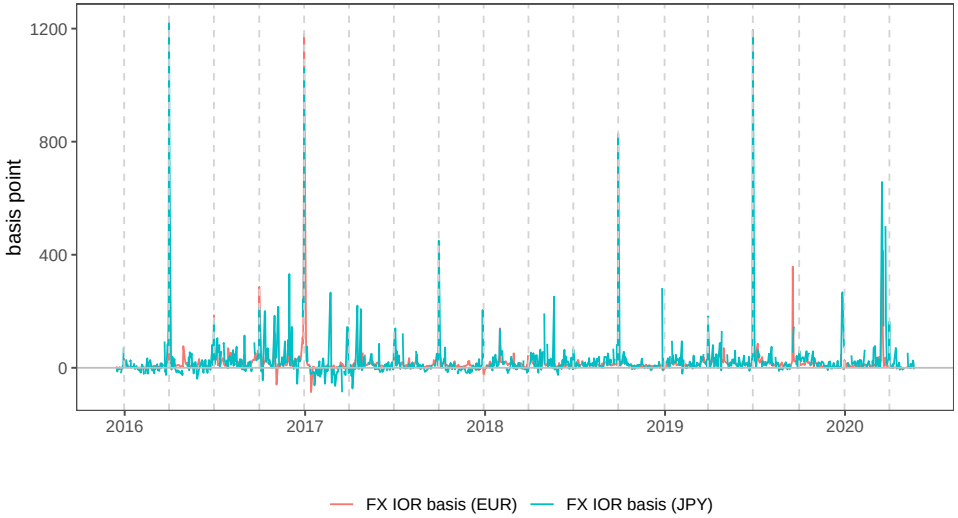


Du, Tepper, and Verdelhan (2018) updated

#2) Constraint on the Composition of Bank Balance Sheets

- Reserve-based intermediation is limited by banks' considerations of intraday liquidity and how liquidity can be allocated across material entities and jurisdictions.
  - Reserves have better intraday liquidity than repo and FX swap lending (e.g. Copeland, Duffie and Yang, 2020).
  - Resolution planning rules require U.S. G-SIBs to hold sufficient amount of liquidity in material entities at the time of bankruptcy filing to ensure a successful resolution. Banks might prefer to keep liquidity inside the US as opposed to leave it at the ECB/BOJ (Correa, Du and Liao, 2021).

Price Evidence of Balance Sheet Composition Constraints



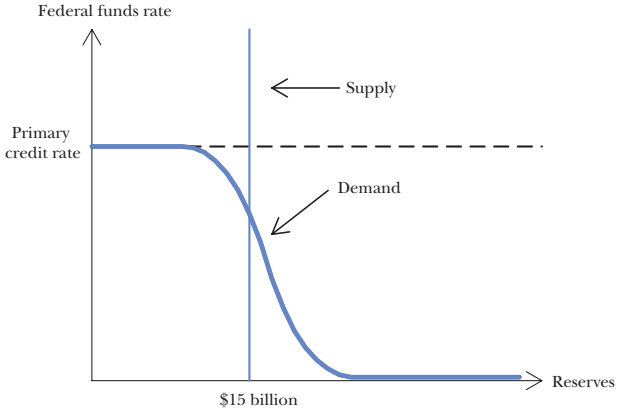
Correa, Du and Liao (2021)

2. Price of Dollar Liquidity Under Ample Reserves: IOR Arbitrage

Fed Funds Rates Pre-GFC

Figure 1

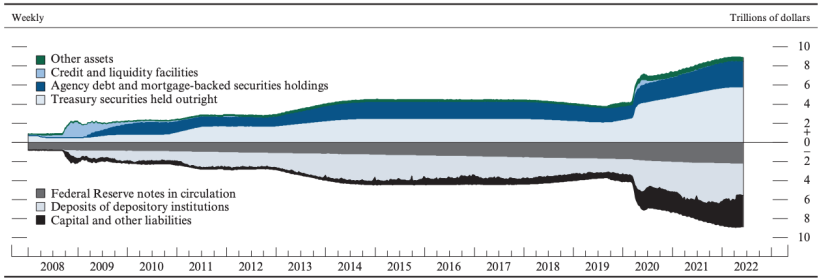
Banks' Demand for and the Fed's Supply of Reserve Balances before the Financial Crisis



Source: Ihrig, Meade, Weinbach (JEP, 2015)

Evolution of the Federal Reserve Balance Sheet

46. Federal Reserve assets and liabilities



NOTE: "Other assets" includes repurchase agreements, FIMA (Foreign and International Monetary Authorities) repurchase agreements, and unamortized premiums and discounts on securities held outright. "Credit and liquidity facilities" consists of primary, secondary, and seasonal credit; term auction credit; central bank liquidity swaps; support for Maiden Lane, Bear Stearns Companies, Inc., and AIG; and other credit and liquidity facilities, including the Primary Dealer Credit Facility, the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility, the Commercial Paper Funding Facility, the Term Asset-Backed Securities Loan Facility, the Primary and Secondary Market Corporate Credit Facilities, the Paycheck Protection Program Liquidity Facility, the Municipal Liquidity Facility, and the Main Street Lending Program. "Agency debt and mortgage-backed securities holdings" includes agency residential mortgage-backed securities and agency commercial mortgage-backed securities. "Capital and other liabilities" includes reverse repurchase agreements, the U.S. Treasury General Account, and the U.S. Treasury Supplementary Financing Account. The key identifies shaded areas in order from top to bottom. The data extend through June 8, 2022.

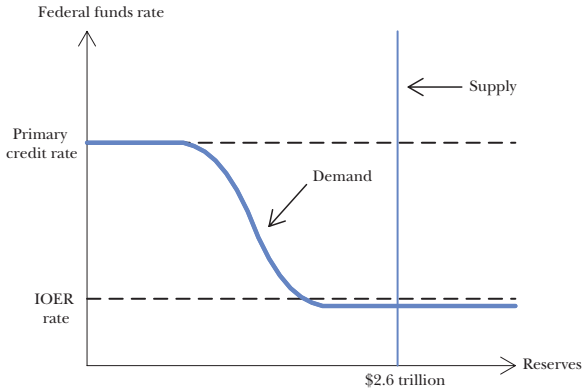
SOURCE: Federal Reserve Board, Statistical Release H.4.1, "Factors Affecting Reserve Balances."

Source: Monetary Policy Report, July 2022

Fed Funds Rates Post-GFC (w/o ONRRP)

Figure 4

Banks' Demand for and the Fed's Supply of Reserve Balances Today



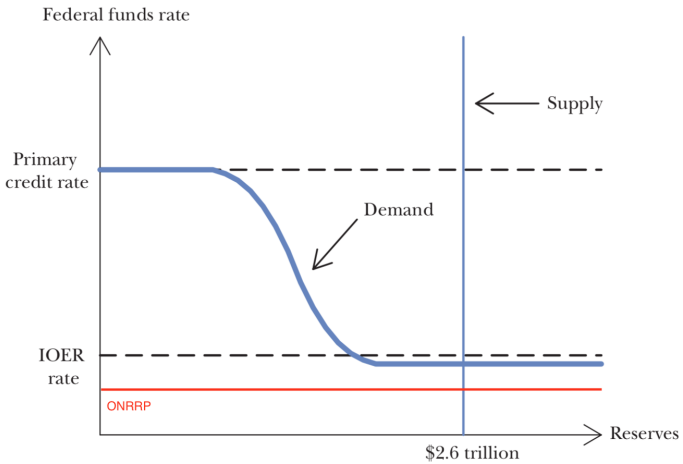
Source: Authors.
Note: IOER = interest on excess reserves.

Source: Ihrig, Meade, Weinbach (JEP, 2015)

ONRRP as the Floor

Figure 4

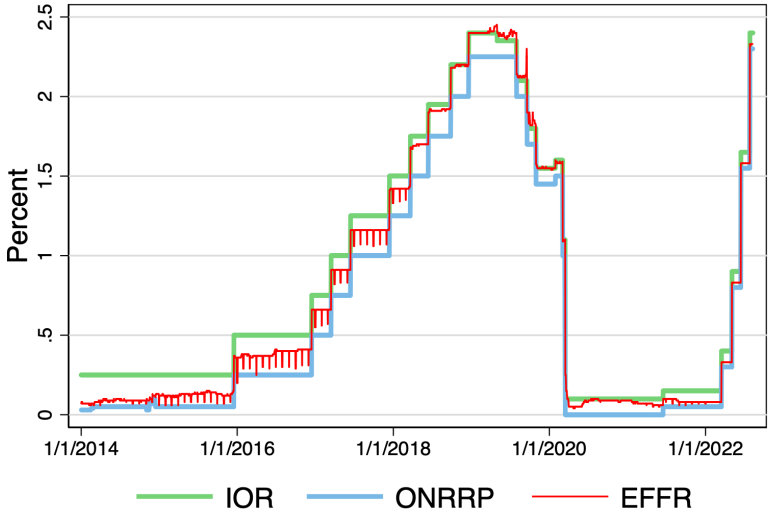
Banks' Demand for and the Fed's Supply of Reserve Balances Today



Source: Authors.
Note: IOER = interest on excess reserves.

Money Market Rates Under IOER and ONRRP

Figure 1: IOR, ONRRP and EFFR

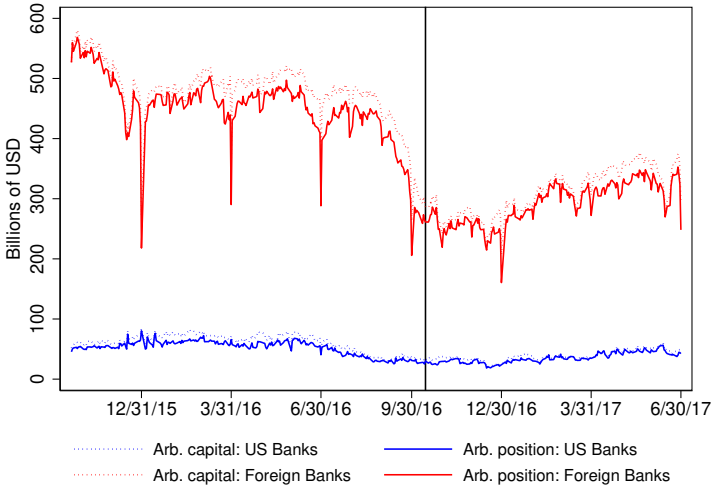


Source: FRED

Why do Private Money Market Rates Trade Below IOER?

- Money market segmentation: cash-rich lenders, such as the federal home loan banks (FHLBs), do not have access to the IOER, so are willing to lend at a rate below the IOER.
- **IOER-arbitrage:** banks can borrow at the lower private money market rates, and then park the dollars at the Fed earning the IOER.
- Bank balance sheet constraints act as limits to the arbitrage
  - IOER-arbitrage expands the size of bank balance sheet, making the leverage ratio constraint more binding.
  - IOER-arbitrage increases the FDIC deposit assessment base, so U.S. banks have to pay the FDIC insurance fee on the arbitrage.
  - Foreign branches do not pay the FDIC fee and face a lower leverage ratio requirement, and account for the bulk of the IOER arbitrage activities.

Estimated IOER Arbitrage Position



Source: Anderson, Du and Schlusche (2021)

Liquidity Shock Under Ample Reserves

- Case study: The 2016 U.S. MMF Reform resulted in a $700 billion loss of unsecured wholesale funding for foreign banks from prime MMFs.
- FBOs simply cut back IOR arbitrages without contracting credit supply.

Figure 2: Prime Fund Funding vs. Reserves

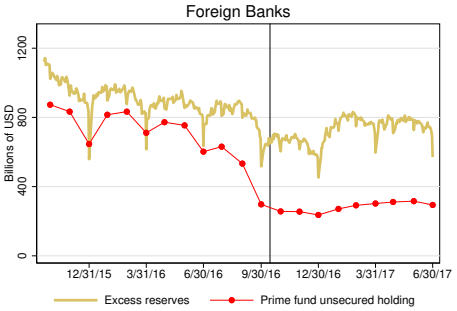
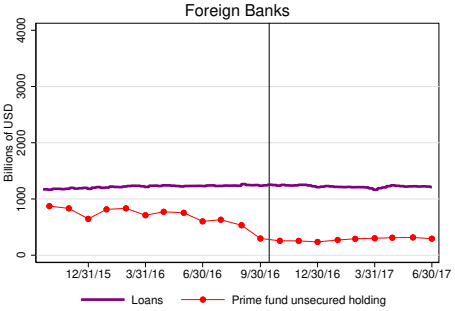


Figure 3: Prime Fund Funding vs. Loans

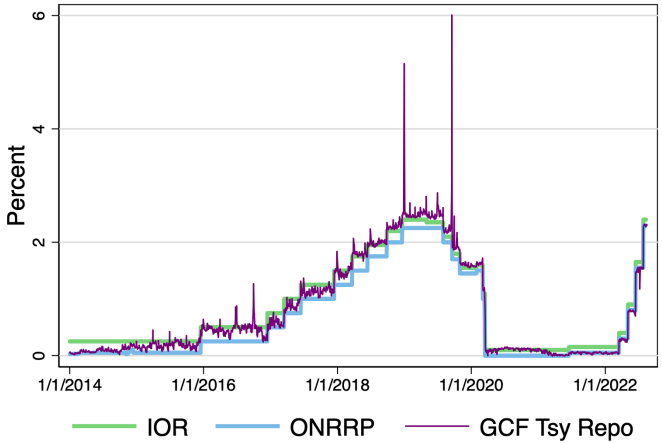


Source: Anderson, Du and Schlusche, 2021

3. Price of Dollar Liquidity Under Scarce Reserve Reserves

Price of Liquidity in the Scarce Reserves Regime

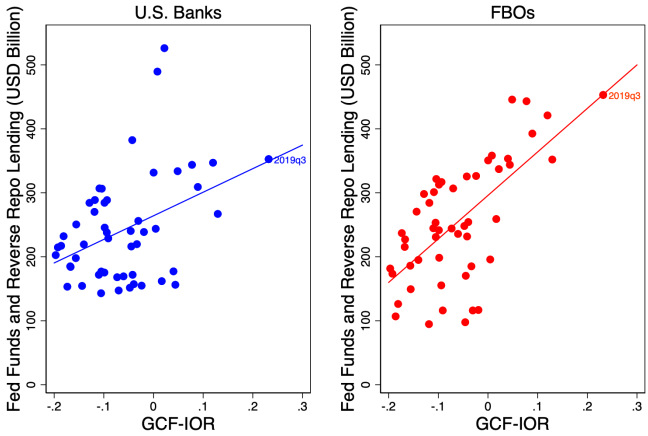
Figure 4: IOR, ONRRP and GCF Tsy Repo



Source: FRED and DTCC

Repo Lending and Intermediation Spreads

Figure 5: Repo Lending vs. GCF-IOR Spread

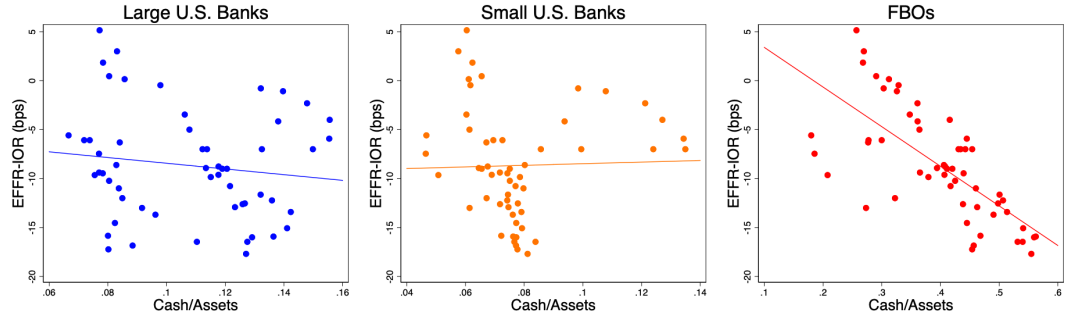


Source: FRB H.8.

Source: Du (2022) JH Remarks

Reserves vs. Price of Dollar Liquidity

Figure 6: The EFFR-IOR Spread and Reserves/Total Assets (2009Q1-2022Q2)

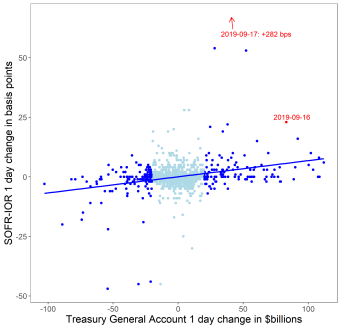


Source: Du (2022) JH Remarks

Liquidity Shock Under Scarce Reserves

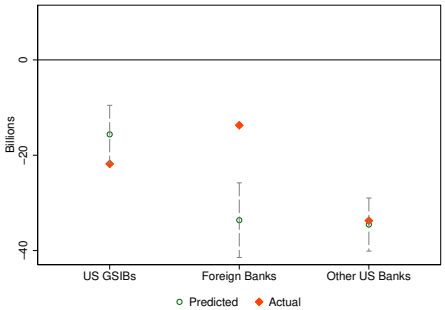
- When the aggregate reserve level becomes too low, banks may be reluctant to drain reserves further. The price of liquidity can spike in response to funding demand shocks.

Figure 7: Repo Spread vs. TGA Balance



Source: Correa, Du and Liao, 2022

Figure 8: Predicted vs. Actual Reserve Draining on September 16, 2019



Source: Correa, Du and Liao, 2022

Back to Abundant Reserves (post-March 2020)

Figure 9: IOER-FF Spread

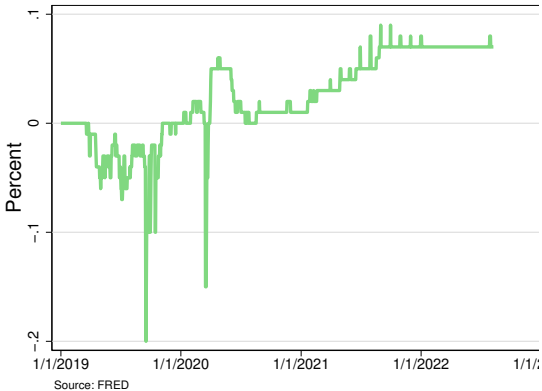
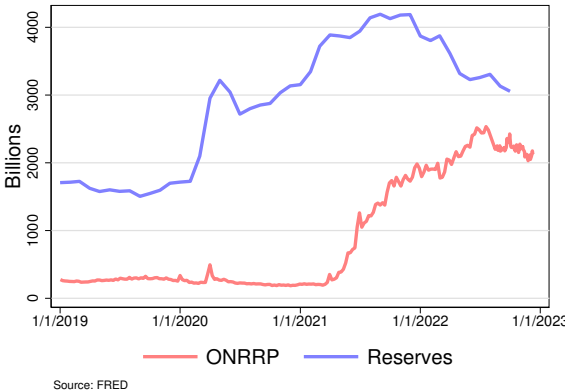


Figure 10: Reserves and ONRRP Take-Up



Tools To Address Future Dollar Funding Shortage

- Cash at the ONRRP
- Central bank swap lines
- Standing repo facility
- FIMA repo
- SLR and other regulatory relief

Conclusion

- Textbook risk-free arbitrages persist post-GFC due to intermediary balance sheet constraints.
- Monetary policy implementation and transmission are closely linked to intermediary balance sheet constraints:
  - In the ample/abundant reserves regime, money market rates have downside risks if the supply of reserves is greater than banks' balance sheet space to do the IOR arbitrage. Large take-ups in the ONRRP help relieve the balance sheet constraint.
  - In the scarce reserves regime, money market rates have upside risks if the supply of reserves is lower than banks' demand for reserves arising from regulations or risk management motives.