Commentary: Bank Balance Sheet Constraints at the Center of Liquidity Problems

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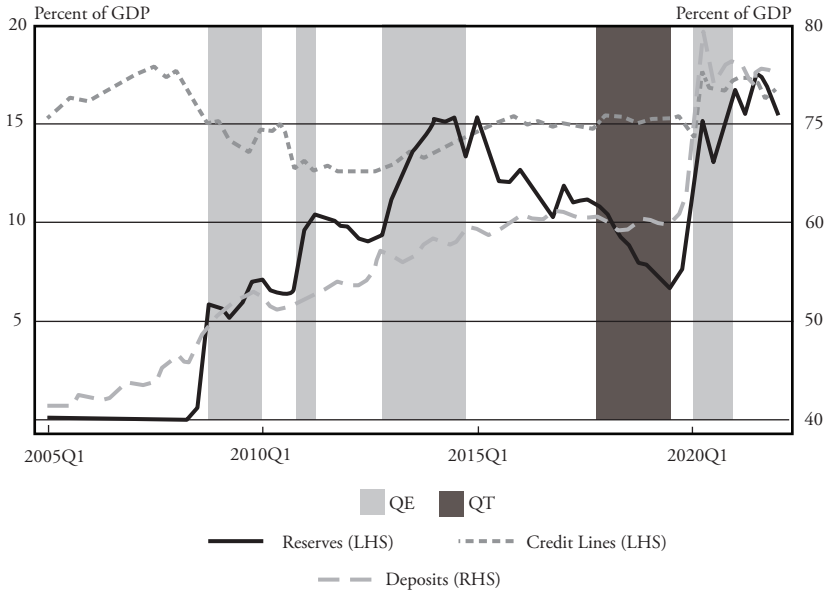
The paper by Acharya, Chauhan, Rajan, and Steffen (2022) establishes an important empirical finding that short-term demandable deposits and bank credit lines rise during quantitative easing (QE), but do not shrink during quantitative tightening (QT) (Chart 1). The key message of the paper is that the financial sector can be more prone to liquidity shocks during a tightening cycle post-QE due to a deterioration in banks' own liquidity profiles.

While any potential liquidity mismatch emerging from the banking sector is of great concern, it is important to acknowledge that banks overall liquidity profile has improved significantly post-global financial crisis (GFC) due to Basel III liquidity regulations. I would like to argue that the center of the liquidity problem within the financial system today may be less of banks own liquidity mismatch, but more of banks' balance sheet constraints that limit their ability to intermediate the liquidity needs of others. In particular, I will illustrate the importance of bank balance sheet constraints for liquidity conditions and policy implementation through a rather niche player in the financial market: foreign banking organizations (FBOs) in the U.S.

Chart 1
Reserves, Deposits, and Credit Lines



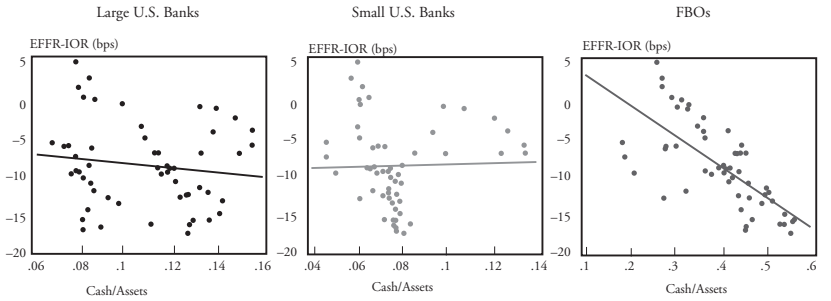
Source: FRB H.4.1 and H.8, FDIC

I. Reserves vs. Price of Liquidity and the Role of FBOs

A key motivating fact in the paper is that there is no robust relationship between aggregate reserves and the price of liquidity, measured by the spread between the effective federal funds rate (EFFR) and the rate of interest on reserves (IOR) without adjusting for deposits or credit lines. However, if we split the aggregate reserves into reserves held by large U.S. banks, small U.S. banks, and foreign branches and agencies in the U.S. (Chart 2), we can see that there is in fact a strongly negative relationship between reserves and the price of liquidity for FBOs without using information on deposits or credit lines. When FBOs' reserves relative to their total assets become larger, the EFFR-IOR spread becomes more negative.

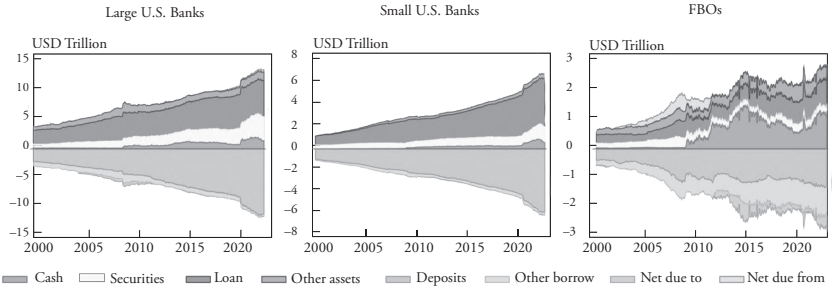
As illustrated in Chart 3, the FBOs have very distinct balance sheets compared to U.S. banks. Overall, FBOs' balance sheets are smaller, more scalable, and more liquid. They have a significantly higher share of reserves and a significantly lower reliance on deposits, and almost no deposits sourced by the FBOs are insured by the Federal Deposit

Chart 2
EFFR-IOR Spread and Reserves Assets by Bank Type
(2009:Q1-2020:Q2)



Source: H.8 and FRED

Chart 3
Assets and Liabilities of Commercial Banks in the U.S.



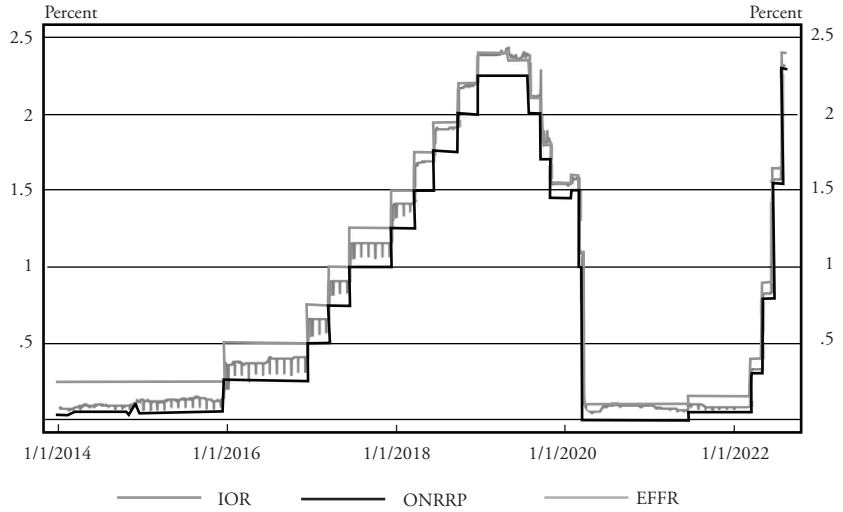
Source: FRB H.8

Insurance Corporation (FDIC). In addition, FBOs have large intraoffice positions, as they act as a key bridge between onshore dollar funding markets and offshore eurodollar markets. Overall, FBOs' heavy reliance on wholesale funding and their close connection with offshore dollar funding markets make them important marginal price setters for U.S. dollar liquidity.

II. Price of Liquidity in the Ample/Abundant Reserves Regime

When the supply of reserves is ample or abundant, the EFFR trades below the IOR (Chart 4). It may at first appear surprising that an unsecured private money market rate like the EFFR is traded below the IOR, the interest rate paid by the Federal Reserve (Fed). This happens because cash-rich lenders, such as the Federal Home

Chart 4
IOR, ONRRP, and EFFR

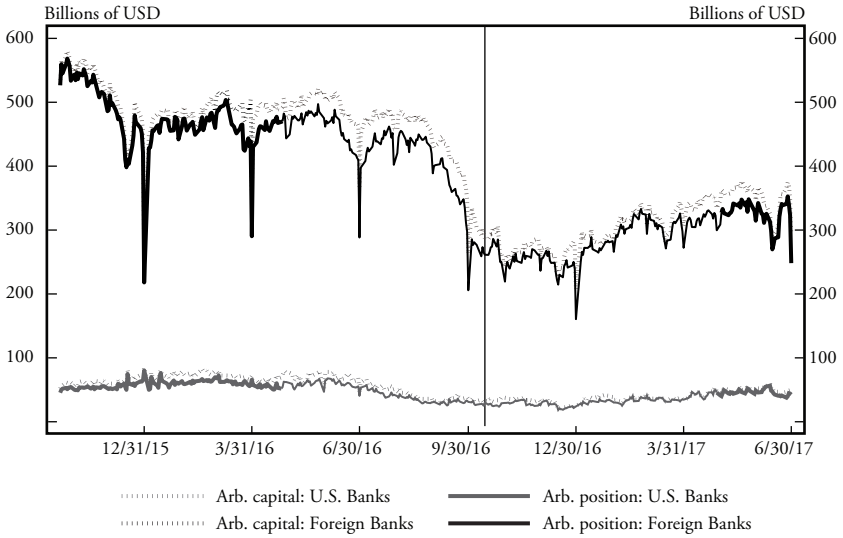


Source: FRED

Loan Banks (FHLBs), that do not have access to the IOR are willing to lend at a rate below the IOR. The existence of the cheap supply of cash gives rise to an arbitrage opportunity for banks, known as IOR arbitrage. Banks simply borrow from the cash-rich lenders at a lower rate, and park the money at the Fed, earning a higher rate. While IOR arbitrage is a textbook risk-free arbitrage, banks may not have enough balance sheet space to scale up this arbitrage to eliminate the gap between private money market rates and the IOR. When the reserves are not exempted from the Basel III leverage ratio calculation, IOR arbitrage expands the size of bank balance sheets and makes the leverage ratio constraint more binding.

FBOs have comparative advantages in engaging in IOR arbitrage due to differences in regulations. First, the leverage ratio requirement for U.S. banks in the form of the supplementary leverage ratio is tighter than the standard Basel III requirement. Second, U.S. banks pay additional FDIC insurance fees on their total assets, which erodes the profits of the IOR arbitrage. FBOs are not FDIC insured, and therefore do not pay the fee. According to estimates from Anderson, Du, and Schlusche (2021), shown in Chart 5, foreign banks indeed account for the bulk of IOR arbitrage activities. Therefore,

Chart 5
Estimated IOR Arbitrage Position by Bank Type



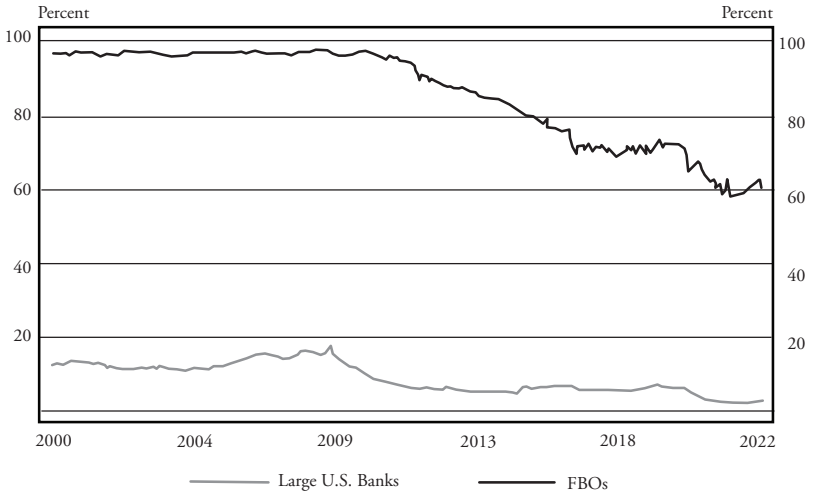
Source: Anderson, Du, and Schlusche (2021).

the IOR-EFFR spread during the ample reserves regime effectively reflects the shadow cost on the FBOs' balance sheets associated with IOR arbitrage.

The IOR arbitrage positions accumulated during QE provide an example of the potential liquidity concern outlined in the paper, as these positions are largely funded by overnight unsecured wholesale funding. As shown in Chart 6, the ratio of large time deposits to total deposits for FBOs declined from 95 percent pre-GFC to the current level of 60 percent. All FBO deposits are uninsured (Chart 7). Therefore, a key question is whether banks can withstand large funding withdrawals given that the liabilities have become shorter term and more runnable.

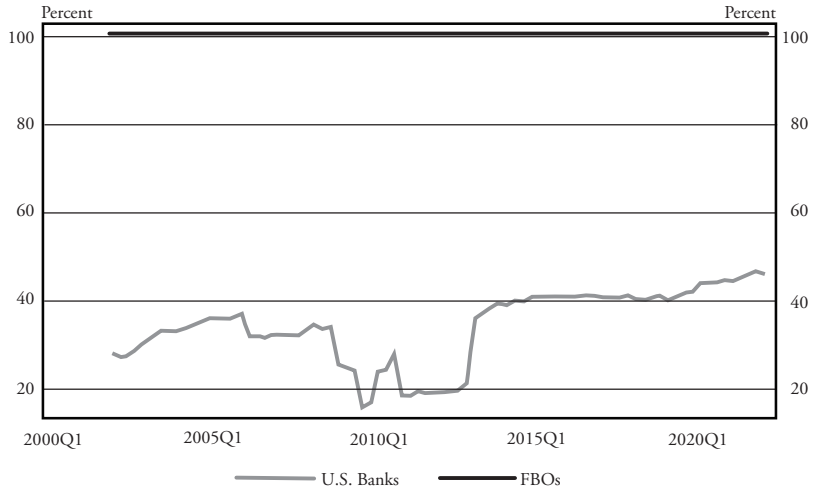
Drawing on the experience from a large negative wholesale funding shock due to the 2016 U.S. money market fund (MMF) reform, during which foreign banks lost about $700 billion in unsecured funding from prime MMFs, we have reasons for optimism. The large funding loss, more so than the loss during the peak of the GFC and the European debt crisis, did not translate into contraction in credit

Chart 6
Share of Large Time Deposits



Source: FRB H.8

Chart 7
Share of Uninsured Deposits



Source: FRB Z.1 L111 and L. 112

supply or elevated financial distress (Chart 8). Instead, foreign banks simply scaled back their liquid arbitrage positions that rely on unsecured wholesale funding, including IOR arbitrage (Chart 9).

II. Price of Liquidity in the Scarce Reserves Regime

When reserves become scarce, private money market rates are generally traded above the IOR, and IOR arbitrage is no longer profitable. Large banks, however, can engage in another money market intermediation activity by draining excess reserves to finance short-term lending, especially in the repo market. During 2018-2019, the second half of the previous round of QT, the Treasury repo rate (for example, the GCF rate) consistently traded above the IOR (Chart 10). Furthermore, banks' repo lending activities increased as the GCF-IOR spread widened (Chart 11).

The willingness and ability of banks to use reserves to lend in private money markets once again depends on banks' balance sheet constraints, this time over the composition of short-term claims, as opposed to the overall size of the balance sheet. These constraints can arise both from regulations and from self-imposed risk management practices. For example, the intraday liquidity constraint may require banks to hold a sufficient level of reserves for intraday payment needs (Copeland, Duffie and Yang, 2021), and therefore, banks cannot lend out more reserves into the repo market, where the liquidity will be locked at least for the overnight duration. Banks may also face constraints when it comes to the distribution of liquidity across entities and jurisdictions. Lending out reserves into repo and foreign exchange swap markets reduces liquidity held by U.S. commercial bank subsidiaries and increases liquidity held by broker-dealer subsidiaries or foreign subsidiaries. Such redistribution of liquidity may not always be feasible due to constraints including the resolution planning rules (Correa, Du and Liao, 2022).

When the overall reserves level becomes too low relative to banks' demand for reserves for the reasons outlined above, short-term money markets become impaired. This is evidenced by a large spike in the repo rate in September 2019, when reserves reached their multiyear low after the 2017-2019 QT.

Chart 8
Prime Fund Funding vs. Loans

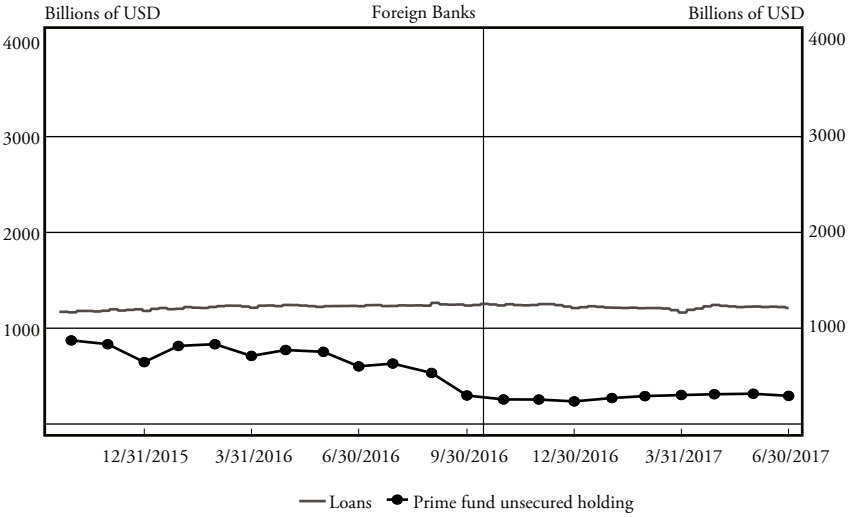
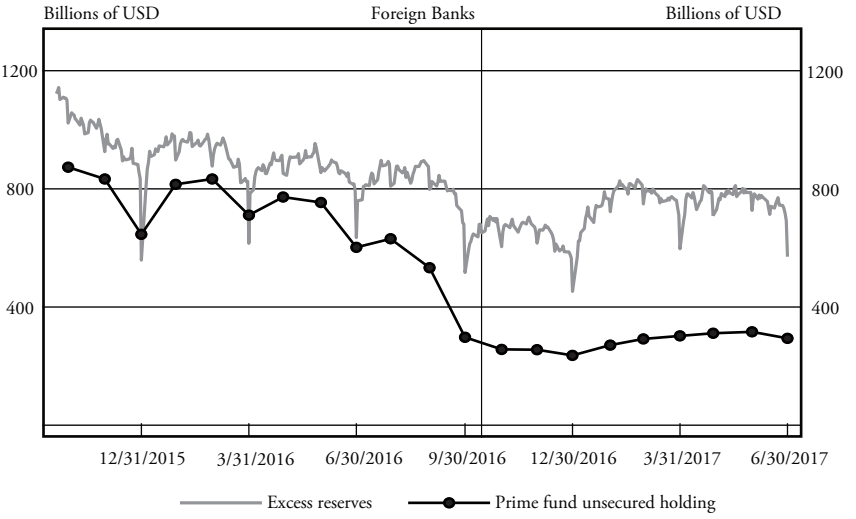
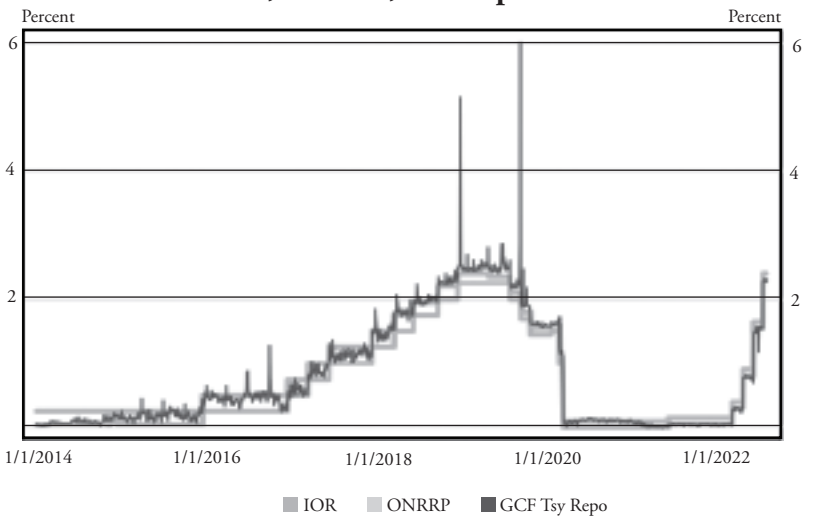


Chart 9
Prime Fund Funding vs. Reserves



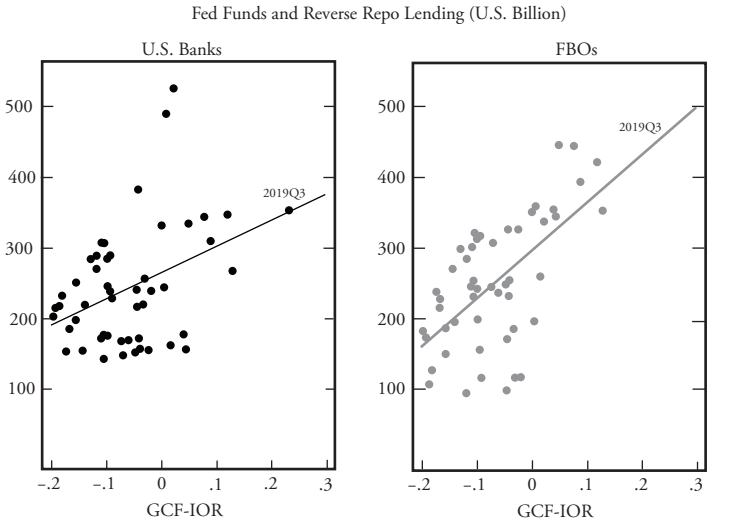
Source: Anderson, Du and Schlusche (2021).

Chart 10
IOR, ONRRP, and Repo Rate



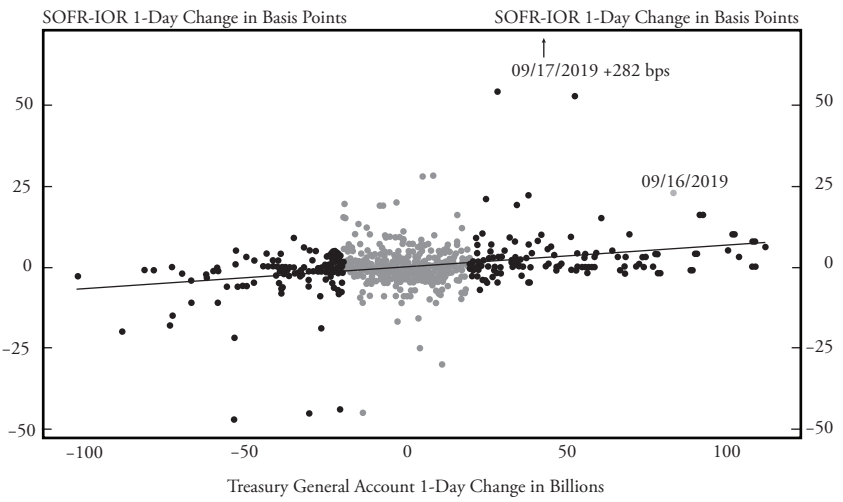
Source: FRED and DTCC

Chart 11
Repo Lending vs. GCF-IOR Spread



Source: FRB H.8.

Chart 12
Repo Spreads vs. TGA Balance

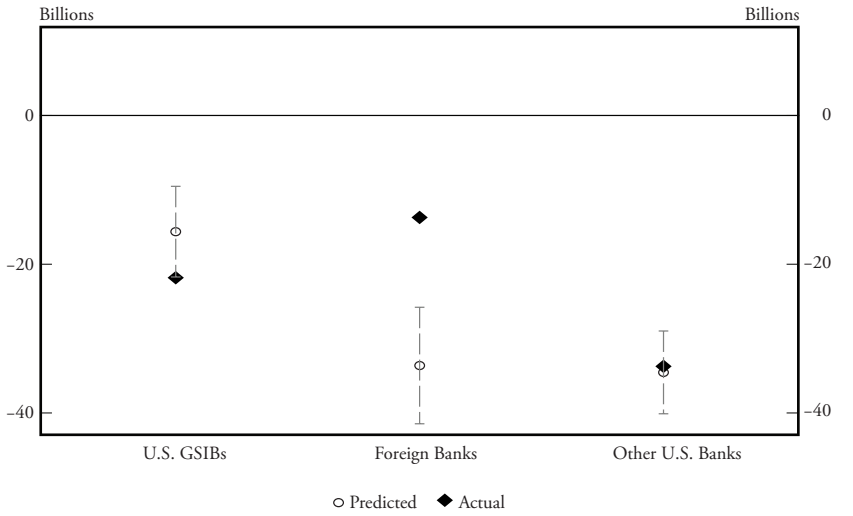


Source: Correa, Du, and Liao (2021).

As shown in Chart 12, on Sept. 16-17, 2019, the repo spread increased significantly beyond its usual fluctuations with respect to some key demand shifters, such as changes in the Treasury General Account balance. In particular, foreign banks appeared to have under-drained their reserves on Sept. 16, 2019, by $20 billion (Chart 13), which could suggest that they reached their lowest comfortable level of reserves before the demand shock.

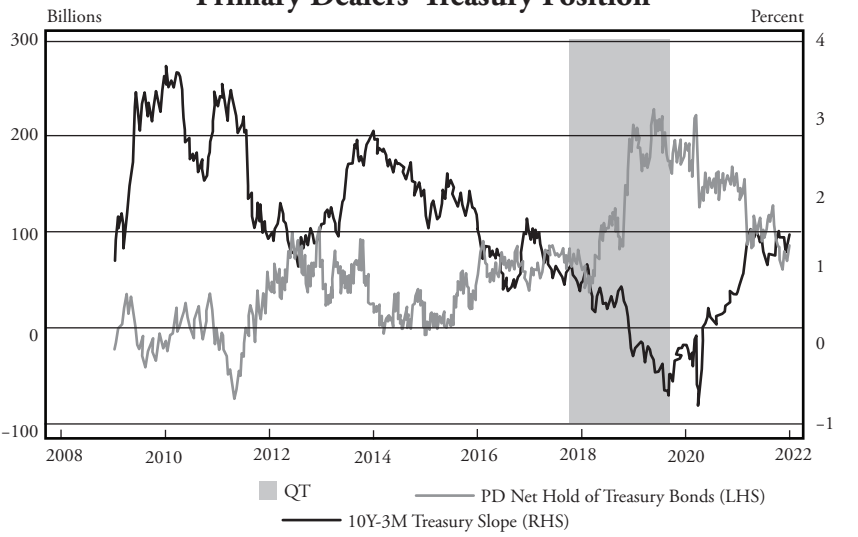
Finally, I also would like to highlight that the growing repo funding needs to finance Treasury bonds can add additional liquidity strains during the QT process. As shown in Charts 12-13, during the previous QT between 2017 and 2019, primary dealers and levered investors increased their holdings of Treasury bonds by about $600 billion. This happened because of the Fed balance sheet runoff and real-money investors' lukewarm demand for Treasury bonds with an inverted Treasury yield curve. Unlike real-money investors' holdings, dealers' and levered investors' holdings of Treasury bonds need to be financed via repo markets, which add pressure to dealer balance sheets and demand for short-term liquidity.

Chart 13
Predicted vs. Actual Reserve Draining on Sept. 16, 2019



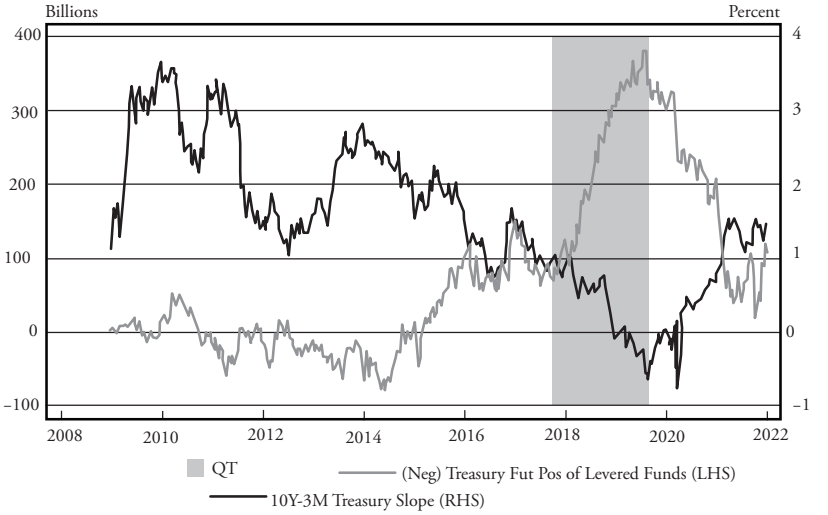
Source: Correa, Du, and Liao (2021).

Chart 14
Primary Dealers' Treasury Position



Source: Hébert, Du, and Li (2022).

Chart 15
Implied Relative-Value Levered Investors' Treasury Position



Source: Hébert, Du, and Li (2022).

III. Conclusions

To conclude, I argue that banks' balance sheet constraints are at the center of liquidity problems post-GFC. What happened during the recent liquidity crises in September 2019 and March 2020 was less about large banks' own scrambling for liquidity, but more about their reluctance to step up to intermediate in dysfunctional financial markets.

In an ample/abundant reserves regime, money market rates have downside risks if the supply of reserves is greater than banks' balance sheet space to engage in IOR arbitrage. In a 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. The overnight reverse repo facility at the Fed can help relieve banks' balance sheet constraints during abundant reserves and maintain ample reserves during the QT.

The good news is that various intermediation fees and banks' intermediation activities available at high frequency can help policy makers monitor liquidity excess and strains in real time. Understanding the regulations and plumbing of financial markets is undoubtedly of first-order importance for monetary policy.

References

Anderson, Alyssa, Wenxin Du, and Bernd Schlusche. 2021. "*Arbitrage Capital of Global Banks*." NBER Working Paper No. 28658.

Copeland, Adam, Darrell Duffie, and Yilin Yang. 2021."R*eserves Were Not So Ample After All*." NBER Working Paper No.29090.

Correa, Ricardo, Wenxin Du, and Gordon Liao. 2021. "*U.S. Banks and Global Liquidity*." NBER Working Paper No. 27491.

Du, Wenxin, Benjamin Hébert, and Wenhao Li. 2022. "*Intermediary Balance Sheets and the Treasury Yield Curve*." NBER Working Paper No.30222.