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TECHNICAL NOTE—SYSTEMIC RISK OVERSIGHT AND SYSTEMIC LIQUIDITY

This Technical Note on Systemic Risk Oversight and Systemic Liquidity for the United States FSAP was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed in July 17, 2020.

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TECHNICAL NOTE

SYSTEMIC RISK OVERSIGHT AND SYSTEMIC LIQUIDITY

Prepared By
Monetary and Capital Markets Department

This Technical Note was prepared in the context of an IMF Financial Sector Assessment Program (FSAP) mission in the United States held during February–March 2020 led by Ms. Michaela Erbenová. It has been factually updated to incorporate COVID-19-related events in March and April 2020. It contains technical analysis and detailed information underpinning the FSAP's findings and recommendations. Further information on the FSAP program can be found at http://www.imf.org/external/np/fsap/fssa.aspx

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Glossary

ANC	Alternative Net Capital rule for broker dealers
ARRC	Alternative Reference Rates Committee
BD	Broker Dealer
BNYM	Bank of New York Mellon
CCP	Central Counterparty
CCyB	Countercyclical Capital Buffer
CFPB	Consumer Financial Protection Bureau
CFTC	Commodity Futures Trading Commission
CLO	Collateralized Loan Obligation
DERA	SEC Department of Economic Research and Analysis
DFA	Dodd-Frank Wall Street Reform and Consumer Protection Act
DVP	Delivery-versus-Payment
Fed	The Federal Reserve System
FHFA	Federal Housing Finance Agency
FHLB	Federal Home Loan Bank
FICC	Fixed Income Clearing Corporation
FINRA	Financial Industry Regulatory Authority
FMI	Financial Market Infrastructure (referred to as an FMU in the United States)
FMU	Financial Market Utility
FOMC	Federal Open Market Committee
FRA	Federal Reserve Act
FRB	Board of Governors of the Federal Reserve System
FRBNY	Federal Reserve Bank of New York
FRP	FRBNY Foreign Repo Pool
FSAP	Financial Sector Assessment Program
FSOC	Financial Stability Oversight Council
FX	Foreign Exchange
GCF	FICC General Collateral Finance repo
GFC	Global Financial Crisis
GSE	Government Sponsored Enterprise
GSIB	Globally Systemically Important Bank
HQLA	High Quality Liquid Asset
IDTA	Independent Dealer and Trader Association
IMF	International Monetary Fund
IOER	Interest on Excess Reserves
JPMC	JP Morgan
LCR	Liquidity Coverage Ratio
LIBOR	London Interbank Offered Rate
MMF	Money Market Fund
MoU	Memorandum of Understanding

OFR	FSOC Office of Financial Research
OMO	Open Market Operations
ONRRP	Overnight Reverse Repo facility
REPO	Repurchase Transaction
SBSD	Security Based Swaps Dealer
SCB	Financial Stress Capital Buffer
SEC	Securities and Exchange Commission
SLR	Supplementary Leverage Ratio
SOFR	Secured Overnight Financing Rate
SOMA	Federal Reserve System Open Market Account
SRC	FSOC Systemic Risk Committee
TGA	Treasury General Account
TT&L	Treasury Tax and Loan account program
U.S.	United States

EXECUTIVE SUMMARY

The heterogeneity of the United States (U.S.) financial markets and complex regulatory and supervisory institutional setup in the United States underscore the importance of enhancing systemic risk oversight and building effective macroprudential tools. An effective framework would encompass identification and prioritization of system-wide risks and vulnerabilities to spur timely policy action. Structures that ensure interagency sharing of information, identify possible emerging regulatory gaps, obtain a good overview of systemic risks, and develop a cooperative framework to address identified threats to financial stability would be necessary components of such a framework. This Technical Note reviews those processes in the United States, as well as examining the issues of systemic liquidity.

The Financial Stability Oversight Council (FSOC) plays the key role in identifying threats to U.S. financial stability and coordinating a response of member agencies. The FSOC annual report provides a comprehensive discussion of the financial risk landscape with particular attention to structural vulnerabilities. The Financial Stability Report issued by the Board of Governors of the Federal Reserve System (FRB) is a welcome and complementary addition to communication of financial stability concerns while the Office of Financial Research's (OFR) annual report provides high quality analysis. FSOC communication and effectiveness could be improved through the release of more detailed minutes and improved traceability of actions taken to address identified vulnerabilities.

Further measures could be considered to improve FSOC effectiveness. Each member should have an explicit objective to promote financial stability as it relates to the individual's work on the FSOC. While it's clear that members have internalized the importance of financial stability analysis, mandates should be robust to changes in personnel and over time. The state-based insurance sector is not represented by a member who has authority to take supervisory action, and as such, consideration could be given to make the State Insurance Commissioner representative a voting member of the Council. Significant data gaps remain, including those of collateralized loan obligations (CLOs) and repurchase transaction (repo) market activity, and it is important that efforts to close gaps be intensified. The Council has made improvements to data sharing through several interagency memorandums of understanding (MoUs).

The FSOC's final interpretive guidance now prioritizes an activities-based approach to identifying and addressing the financial stability risks in the nonbank sector. This approach, which still allows for designation of entities, is in line with international practices and has benefits over the previous entities-based approach. The FSOC should provide further detail on how the new activities-based approach will be operationalized.

The FSOC should encourage its members to prioritize the development of tools to address risks and vulnerabilities in the nonbank sector. Exposure of nonbanks to nonfinancial debt is elevated with no consensus on tools that could be used to address the buildup of risks. Reforms of housing finance (under consideration), provide an opportunity to embed macroprudential elements

into nonbank activities, while mutual fund liquidity stress tests could be used to mitigate risks from asset managers.

Tools to address structural vulnerabilities in the banking system are generally sufficient while coverage of the Countercyclical Capital Buffer (CCyB) should be extended to improve effectiveness. The FRB's implementation framework for the CCyB highlights the need for judgment while noting the risks of activating the CCyB could lead to migration of credit activity to banks that are not subject to the CCyB, or to nonbanks. For this reason, the FRB should consider expanding CCyB to category IV banks, which would increase the coverage from around 70 percent of banking sector assets to 80 percent.

A key structural driver of money markets has been the Federal Reserve System's (Fed) balance sheet changes. The Fed responded effectively to the spike in interest rates and volatility in September 2019 by restarting regular Open Market Operations (OMOs) and reversing some of the reduction in reserves that had occurred since 2014. Fewer reserves have revealed vulnerabilities caused by a nexus of a desirable tightening in the post-crisis regulatory framework and associated tighter bank liquidity risk management frameworks. Banks have tried to optimize their balance sheets leading to a heightened conservatism with a high aversion to borrowing from the Fed's Window, with a net effect of a less flexible and nimble set of large intermediaries who are less able/willing to provide liquidity when conditions tighten.

Market resilience was severely tested in the March–April COVID-19 crisis period but was backstopped by a plethora of timely Fed actions. The Fed took many steps in line with its history of responding to crises and consistent with the recommendations of this FSAP by quickly scaling up OMOs and outright purchases of securities, improving the terms and accessibility of the Discount Window, enhancing and widening its network of central bank foreign exchange (FX) swap lines, and deploying a range of old and new liquidity support programs aimed at backstopping money and securities markets. The initial experience suggests that market pressures were quickly contained.

Market resilience could be bolstered further if the Fed retains regular OMOs once conditions stabilize and gives banks a better basis to plan to access to the Discount Window to discourage reserves hoarding. Regular OMOs should continue as they provide liquidity certainty to markets and have been proven to be scalable and effective. The Discount Window could be made more attractive if banks were given a better basis for incorporating its use in liquidity planning for monetization of high-quality-liquid-collateral. Broadening the specification of the Fed's operational target to include repo rates would also reduce uncertainty.

The authorities and market participants should work together to address the sole provider vulnerability in the government securities settlement and triparty repo markets. Bank of New York (BNYM) plays a unique role in clearing and settlement, as well as conduct of Fed's repo OMOs. Focus should be on establishing robust and effective backup plans that could be used to preserve markets functioning in the unlikely event of BNYM problems. An option is to consider the possibility

of repo transactions settling across the Federal Reserve Bank of New York's (FRBNY) systems and accounts as is common internationally.

The Alternative Reference Rates Committee (ARRC) and the authorities have made great strides in delivering on the transition plan but more needs to be done. The end of London Interbank Offered Rate (LIBOR) is fast approaching and firms need to move from planning to transition to the Secured Overnight Financing Rate (SOFR), to actually moving their business. The authorities should play a more proactive role in ensuring that firms move business to the new benchmarks before the LIBOR cessation deadline with time-bound deadlines and firm targets.

Liquidity backstops would be bolstered if the Fed could lend bilaterally to designated systemically important nonbanks. The Fed's ability to provide bilateral liquidity support to an individual designated systemically important nonbank should be reinstated in the law. Additionally, the Fed's liquidity support tools could be enhanced if operational requirements for providing designated Central Counterparties (CCPs) were fully prepared and if procedures for providing FX liquidity support to both banks and nonbanks were better established.

Table 1. United States: Recommendations for Systemic Risk Oversight and Systemic Liquidity

Systemic Risk Oversight and Macroprudential Policies	Timing*	Agency
Improve traceability of actions taken to address identified vulnerabilities (¶12).	ST	FSOC
Ensure each FSOC member has an explicit financial stability objective in their mandate (¶13).	MT	Congress
Upgrade the State Insurance Commissioner member to a voting member (¶14).	MT	Congress
Intensify efforts to close data gaps, including reporting disclosures of holdings of CLOs and leveraged loans, to reinforce market discipline (¶15).	ST	FSOC/OFR
Complete OFR recruitment for key positions and skills as quickly as possible (¶15).	ST	OFR
Encourage its members to prioritize the development of macroprudential tools to address risks and vulnerabilities in the nonbank sector (¶28).	Ongoing	FSOC
Provide an overview of how the new activities-based approach will be operationalized (¶29).	I	FSOC
Consider extending the CCyB to Category IV banks (¶31).	MT	FRB
Systemic Liquidity		
Promote the fungibility of Treasury securities and Reserves by adjusting assumptions about firms' access to the Discount Window in liquidity metrics (¶78).	ST	Fed, OCC, FDIC

Table 1. United States: Recommendations for Systemic Risk Oversight and Systemic Liquidity (concluded)		
Continue operating regular fine-tuning OMOs (¶80).	I	Fed
Develop robust and effective backup plans in the event BNYM is not able to settle and clear repo transactions (¶90).	MT	Fed
Include repo rates explicitly in the Fed's operational target and focus on a single policy rate (¶82 & 83).	ST	Fed
Examine the merits of an appropriately priced standing repo facility (¶84).	ST	Fed
Develop capacity to conduct repo OMOs in the absence of BNYM (¶90)	MT	Fed
Enact legislation to restore the power to provide bilateral liquidity assistance to designated systemically important nonbanks (¶86).	MT	Congress
Advance preparedness for providing liquidity to systemic nonbanks and Central Counterparties (CCPs) during stress situations (¶87).	ST	Fed, Treasury
Develop a more comprehensive framework to guide market-wide liquidity support in securities markets (¶88).	MT	Fed, Treasury
Develop FX liquidity provision protocols (¶89).	MT	Fed, Treasury
Other Cross-Cutting Issues		
Authorities to set hard targets with deadlines for firms to transition to SOFR and consider applying regulatory powers to encourage faster preparations. Authorities to provide more guidance on standards for use in new SOFR products (¶91).	I	Fed, OCC, FDIC, SEC, CFTC,
* I = Immediate (within 1 year); ST = Short term (within 1 to 2 years); MT = 'Medium Term (within 3 to 5 years).		

INTRODUCTION

1. This note examines the systemic risk oversight framework in the United States and the capacity of the U.S. authorities to backstop liquidity in key money markets.[1] The note analyzes the systemic risk oversight and macro-prudential framework and the central role the FSOC plays in identifying financial vulnerabilities. It also updates the 2015 recommendations on systemic risk oversight and takes account of new developments—in particular, the proposed change in the FSOC's designation role to move away from designating systemically important entities to a focus on activities. The resiliency of key money markets and the authorities' capacity to backstop liquidity is considered in the context of both normal and stressed conditions for both depository institutions and nonbanks. Markets and nonbanks play a dominant role in intermediating liquidity in the United States and hence, the resiliency of market liquidity and the adequacy of liquidity backstops are key in delivering financial stability.

2. The analytical work reflected in the note was largely carried out before the global intensification of the COVID-19 outbreak. The on-site work supporting the findings and conclusions was conducted during February 18–March 5, 2020. The note has been factually updated to cover events since the conclusion of the on-site visits and is based on information available as of May 15, 2020. The characterizations of the programs implemented as part of the COVID-19 crisis response are based on public announcements by U.S. government agencies and do not reflect the depth of discussions and information-gathering as the rest of the document. The recommendations on systemic liquidity are relevant for the period after the crisis containment phase has concluded.

3. The analysis builds on findings of earlier assessments. Earlier assessments comprises the recommendations made during the 2015 U.S. FSAP (Appendix I).

IDENTIFYING SYSTEMIC RISKS: WHAT HAS CHANGED?

A. Overview

4. The heterogeneity of the U.S. financial markets and complex regulatory and supervisory institutional setup in the United States underscore the importance of enhancing systemic risk oversight and building effective macroprudential tools. The effective framework would encompass identification and prioritization of system-wide risks and vulnerabilities to spur timely policy action where warranted. Structures that ensure interagency sharing of information, identify possible emerging regulatory gaps, obtain a good overview of systemic risks, and develop a cooperative framework to address identified threats to financial stability would be necessary components of such a framework.

[1] The Technical Note was prepared by Kelly Eckhold and Darryl King (both MCM), and Ron Morrow (Bank of Canada, external expert).

5. The FSOC continues to play a key role in identifying threats to U.S. financial stability and is responsible for coordinating the regulatory responses of member agencies to address these threats. The FSOC is made up of 10 voting members and 5 non-voting with the heads of agencies representing themselves, and not their agency, on the FSOC. The Dodd-Frank Wall Street Reform and Consumer Protection Act (DFA) gives the FSOC a range of powers that enable it to respond to emerging threats to financial stability (Box 1). The FSOC and its standing sub-committees provide a forum for member agencies to bring forward and discuss financial system risks and vulnerabilities and share data and information to support financial stability analysis.[2] The FSOC process has contributed to a collective focus on financial stability issues and helped build strong collaborative interagency relationships.

6. At the core of systemic risk identification and oversight is the monthly meeting of the Systemic Risk Committee (SRC). The main role of this committee is to monitor and analyze financial markets, the financial system, and issues related to financial stability. This analysis is, in turn, used to support the Council's identification and response to financial stability risks. All FSOC member agencies participate on the SRC. The FSOC secretariat regularly solicits member agencies for SRC agenda items, while agenda items may also be referred to the SRC by FSOC principals or deputies. The SRC also plays a key role in the preparation of the FSOC annual report.

7. The FSOC annual report provides a rich and comprehensive discussion of the financial risk landscape with particular attention to structural vulnerabilities. The 2019 report discussed in detail a wide range of risks and vulnerabilities including cybersecurity, CCP resilience, short-term wholesale funding markets, LIBOR transition, and nonbank mortgage origination and servicing. The report contains recommendations, and a section on regulatory developments and FSOC activities, however none of this is tied back to previously identified vulnerabilities.

8. The FRB's Financial Stability Report is a welcome and complementary addition to the communication of financial stability concerns. The semi-annual report, which was first issued in November 2018, covers cyclical issues with the analytical framework set across four categories: (i) asset valuations (covering a wide range of asset classes from farmland to financial assets); (ii) borrowing by businesses and households; (iii) financial sector leverage (including bank and nonbank financial institutions); and (iv) funding risks (assessing the functioning of core funding markets, liquidity conditions of banks, and liquidity and maturity mismatches in nonbanks). This coverage complements well, the FSOC contribution which focuses on structural vulnerabilities.

[2] FSOC Committees include the Deputies Committee; Data Committee; Financial Market Utilities and Payment, Clearing, and Settlement Activities Committee; Nonbank Financial Companies Designations Committee; Regulation and Resolution Committee; and Systemic Risk Committee.

Box 1. Summary of Duties and Objectives of FSOC[1]

Facilitate regulatory coordination and identify gaps in regulation that could pose risks to the financial stability:[2] The Council has a statutory duty to provide a forum for discussion and analysis of emerging market developments and financial regulatory issues and resolution of jurisdictional disputes among the members of the council.

Facilitate information sharing and coordination:[2] The Council has a duty to collect information and coordinate among member agencies and other Federal and State agencies regarding domestic financial services policy development, rulemaking, examinations, reporting requirements, and enforcement actions.

Take an activities-based approach to identifying and assessing financial stability risk: The Council will prioritize its efforts to identify, assess, and address potential risks and threats to U.S. financial stability through a process that begins with an activities-based approach.[3]

Designate nonbank financial companies for consolidated supervision and enhanced prudential standards: If the activities-based approach does not adequately address the potential risk to financial stability, DFA Section 113 gives the Council the authority to designate nonbank financial companies for consolidated supervision by the FRB, regardless of their corporate form. Designated companies are required to meet heightened prudential standards set by the FRB.

Designate systemic Financial Market Infrastructures (FMIs) and systemic payment, clearing, or settlement activities:[2] The Council has the responsibility to designate Financial Market Utilities (FMUs) as systemically important**.** Under the DFA, designated FMUs have to comply with risk management standards prescribed by the FRB, the SEC, or the Commodity Futures Trading Commission (CFTC) as appropriate. Eight FMUs have so far been designated.[4] The Act also authorizes the Council to designate systemically important payment, clearing or settlement activities. That power has not been used to date.

Recommend stricter standards:[2] The Council has the authority to recommend stricter standards for the largest most interconnected forms, including designated nonbank financial companies. Moreover, where the council determines that certain practices or activities pose a threat to financial stability the council may make formal recommendations to the primary regulatory agencies for new or heightened regulatory standards.

Take action regarding firms that pose a "grave threat" to financial stability: The FSOC has a voting role in any determination made by the Federal Reserve whether to take certain mitigating actions with respect to firms that pose a "grave threat" to U.S. financial stability. No actions have so far been taken under this provision.[5]

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[1] See 'Frequently Asked Questions on the FSOC' at https://home.treasury.gov/policy-issues/financial-markets-financial-institutions-and-fiscal-service/fsoc/about-fsoc. This is not a comprehensive list.

[2] DFA Section 112.

[3] 12CFR Part 13190: Authority to Require Supervision and Regulation of Certain Nonbank Financial Companies. Final Interpretative Guidance. II A (1)

[4] Designated FMUs are: Clearing House Payments Company LLC; Continuous Linked Settlement Bank International (CLS); Chicago Mercantile Exchange (CME); Intercontinental Exchange Clear Credit LLC (ICE); Depository Trust Company (DTC); Fixed Income Clearing Corporation (FICC); National Securities Clearing Corporation (NSCC); and Options Clearing Corporation.

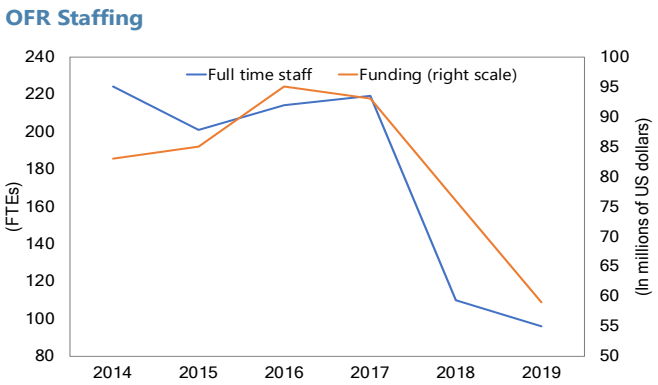
[5] FSOC is tasked to provide an affirmative vote on such actions, following a determination by the Board of Governors of the Federal Reserve System that a firm poses a grave threat (DFA Section 121).

9. The OFR's annual report also complements the FSOC annual report, providing an overall assessment of the risks to financial stability. The OFR structures its assessment around several key categories of risk: macroeconomic, market, credit, solvency and leverage, funding and liquidity, and contagion.[3] The OFR's report also highlights key financial system vulnerabilities based on their own analysis as well as concerns voiced by financial regulators, financial market participants, and other financial system stakeholders. The OFR produces several publications including the quarterly updates of its Financial System Vulnerabilities Monitor which presents a heat map of 58 indicators of potential vulnerabilities in the financial system.[4]

10. The FSOC has made improvements to data sharing through a number of interagency MoUs. The OFR also maintains the FSOC Interagency Data Inventory which catalogs the data collections of FSOC members and other government organizations. The inventory can be used to search for data more easily and to analyze gaps and overlaps in data collections. In the event an FSOC agency wishes to access data from another agency where there is no pre-existing MoU for data sharing, procedures have also been put in place between agencies to expedite ad-hoc data sharing. The OFR recently commenced publishing data from its new survey on cleared repo transactions, while other FSOC members have gathered data on leveraged loans, CLOs, and nonbank mortgage lending to support the systemic risk analysis. Despite the progress, data gaps related to these activities remain.

11. The OFR was restructured in 2018 with its workforce reduced by approximately 110 employees—a more than 50 percent reduction (Figure 1). It is in the process of hiring once again, and once fully staffed, is expected to employ up to 145 people. Through this transition, the agency has continued to deliver on its key mandates that critically support the systemic risk assessment work of the FSOC (data collection, standardizing data formats, developing applied and long-term research, and measuring and monitoring risks).

Figure 1. United States: OFR Resourcing



Note: Full-time staff at the Office of Financial Research and annual funding.
Sources: OFR, IMF staff.

[3] https://www.financialresearch.gov/financial-vulnerabilities/#/

[4] Bank Systemic Risk Monitor, Financial Stress Index, Financial System Vulnerabilities Monitor, U.S. Money Market Fund Monitor, and the Financial Markets Monitor.

B. Recommendations

12. FSOC communication and effectiveness could be improved through the release of more detailed minutes and improved traceability of actions taken to address identified vulnerabilities. The traceability of actions taken to address identified vulnerabilities should be improved. The annual report is not structured in a way that allows the reader to match identified stability risks against actions currently being considered by members, or past actions already taken, to mitigate these risks. Regulatory changes made by member agencies are listed but are not linked back to identified vulnerabilities and, in some cases, are unrelated to any identified vulnerability. Where possible, specific actions being considered by member agencies to mitigate identified potential systemic risks should be identified. Subsequently, actions taken should also be linked back to identified vulnerabilities. While recognizing the full transparency of the open sessions of FSOC (generally two per year), consideration could be given to releasing more detailed minutes of the meetings held by the Principals that are not open to the public (there were three non-public meetings in 2019 and seven in 2018). These minutes currently released, are generally high level, and it is well appreciated that to release more detail requires careful consideration of the trade-off between the benefits of enhanced transparency and the need to protect supervisory and other market-sensitive data from disclosure in order to prevent destabilizing market speculation that could occur if that information were to be disclosed.

13. Many agencies represented on FSOC have only weak or no financial stability objective in their mandate. While it's acknowledged that many members have clearly internalized the importance of financial stability analysis and make significant contributions to the Council's work, mandates should be robust to changes in personnel and over time. It is recommended that each member agency should be provided with an explicit objective to promote financial stability as it relates to that member's work on the FSOC. The inclusion of a specific financial stability mandate would reinforce their focus on financial stability issues and incentivize members to take actions to address stability risks. Changing member mandates in this way would not undermine FSOC's role in financial stability issues.

14. The insurance sector does not have a voting member on the FSOC who has authority to take supervisory action. The insurance sector is represented by the independent member with insurance expertise who is a voting member, the Director of the Federal Insurance Office (who is a non-voting member), and a State Insurance Commissioner (who is also a non-voting member). Of those three members, only the State Insurance Commissioner has any authority to supervise and regulate insurers. It is recommended to upgrade the State Insurance Commissioner member to a voting member.

15. The FSOC annual report notes that significant data gaps remain and efforts to close data gaps should be intensified. Such gaps undermine efforts to conduct effective research into areas of potential financial vulnerability. Also, some market participants have been slow to adopt relevant consensus-based data standards that inhibit data sharing and collection. It is therefore important that efforts to close data gaps be intensified. Additional repo data covering the bilateral

non-cleared market should be collected to complement existing data and create a complete picture of repo market activity, as well as data on leveraged loans, CLOs, and residential mortgages originated and serviced by nonbanks. To ensure that the OFR is well positioned to deliver on its important mandate, and in the wake of its recent restructuring the OFR should complete its recruitment for key positions and skills as quickly as possible.

DEALING WITH SYSTEMIC RISKS: IS THE TOOLKIT ADEQUATE?

A. Overview

16. Tools to address potential systemic risks are distributed across FSOC members who are collectively accountable for identifying and responding to threats to financial stability.[5] The toolkit mainly consists of agencies exercising their own powers vis-à-vis the entities they oversee, to either mitigate potential systemic risks or strengthen the resilience of the financial system against systemic risk events. Tools that reside with the FSOC consist of the authority to issue recommendations for new or heightened regulatory standards to financial regulators (DFA s120), designate nonbank financial companies for consolidated supervision (DFA s113), and designate systemically important financial market utilities or payment, clearing and settlement activities (DFA s804). The United States, however, stands out amongst its peers as not having any borrower-based tools in the housing sector.

17. Tools to deal with structural and cyclical vulnerabilities in the banking system are generally sufficient. Tools to enhance the structural resilience of the banking system include the Globally Systemically Important Bank (GSIB) capital surcharge as well as enhanced capital and liquidity standards for large banks (category I and II banks). For cyclical vulnerabilities, the CCyB is applicable to large internationally active banks, and it has not been activated since it was introduced in 2013. The FRB issued the framework for implementation of the CCyB in 2016 noting that the purpose of the instrument was to increase the resilience of large banking organizations (applicable to banks with more than US$250 billion in assets, categories I–III) when there was an elevated risk of above-normal losses and to reduce fluctuations in the supply of credit.[6] In setting the CCyB, the FRB considers a wide range of financial and macroeconomic indicators to assess financial system vulnerabilities which include asset valuation pressures, risk appetite, leverage in financial and non-financial sectors, and maturity and liquidity transformation. The FRB notes that empirical models that capture a manageable set of quantitative indicators (e.g., combinations of credit-to-GDP to trends in residential and commercial real estate) can be a useful input for the setting of the CCyB while emphasizing the need for judgement as no fixed set of indicators can adequately capture all the

[5] IMF Macroprudential Policy Survey: https://www.elibrary-areaer.imf.org/Macroprudential/Pages/Reports.aspx.

[6] Federal Register 09/16/2016: Regulatory Capital Rules: The Federal Reserve Board's Framework for Implementing the U.S. Basel III Countercyclical Capital Buffer.

vulnerabilities on the financial system. Also considered is the extent to which activation of the CCyB could lead to migration of credit activity to banks that are not subject to the CCyB, or to nonbanks. One view is that because of high through-the-cycle capital requirements, that it is appropriate to set the CCyB at zero in a normal risk environment, which could be most of the time.[7]

18. The recently finalized stress capital buffer (SCB) also potentially operates in a countercyclical manner. This buffer includes supervisory stress test losses, four quarters of planned common stock dividends, and the GSIB buffer.[8] The SCB's two components that potentially act in a countercyclical way are: (i) the stress scenarios (the gap between the current economic conditions and the stress scenario would be smaller during a downturn which may offset some of the procyclicality in stress test loss rate), and (ii) planned dividends (banks plan to have higher dividend payouts when conditions are good and profits are high). However, the macroeconomic stress scenarios appear less effective as a countercyclical tool than the requirement to pre-fund dividends and share buybacks. In this regard, reducing the pre-fund requirement to four quarters, instead of nine, might have reduced the countercyclical nature of the stress tests.

19. In late 2019, the FSOC published final interpretive guidance that modified its approach to assessing the financial stability risks associated with nonbank financial companies. Efforts to identify, assess, and address financial risk and vulnerabilities will now prioritize an activities-based approach rather than the previous approach where the focus was on entities. The FSOC states in the guidance that the new approach may allow it to more effectively identify and address the underlying sources of risks to financial stability on a system-wide basis and reduce possible competitive market distortions that could result from entity-specific designations.

20. The first step under this new approach involves an ongoing activities-based assessment of nonbank financial entities. As potentially risky activities are identified, the FSOC will focus on framing questions in the first step of the activities-based approach: (i) What are the triggers that could give rise to a potential financial stability risk (e.g., sharp reductions in asset prices or large credit losses)? (ii) What is the manner or mechanism in which this potential risk is transmitted to other parts of the financial system? (iii) What is the magnitude and breadth of the spillover effects from this risk to other companies and markets? (iv) Could the cumulative adverse effects of the potential risk impair the financial system and harm the U.S. economy?

21. When the FSOC identifies an activity that poses a potential risk to financial stability it will then engage with relevant state and federal financial regulators. The overall objective is to leverage existing regulators knowledge and expertise as well as their ability to take the necessary regulatory or supervisory actions to mitigate the identified risks or vulnerabilities.

[7] For example, see Quarles R.K. March 29, 2019: Frameworks for the Countercyclical Buffer. These remarks represent personal views, which do not necessarily represent those of the Federal Reserve Board or the Federal Open Market Committee.

[8] For further discussion on the SCB, see USA FSAP Technical Note 2020: Banking Supervision and Regulation.

22. If the FSOC believes that the actions taken by relevant regulators do not adequately mitigate the potential risks to financial stability it can then publicly issue non-binding recommendations to the relevant regulators. This is an existing power of the FSOC (DFA s120), but it is now subject to a cost-benefit test under the "final interpretive guidance." The FSOC will ascertain whether the relevant primary financial regulatory agency would be expected to perform a cost-benefit analysis of the actions it would take in response to the Council's contemplated recommendation. In cases where the primary financial regulatory would not be expected to conduct such an analysis—the Council itself will prior to making a final recommendation—conduct such an analysis. The FSOC will issue the recommendation only if it believes that the results of its assessment of benefits and costs support the recommendation.

23. If the activities-based approach does not adequately address the potential risk to financial stability, the FSOC may still consider entity-specific designation as last resort. Entity-based designation, which subjects nonbank financial institutions to consolidated supervision by the FRB is an existing power of the FSOC (DFS s113) but is now subject to both a cost-benefit analysis and an assessment of the likelihood of the nonbank financial company's material financial distress under the "final interpretive guidance." Importantly, under Section 113(f) of the DFA, the FSOC may waive or modify the procedural requirements related to nonbank financial company designations if the FSOC determines that such action is necessary or appropriate to prevent or mitigate threats posed by a nonbank financial company to U.S. financial stability.

24. The activities-based approach to identifying risks to financial stability is in line with international practices and has benefits, although the specifics around its implementation, are yet to be announced. The activities-based approach is intended to identify and address risks to financial stability on a system-wide basis, regardless of the type of entity, regulatory body, or charter and will reduce potential for regulatory arbitrage and competitive disadvantages across entities and sectors. This will allow existing regulatory entities, for example, the state insurance regulators, to address potential threats to financial stability rather than have an additional regulator, (i.e., the FRB) involved. Under the "final interpretive guidance," risks to financial stability that can be assessed include elevated asset valuation risk, rising credit risk, excessive leverage, elevated liquidity risk, interconnectedness across the financial sector, growth of unregulated financial activities, and operational risks including those arising from the digital transformation of the financial sector.[9]

25. The new restriction placed on the use of DFA s120 and s113 is a potential barrier to the FSOC's ability to issue recommendations to primary regulators or undertake entity-specific designation. In order to conduct a cost-benefit analysis of either a recommendation or a designation decision, the expected benefits of such an action must be calculated under the final interpretive guidance. This requires the calculation of the expected costs that will arise if a financial stability risk is triggered, and an estimate of probability of the trigger occurring. The former is challenging enough which will require several strong assumptions, including determining how the risk will impact other financial institutions, financial markets, and the economy as a whole. The latter

[9] Federal Register/Vol. 84, No 249: Financial Stability Oversight Council 12 CFR Part 1310, RIN 4030-ZA00.

will be exceptionally difficult to assess, given the inherently large number of extreme but plausible events that could trigger the risk. Of concern here, is to ensure that the process does not constrain the FSOC from responding to all identified risks within the timeframe that allows for the mitigation of such risks.

26. The new activity-based approach could also make it difficult to identify situations where an entity's activities are collectively systemically important, but the activities individually are not seen to be a risk to financial stability. As an example, a nonbank financial institution operating with high leverage and reliance on short-term wholesale funding may perform multiple activities including as an intermediary across multiple markets, but none of these activities when considered individually give rise to the potential for systemic risk. In such a scenario, the activities-based approach will be challenged to identify situations where the firm's simultaneous failure across multiple activities could lead to a cascading series of failures across markets and other participants giving rise to a systemic risk event. An example of such a situation is Lehman Brothers—a firm whose failure was a catalyst for systemic risk contagion during the global financial crisis (GFC).

27. A final challenge for the new approach may involve activities that are outside of the current regulatory perimeter. Payment service providers, which are currently not subject to state or federal prudential regulatory requirements, offer a possible example of this type of situation. Here, if the payment service provider started to play a dominant role in payments intermediation, the disruption of that payment service provider could pose significant risk to the financial system. In this example, there may not be a primary financial regulator to help gather information or take action to address the potential risk, yet it is still part of the FSOC's mandate to highlight the gap in regulation (DFA s112(a)(2)(G)).[10]

B. Recommendations

28. In keeping with its mandate to respond to emerging threats to financial stability, the FSOC should encourage its members to prioritize the development of macroprudential tools to address risks and vulnerabilities in the nonbank sector. Of high priority here is to develop tools to address the systemic risks arising from high corporate leverage, while two further areas are noted:

- Changes to key elements of the U.S. mortgage finance system, which are currently under consideration, provide an opportunity to embed macroprudential elements into nonbank activities.[11] The Consumer Financial Protection Bureau (CFPB) is currently considering changes to the qualified mortgage definition, while at the same time, the Treasury and Federal Housing

[10] The FSOC is required to report to Congress any case in which no primary financial regulatory agency exists for a nonbank financial company conducting financial activities which pose a risk to financial stability.

[11] Of the US$11 trillion in residential mortgages, US$3.6 trillion (33 percent) is held by banks, representing 20 percent of banking sector assets. Over half of the mortgages are originated by nonbank mortgage companies.

Finance Agency (FHFA) are examining options for ending the conservatorship of Fannie Mae and Freddie Mac.[12] This provides an opportunity for a holistic approach to be taken to the design and interaction of the Government Sponsored Enterprise (GSE) capital regime, mortgage underwriting and insurance standards, and lending restrictions aimed at ensuring borrowers' ability to repay their mortgage loan. As authorities undertake this work, they should consider the full range of changes and how best to integrate and calibrate macroprudential elements (e.g., debt service ratio standards or integration of CCyB-like element into GSE capital requirements) to improve the resilience of the financial system.

- Consistent with stress testing work undertaken during the FSAP, the Securities and Exchange Commission (SEC) should consider several changes to mitigate asset manager liquidity risks. First, the SEC should explicitly require mutual funds to perform liquidity stress tests as part of their liquidity risk management program. Second, asset managers should be required to align the redemption frequencies more closely with the asset liquidity. Finally, the SEC could consider mandatory liquidity buffers for mutual funds exposed to liquidity risk.

29. The FSOC should, as soon as possible, provide more detail on how the new activities-based approach will be operationalized. Authorities indicated that the FSOC Deputies Committee has approved a process for implementing the activities-based approach—this information, perhaps in a summarized but sufficiently detailed form, should be promptly communicated to the public.

30. The FSOC should be transparent about its use of the activities-based approach in its annual report. Many of the risks and vulnerabilities already identified in the FSOC's annual report fit well with an activities-based approach. To this end, the FSOC should clearly identify the potential risks being considered under this new approach and describe its ongoing engagement with relevant regulators. This description should cover the actions that have been or will be taken by primary regulators to better understand and mitigate the potential risk, as well as those actions taken to strengthen the resilience of the financial system in light of the potential risk.

31. The FRB should consider extending the CCyB to Category IV banks. Limiting application of the CCyB to Category I–III banks results in 70 percent of banking asset coverage and with it the risk that activation could lead to migration of credit activity to other large banks, a concern noted by the FRB. Extending the CCyB to Category IV banks would increase coverage by another 10 percent of banking assets which reduces the risk of such migration, while increasing the efficacy of the instrument. This approach is aligned with the recommendation for the authorities to consider extending the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio to all large banks (see Technical Note on *Banking Supervision and Regulation*).

[12] The DFA (s1411 and s1412) requires that for residential mortgages, creditors must make a reasonable and good faith determination that the consumer has a reasonable ability to repay the loan. Congress established a presumption of compliance for 'qualified mortgages' which are mortgages that meet criteria as defined in CFPB rules.

ARE THERE VULNERABILITIES IN MONEY MARKETS AND ARE BACKSTOPS ADEQUATE?

A. Background—Systemic Liquidity Risks and Their Financial Stability Implications

32. Systemic liquidity risk is the risk that multiple institutions simultaneously face liquidity difficulties. Such risks, if not contained, can lead to solvency concerns across the financial system. Individual institution liquidity stresses can amplify into to systemic risk through financial system interconnectedness. An initial shock could be amplified in financial markets to dislocate important liquidity markets.

33. Maturity mismatches and foreign exchange mismatches increase systemic liquidity vulnerabilities. Maturity mismatches lie at the heart of systemic liquidity vulnerabilities as institutions to can encounter difficulties in accessing new funding or refinancing existing funding (funding liquidity risk). If markets become less liquid, firms may be unable to liquidate assets at reasonable prices within a reasonable timeframe (market liquidity risk). FX asset-liability mismatches compound systemic liquidity vulnerabilities as central banks can more easily and effectively backstop domestic currency funding shortfalls.

34. The U.S. financial sector structure raises the importance of the maintenance of an adequate level of money market liquidity for financial stability. Credit intermediation in the United States occurs primarily in markets. While banks only hold about one-fifth of financial system assets, nonbanks play a large role and are heavy users of markets to raise funding and to manage liquidity risks.

Key Liquidity Markets

35. The Fed funds market is the key unsecured interbank segment.[13] The Fed funds market typically trades between US$40–80 billion per a day but has declined in prominence over the last 20 years as the repo market has grown to encompass a much wider range of entities (Figure 2, panel 1). The Fed's expansion of reserve balances—quantitative easing (QE)—also played a role in reducing Fed Funds market trading. Activity in the Fed funds market largely reflects Federal Home Loan Banks (FHLBs) and other GSE lenders of funds (whom have relatively conservative investment guidelines and more limited investment options) to domestic and foreign banks (who find such borrowing advantageous from a regulatory perspective).[14] Both banks and GSEs operate in the repo and Fed

[13] The Fed funds market is segmented. Depository institutions receive remuneration on their balances at the rate set on Interest on Excess reserves, while balances held by the FHLBs are not remunerated.

[14] The outflow assumptions banks must make when calculating their Liquidity Coverage Ratio (LCR) are less conservative for short term loans banks take from GSEs and the FHLBs in the Fed funds market compared to other types of short-term borrowings. Hence, bank borrowers in the Fed funds market have lower liquid asset requirements (at the margin) and a lower effective cost of funds associated with such funding.

funds markets with price discovery increasingly occurring in the much larger repo market and transmitted to the Fed funds market through arbitrage (Box 2).

Box 2. Price Discovery in Key Money Markets

Historically the Federal Reserve has always focused on the level of the Fed funds rate when determining the implementation of monetary policy. Motivating this has been that the Federal Reserve itself directly supplies the reserves that balance Fed funds demand. Banks in the 1990's were active in the Fed funds market and it was an important marginal source of funds for banks (Figure 2, panel 1).[1]

There is a significant body of research that shows that there is a two-way link between trends in the Fed Funds market and the repo market. These links fluctuate depending on the strength of arbitrage, the level of interest rates, and the relative abundance of reserves. Bech, Klee and Stebunovs (2011) show that the pass through of the Fed funds rate to repo rates deteriorated during the zero lower bound period.[2]

Statistical analysis of the Granger Causality between the Fed funds and repo markets confirms that a two-way causality exists (Box table below). This seems consistent across different sub-periods since 2014 and after taking account of exogenous factors such as quarter end effects and the level of excess reserves.

Granger causality analysis of the links between the Federal Funds and Repo markets.[3]

Period	Exogenous	Equation			
		EFFR SOFR		SOFR-EFFR	
		F-Stat	adj. R^2	F-Stat	adj. R^2
August 2014-November 2019	None	7.44 (****)	0.11	6.76 (****)	0.11
"	Quarter-end	9.65 (****)	0.23	11.6 (****)	0.45
"	Excess Reserves	7.25 (****)	0.11	6.49 (****)	0.11
"	Quarter-end and Excess Reserves	9.49 (****)	0.23	11.35 (****)	0.47
August 2014 - December 2017	None	5.95 (****)	0.23	2.31 (**)	0.16
"	Quarter-end	9.3 (****)	0.41	7.28 (****)	0.45
"	Excess Reserves	7.04 (***)	0.26	3.04 (**)	0.2
"	Quarter-end and Excess Reserves	9.24 (****)	0.42	7.24 (****)	0.45

(**) 5% significance, (***) 1% significance, (****) 0.5% significance
Estimates for VAR models in differences with 3 lags. Lag length was chosen using selection-order critera as AIC, SBIC, FPE
Dummies for End-of-month, FOMC meeting, or FOMC minute release were not significant and thus not included

[1] See Bech and Atalay (2008) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1299021 for a useful analysis of the literature on the operation of the Federal Funds market and for data on the volumes traded and activity of the market from 1997–2006.

[2] See Bech, Klee and Stebunovs (2011) Arbitrage, Liquidity and Exit: The Repo and Federal Funds Markets Before, During, and After the Financial Crisis, Paolo Baffi Centre Research Paper No. 2011–99 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1884155.

[3] Federico Grinberg (IMF) contributed to this analysis.

36. The FX swap market is a key liquidity conduit given the U.S. dollar's global funding currency role. International investors and borrowers are an important part of the U.S. dollar money markets. Developments in the domestic U.S. money market critically influence and are influenced by the supply and demand for U.S. dollars globally. The FX swap market is a key conduit linking the

offshore and domestic money markets. Turnover in FX swaps involving the U.S. dollar dominate global FX swap market turnover at around US$2.9 trillion per day.[15]

37. Short term Treasury and U.S. government agency markets along with the commercial paper market are important sources of funding for the wider economy. These markets are still of a significant size (e.g., corporate paper outstanding was around US$1,149 billion as at the end of January 2020) but are less heavily traded in the secondary markets. Hence activity in these markets is less important for price discovery and the liquidity management of intermediaries.

38. The U.S. money markets center around a vibrant repo market. The repo market is the largest globally and is central to channeling liquidity and funding between banks, FHLBs, and nonbanks. Repo market turnover is at least US$2.9 trillion a day, dwarfing turnover in other key market segments (Figure 2, panel 2).

B. Repo Markets

39. The repo market is very large with most repos transacted on an overnight basis. There are several actively traded repo market segments (Figure 2, panel 3). The extent of total activity is uncertain as the uncleared bilateral repo market is not well measured even though it is widely understood to comprise around half of total activity.[16] Much activity is in the overnight segment, but perhaps a third to a half of activity is for longer maturities up to six months. Overnight repo trading is favored by cash investors and borrowers alike. Repo is heavily used by leveraged investors in U.S. treasuries who have tended to favor overnight funding in recent years as liquidity has been plentiful and funding cheap. A significant increase in the supply of U.S. treasuries in recent years has been a key driver of increased repo market activity.

40. A wide range of investors and borrowers use repo markets for funding and liquidity management. Fund and asset managers, along with other liquid nonbank financial institutions (for example foreign central banks) are important cash lenders in the repo market. Cash borrowers include primary dealers, hedge funds, and other smaller broker dealers (BDs) who use repo to finance securities holdings or matched repo books (primary dealers in particular). Money market funds play as especially prominent role as key cash investors via overnight repos, consistent with the tighter liquidity requirements in the wake of the money market fund reforms completed in

[15] BIS triennial FX turnover survey, April 2019 https://stats.bis.org/statx/srs/table/d11.1 .

[16] One of the most comprehensive estimates was obtained by a pilot study of the bilateral repo market conducted by the OFR and the Federal Reserve with input from the SEC which estimated bilateral repo trading at around half of the total market. See "The U.S. Bilateral Repo Market: Lessons from a New Survey (PDF)," by Viktoria Baklanova, Cecilia Caglio, Marco Cipriani, and Adam Copeland, Office of Financial Research Brief Series 16–01, January 2016. The OFR intends to issue a data collection rule establishing a permanent collection of bilateral repurchase agreements and certain securities lending activity data (see the Minutes of the Financial Stability Oversight Council (PDF), September 22, 2016.).

October 2016. Primary dealers play a key intermediation role and the biggest primary dealers are affiliated with U.S. banks.

41. Smaller broker-dealers play a significant role in the repo market—especially in the cleared Fixed Income Clearing Corporation (FICC) Delivery-Versus-Payment (DVP) repo market segment. Comprehensive estimates of their total turnover are not available although a group of the larger entities that form the "Independent Dealer and Trader Association" (IDTA) estimated their members daily turnover of US$150–200 billion per day from April 2018–February 2019. This was around a fifth of the total repo turnover used to calculate the SOFR benchmark over the same period.[17] Smaller broker-dealers are less tightly regulated than primary dealers and banks and tend to be highly leveraged owners of U.S. government and agency securities financed using overnight repos in the cleared DVP repo market segment.[18]

42. Repos trade across two main segments—each of which has a centrally cleared and uncleared sub-segment. Tri-party repo is around a third of the market (Figure 2, panel 3) and is based on the clearing and settlement infrastructure provided by the BNYM.[19] JP Morgan provided these services until they withdrew in 2016. BNYM provides collateral valuation, margining, and management services to facilitate tri-party trading. There are two tri-party repo segments: non-centrally cleared tri-party repo, which are tri-party transactions not cleared through the FICC; and General Collateral Finance (GCF) repo, which is an inter-dealer market where repos are traded in a blind-brokered market and novated to the FICC, which acts as a central counterparty. The bi-lateral repo segment comprises half of the market. The uncleared segment is not well measured and reflects transactions negotiated and settled directly between broker-dealers and customers. There is a robust DVP centrally-cleared market, additionally, there is a relatively small but fast growing cleared bilateral repo segment that exists in the DVP repo market, called sponsored repo, where transactions are negotiated bilaterally but settled at the FICC, through a set of participants that act as settlement agents and guarantors for the repo trades of their clients.

43. While a wide range of securities are used as collateral, Treasury, and agency securities predominate. Treasury and agency securities are the largest collateral segments, but a very wide range of other collateral is available in repo—especially outside of the tri-party repo market.[20]

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[17] See IDTA, White Paper on the Repo Market Affecting U.S. Treasury and Agency MBS, December 6, 2019—https://www.idtassoc.com/s/IDTA-White-Paper-12619-c2.pdf.

[18] The SEC Department of Economic Research and Analysis (DERA) quarterly Economic and Risk Outlook issued in November 2019 provides a useful overview of the activities of the SEC-registered broker-dealer community—see pages 9–11 at https://www.sec.gov/files/DERA_Quarterly%20Economic%20and%20Financial%20Outlook%20Nov%202019.pdf

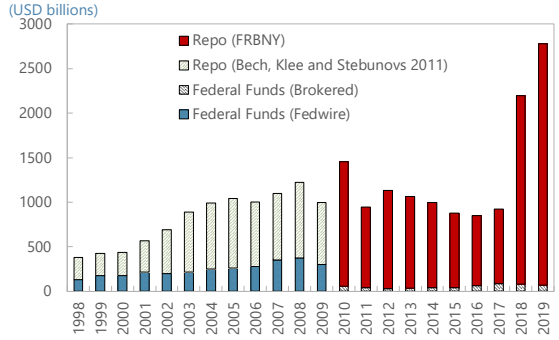
[19] A useful overview of the structure of the repo market is available at Bowman, David, Joshua Louria, Matthew McCormick, and Mary-Frances Styczynski (2017). "The Cleared Bilateral Repo Market and Proposed Repo Benchmark Rates," FEDS Notes. Washington: Board of Governors of the Federal Reserve System, February 27, 2017, https://doi.org/10.17016/2380-7172.1940.

[20] Federal Reserve Bank of New York data indicate that 60 percent of repos were against US Treasury securities over 2019—see https://www.newyorkfed.org/data-and-statistics/data-visualization/tri-party-repo#interactive/tripartygcf

Figure 2. United States: Structure of Key Money Market Segments

The repo market has increased in importance as more participants have gained repo market access…

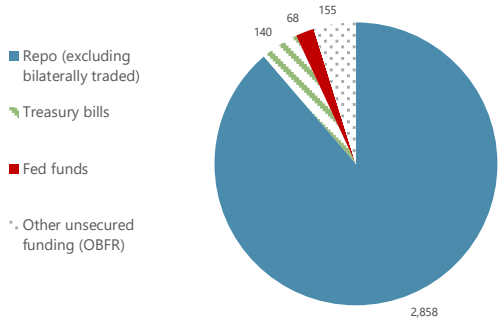
1. Estimated Federal Funds market versus Repo market traded volumes 1998-2000
(USD billions)



Sources: Federal Reserve Bank of New York, Bech, Klee and Stebunovs (2011)

….and is the key liquidity conduit

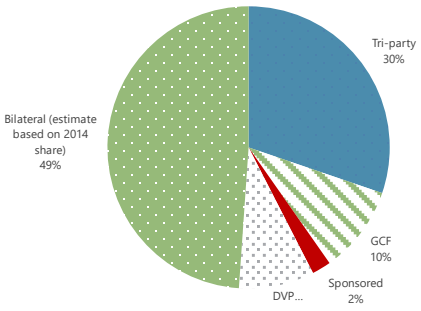
2. Traded volumes in key money market segments (2019 daily average, USD billions)



Sources: Federal Reserve Bank of New York, SIFMA

Repo activity is diversely spread between bilateral, centrally cleared and triparty venues ….

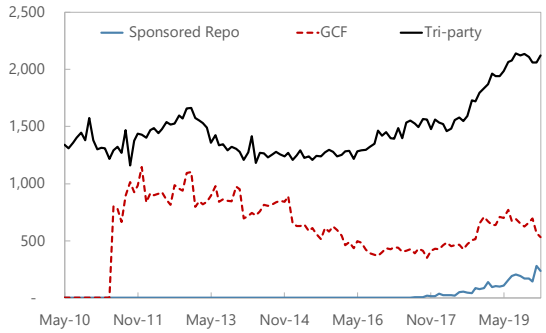
3. Share of repo trading by segment in 2019
(Percent)



Sources: Federal Reserve Bank of New York, Office of Financial Research, IMF Staff calculations

Repo activity is growing strongly in part reflecting growth in centrally cleared sponsored repo….

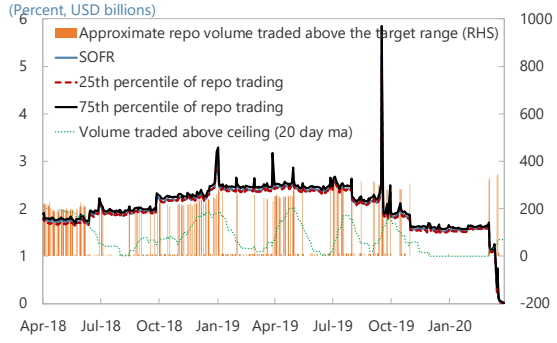
4. Significant non-bilaterally settled repo volumes
(USD billions)



Sources: Federal Reserve Bank of New York, Office of Financial Research

Repo rates are variable although Federal Reserve Open Market Operations have effectively quelled variability

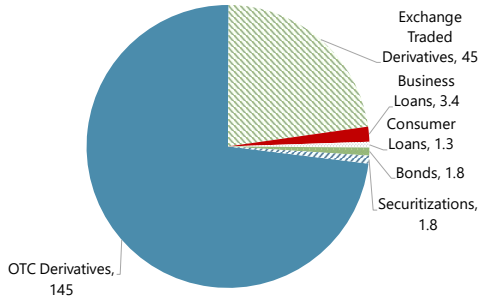
5. Distribution of intraday repo market trading versus approximate volumes traded above the Federal funds target range
(Percent, USD billions)



Sources: Federal Reserve Bank of New York, IMF Staff calculations

Market reliance on LIBOR is very high

6. Volumes of Instruments Tied to USD LIBOR (USD trillions, end 2016)



Sources: ARRC Second Report, 2018

44. There are tight linkages between the cleared and tri-party repo market as these all use BNYM's tri-party repo settlement infrastructure. BNYM provides a critical monopoly role in the settlement of U.S. Treasury securities. Primary issuance of U.S. treasuries occurs over the accounts of BNYM. The cleared repo market segments ultimately settle at BNYM and even the FRBNY's repo transactions settle at BNYM. These tight links reflect the efficiencies that concentrating settlements at BNYM provide for broker-dealers. Primary dealers have concentrated their collateral management operations with BNYM making it most efficient from a business-as-usual perspective for all the significant ancillary repo market segments to also settle there.

45. Tri-party repo market reforms have reduced risks. Tri-party repo has been important as it allows participants to minimize cash requirements while at the same time optimizing collateral use. Historically the tri-party repo providing banks had provided intraday credit to dealers rolling over maturing overnight repo transactions providing another significant benefit to the Tri-party system. However, such overdrafts, while still available, are now very costly and are not significantly utilized reflecting regulatory reforms in the wake of the GFC when it was recognized that these daylight overdrafts were a significant financial stability concern.

46. Demand for cleared repo is increasing so participants can harness the benefits of netting and obtain better repo market access. Growth in FICC sponsored repo has allowed a much wider range of cash investors (money market funds in particular) and borrowers (leveraged investors and hedge funds) access to centrally cleared, netted repo. Cleared repo has proven advantageous from a risk management perspective as well as being balance sheet efficient for participants seeking to offset the impact of tighter leverage, capital and liquidity rules.

C. Key Developments in Money Market Liquidity and Resiliency Before March 2020

47. Money market volatility picked up as the Fed reduced its balance sheet. Volatility patterns shifted from early 2017 as commercial bank reserves at the Fed fell reflecting tighter liquidity (Figure 3, panel 1). Month-end pressures (driven by some market participants that face regulatory driven incentives to withdraw from markets) changed from seeing lower rates to higher rates at month ends before 2017 (Figure 3, panel 2). Interest rates have become more sensitive to changes in reserve supply (Figure 3, panel 3). The Fed funds rate drifted up relative to the target range, ultimately requiring adjustments to the Fed's administered policy rates to ensure the Fed funds rate remained well inside the Federal Open Market Committee's (FOMC's) target range. There have been several volatility spikes culminating in an exceptional period of volatility in mid-September 2019 where the Fed funds rate moved outside of the target range and repo rates sharply spiked to 10 percent.

48. The money markets have generally functioned well even despite the increased volatility—although the support of the Fed was instrumental in managing the September 2019 spike. Notwithstanding increased volatility, markets have continued to function well and even on the most volatile days the repo market remained active with the market clearing.

The Fed funds market has been less resilient as traded volumes and the diversity of participants is lower than in repo and there are some signs of reduced liquidity on more volatile days (Figure 3, panel 4). Encouragingly, volatility spikes in repo and Fed funds markets have not generally been transmitted more widely in key funding and liquidity markets. For example, the commercial paper and longer-term FX swaps markets were not greatly impacted by the September 2019 volatility. To some extent, the absence of wider impact was because most spikes were perceived to be transitory. There was more concern about the September quarter 2019 volatility event, although the Fed's significant and regular repo operations on a scale not seen since the GFC combined with resumed Treasury securities purchases was instrumental in restraining liquidity fears and backstopping markets (Figure 4, panel 5).

49. The impact of the Fed's balance sheet normalization strategy has been significant. The Fed decreased reserve balances by about US$1.25 trillion from the peak in 2014 to the September 2019 trough—a reduction of almost 50 percent.

50. The Fed's non-reserve liabilities have expanded creating another liquidity drain in the absence of regular OMOs. While much of the decrease in reserve balances has reflected reduced Fed securities holdings, growth in the Fed's non-reserve liabilities has also contributed. The Treasury General Account (TGA) has expanded reflecting the Treasury's desire to hold additional precautionary cash balances and has become more variable, in part due to exceptional run-downs of the TGA during periods when the debt ceiling has been binding.[21] The Fed offers foreign central banks a service where it takes deposits secured on U.S. treasuries known as the Foreign Repo Pool (FRP). The FRP has grown significantly over the last five years as the Fed has loosened rules that previously restricted the size and variability of foreign central bank deposits in an environment where reserves have been plentiful, and the return paid by the Fed has been attractive to other short-term, risk-free investments. More recently, the size of the FRP has dipped as the Fed reviewed the remuneration paid and set it in line with the Overnight Reverse Repo rate (ONRRP). Finally, Title VIII of the DFA allowed the Fed to open accounts for designated FMIs that CCPs use to hold their cash collateral. Normally, central banks offset these drains of reserves in regular OMOs, but the Fed hasn't regularly held OMOs in the period of ample reserves and hence the growth of non-reserve liabilities has organically contributed to the Fed's balance sheet normalization process.

51. The cyclical increase in U.S. Treasury supply has been an important influence. Collateral supply has expanded significantly as the U.S. budget deficit has increased. Primary dealers and other leveraged investors have absorbed this supply and required more repo to finance Treasury purchases (Figure 3, panel 5). Smaller broker-dealers and hedge funds have stepped in to help

[21] The Treasury shifted from holding the bulk of its funds in secured deposits with commercial banks under the Treasury Tax and Loan (TT&L) program to the Federal Reserve in 2008 when the Fed received the authority to pay interest on reserve balances to commercial banks. The Treasury does not receive an explicit interest rate on its TGA balance but receives an implicit return as the Fed's net income is returned to the Treasury regularly through the year. The agreements with banks included in the TT&L program are no longer in force and would need to be renegotiated to reactivate the program.

absorb supply. Most players have used overnight repos to finance the growth in collateral supply as overnight repo has been cheap and readily available in the era of ample reserves (Figure 3, panel 6).

52. The impact of regulation on market functioning led to important behavioral changes. Since the GFC, banks and their affiliated broker-dealers have been subject to heightened prudential regulation and have significantly upgraded internal liquidity risk management frameworks and governance. These changes may have contributed at least indirectly to cash hoarding, diminished incentives to intermediate liquidity and decreased willingness to quickly step-in during sudden periods of market volatility and uncertainty by banks and broker-dealers. To some extent this is reflected by the fact that reserves are now concentrated at the GSIBs (Figure 4, panel 1). The pressures have been building for some time but masked by the Fed's large balance sheet until more recently. There are a range of relevant regulatory constraints that bind to different extents across firms including: the supplementary leverage ratio (SLR); the GSIB surcharge; liquidity stress test requirements; and resolution funding requirements. Box 3 discusses in more detail how these various regulatory requirements impact on the demand for reserves and the elasticity of the demand curve.

53. Tighter bank risk management has meant fewer buffers available to customers and less balance sheet flexibility in major intermediaries. The capital and liquidity risk management infrastructures of banks has increased significantly in terms of scope and complexity/sophistication in the years since the GFC. Three underlying factors have driven this trend.

- Firstly, a key driver has been increased market discipline on firms seen to be falling short of regulatory requirements or whom are reliant on the Fed for liquidity support. Senior management has consequently been less tolerant of liquidity shortfalls prompting the construction of frameworks and buffers to make shortfalls less likely.

- Secondly, the regulatory framework itself has been more restrictive and sophisticated which has driven increased sophistication in bank liquidity risk management frameworks. Firms have been required to think more carefully about how they might manage liquidity in stress and resolution situations that are very different to business-as-usual. Considering these tail-event risks in more detail has led to better risk management frameworks but also a need for larger buffers and more constraints to ensure the diverse lines of business within large financial firms can all remain within regulatory requirements. Liquidity buffers now often feature a more prominent role for cash as these new sophisticated frameworks have been developed in an environment where reserves have been cheap and abundant, and management has become very comfortable with cash reserve buffers due to its superior liquidity properties.

- Finally, pressures on returns has driven a greater desire of management to optimize bank balance sheets. Fewer capital and liquidity buffers have been left laying idle. This has meant a reduction in bank flexibility which means banks are not as responsive to short term fluctuations in the demand for liquidity by customers as prior to the GFC. Firms focus on ensuring current customer needs can be met—and they plan with customers to try and ensure that adequate capital and liquidity is available to meet their projected business needs. But unexpected needs

from other market players may not easily be accommodated quickly. In some circumstances, this means interest rate volatility needs to be persistent to warrant a response that can come but only with time. In other situations, there may be a very inelastic demand for reserves.

D. The Federal Reserve's Liquidity Provision Approach in Normal Times

54. Prior to the COVID-19 crisis, the Fed operated an ample reserves system with few regular OMOs in business as usual circumstances. The Fed supplied significantly greater reserves than required by banks to meet reserve requirements (which were moved to zero in March —Figure 4, panel 2). The FOMC's balance sheet normalization principles state that the Fed will operate its ample reserves framework with the smallest balance sheet possible while ensuring the Fed funds rate remains well within the 25-point-wide target range established by the FOMC (Figure 4, panel 3).[22] No regular OMOs were held as the presence of excess reserves ideally meant that the interbank market should be robust to short term fluctuations in autonomous factors.

55. The Fed aims to influence market rates by varying the rates on its standing facilities. The key tools are the rates the Fed offers on its liquidity absorbing standing facilities: The ONRRP; and the Interest on Excess Reserves (IOER) to depository institutions. As the demand for reserves changes over time, the Fed responds by varying the interest rates paid on its liquidity absorbing standing facilities. The Fed has made a series of changes to the level of IOER and ONRRP in the last two years in order to keep the Fed funds rate well within the target range.

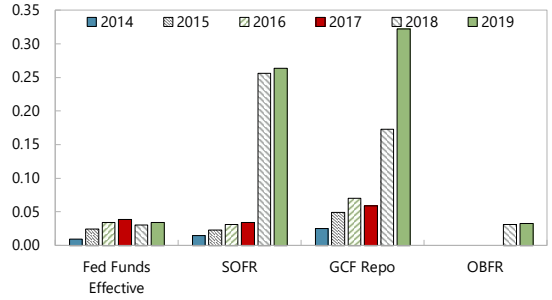
56. The operating target guiding liquidity management is the Fed funds rate although other rates play some role. The FOMC's focus is mainly on the level of the Fed funds rate and communications are focused on the level of the Fed funds rate relative to the target range. However, market participants believe the Fed considers a wider set of benchmark money market rates when determining its operational stance including developments in repo rates. The actual role of rates other than the Fed funds rate is not clearly specified by the Fed.

[22] The FOMC's balance sheet normalization principles are available at https://www.federalreserve.gov/monetarypolicy/policy-normalization-discussions-communications-history.htm.

Figure 3. United States: Developments in the Liquidity and Resiliency of Key U.S. Money Markets

The level of money market volatility has increased….

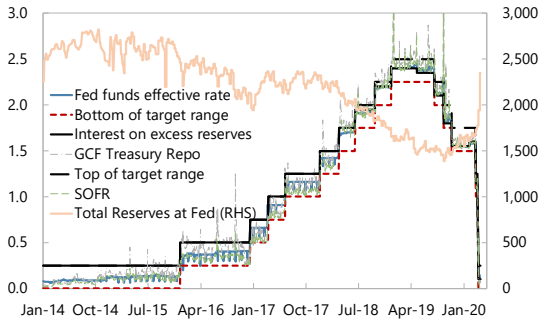
1. Standard Deviation of Daily Changes in Overnight Rates
(In percent)



Sources: Federal Reserve Bank of New York, DTCC, IMF Staff calculations

… and volatility patterns have changed as Fed balance sheet unwind has progressed ….

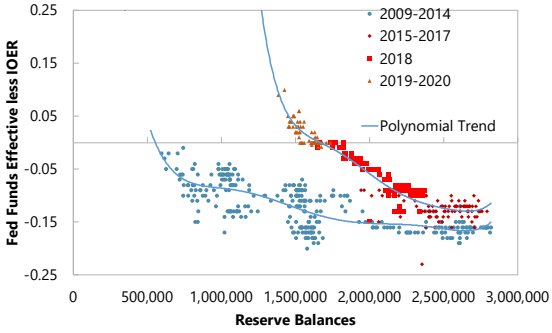
2. SOFR, GCF Repo, Fed Funds Rates
(Percent, USD billions)



Sources: Federal Reserve Bank of New York, DTCC

The reserves demand curve has steepened, in part reflecting tighter regulatory constraints …

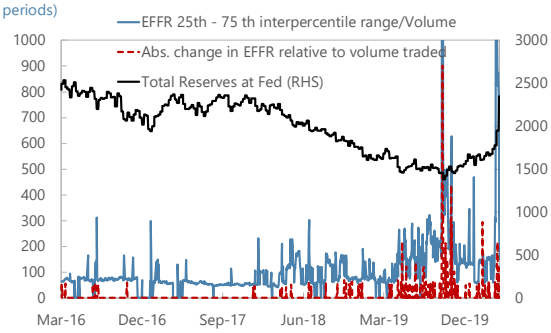
3. Fed Funds Effective less IOER vs. Reserve Balances
(Percent, USD millions)



Sources: Federal Reserve Bank of New York, IMF Staff calculations

… money markets are usually resilient but increasing signs of vulnerability in times of stress are evident

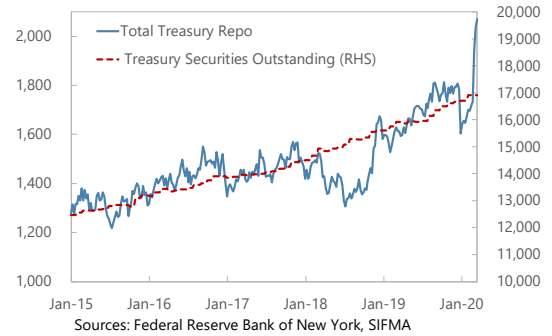
4. Daily Federal Funds market liquidity indicators
(2016-20, Index, USD billions, excluding month end and policy rate change periods)



Sources: Federal Reserve Bank of New York, IMF Staff Calculations

Primary dealers need for repo financing has increased as with the supply of treasuries ….

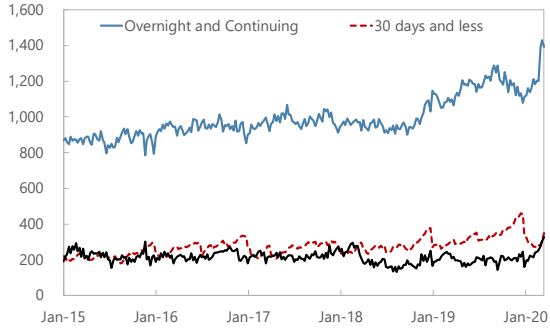
5. US Treasuries Outstanding vs Treasury Repos by Primary Dealers
(USD billions)



Sources: Federal Reserve Bank of New York, SIFMA

…and much of this financing has been on an overnight basis raising refinancing risks and decreasing resiliency

6. US Treasury Repo by Primary Dealers
(USD billions)

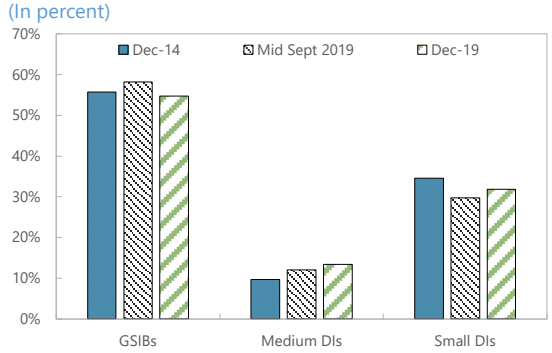


Sources: Federal Reserve Bank of New York

Figure 4. United States: Aspects of the Federal Reserve's Liquidity Provision Framework

Reserves are relatively heavily concentrated at large banks... Error! Bookmark not defined.

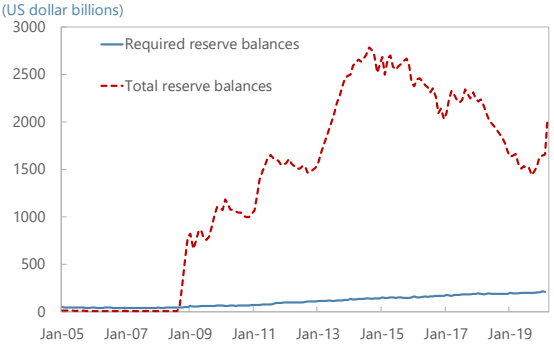
1.Proportion of total reserves held by size of institution
(In percent)



Sources: Federal Reserve Board

... and the Federal Reserve supplies ample reserves

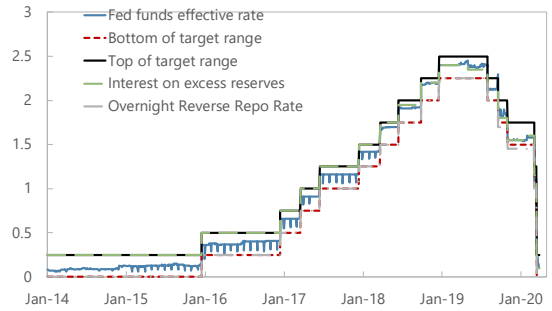
2. Total versus required reserve balances
(US dollar billions)



Sources: Federal Reserve Board

The Federal Reserve's operating target is to keep the Fed Funds rate well inside the 25-basis-point-wide target range

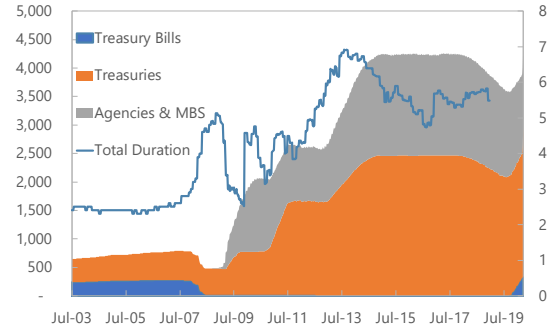
3. Federal Reserve target range, administered and federal funds effective rates
(Percent)



Sources: Federal Reserve Bank of New York, Federal Reserve Board

The Federal Reserve supplies reserves through long-term asset purchases

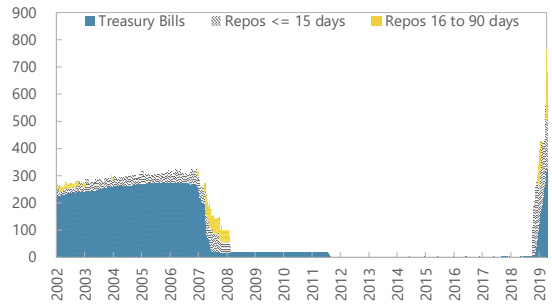
4. Composition and duration of the SOMA portfolio
(USD billions and years (right axix))



Sources: Federal Reserve Bank of New York

Recent illiquidity in money markets saw a resumption of short-term repos and T-bill purchases

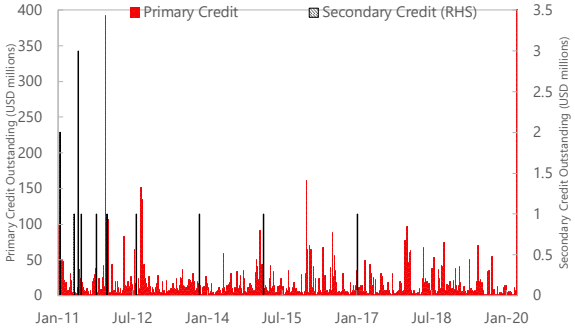
5. Federal Reserve treasury bill holdings and repos outstanding
(USD bilions)



Sources: Federal Reserve Bank of New York, IMF Staff calculations

The Discount Window is not heavily used...

6. Discount Window Usage -2011 - 2020
(USD millions)



Sources: Federal Reserve Board

57. The Fed's counterparties vary depending on the facility/operation concerned but the main counterparts are depository institutions and primary dealers. The Fed deals with money market funds, depository institutions, GSEs and primary dealers. Money market funds only have access to the ONRRP facility where counterparties can invest cash overnight in exchange for government securities via reverse repo with the Fed.[23] Depository institutions can access the full range of Fed facilities (in principle) including the ONRRP, IOER, term deposit auctions, as well as the Fed's standing credit facilities. GSEs only have access to the ONRRP facility as they are not permitted to receive interest on reserves. Primary dealers have access to Fed OMOs (if held) and are the main conduit between the Fed and the wider market. The Fed currently has 24 primary dealers.[24]

58. The structural demand for liquidity is met through the purchase of U.S. Treasury and agency securities. Growth in the Fed's non-reserve liabilities such as currency in circulation gives rise to a structural liquidity shortage which is balanced through the purchase of securities held in the System Open Market Account (SOMA) portfolio (Figure 4, panel 4). The SOMA is currently composed of both U.S. Treasury and Agency securities reflecting past QE operations. The FOMC's normalization principles state that in the long term the Fed will aim to predominantly hold U.S. Treasury securities in the SOMA. Currently, the composition of the SOMA is in transition where a portion of maturing Agency securities are rolled over, and the balance reinvested in new treasuries. The average duration of the domestic securities in the SOMA portfolio was around 5.5 years in 2018.[25]

E. Liquidity Backstops

Bilateral Liquidity Backstops: The Fed's Discount Window

59. The Discount Window provides a very broad, flexible, and transparent bilateral liquidity backstop for depository institutions. The Federal Reserve Act (FRA) Section 10(B) provides the authority underlying the Discount Window and Regulation A provides the detailed implementation guidelines. The Primary Credit facility is available to depository institutions (including U.S. branches and agencies for foreign banking organizations) in sound financial condition to meet unexpected liquidity shortfalls on a "no questions asked" basis that, as of March 9, was priced at 50 basis points over the top of the Fed funds target range. Primary Credit is typically advanced for one day but may be extended up to a few weeks for smaller institutions. The Secondary Credit facility provides credit to weaker financial institutions at a further 50 basis point

[23] The list of Fed Money Market Fund counterparties are available at https://www.newyorkfed.org/markets/rrp_counterparties. There are currently just over 100 MMF counterparties.

[24] The current list of primary dealers and the criteria for selection and associated obligations are available at https://www.newyorkfed.org/markets/primarydealers.

[25] See the Federal Reserve Bank of New York's 2018 OMO Report - https://www.newyorkfed.org/medialibrary/media/markets/omo/omo2018-pdf.pdf.

margin above the Primary Credit rate.[26] Secondary Credit is also typically extended on an overnight basis, but may be advanced for a longer period as a backup source of funding to a depository institution that is not sufficiently sound to be eligible for Primary Credit if, in the judgment of the relevant regional Federal Reserve Bank, such a credit extension would be consistent with a timely return to a reliance on market funding sources. Secondary Credit may also be extended to facilitate the orderly resolution of serious financial difficulties of a depository institution. Discount Window loans must be collateralized to the satisfaction of the advancing reserve bank. A very broad set of collateral may be used to secure Discount Window loans.[27] As noted above, Discount Window loans are typically extended for short maturities; however, during recent crisis periods (including since March 15, 2020) Discount Window loans have been permitted to be rolled over upon request of the borrower, subject to the discretion of the lending Reserve Bank and legal limitations on lending to undercapitalized FDIC-insured depository institutions.

60. The Discount Window is rarely used in significant volumes. Prior to March 2020, usage was low and dominated by idiosyncratic liquidity needs of smaller depository institutions (Figure 4, panel 6). Larger depository institutions did not use the Discount Window and did not incorporate access to it in their liquidity planning. Fed surveys of large depository institutions have consistently shown a strong aversion to using the Discount Window. Firms instead planned on raising more funding from customers (for example, FHLBs) or reducing lending to customers and running down liquid assets. The Discount Window was not used by depository institutions during recent periods of money market volatility even though, it should have been profitable to do so to fund repo market investments.

61. The Discount Window is heavily stigmatized. Stigma is a function of several factors including, but not limited to, the penalty rate applied to the Discount Window, publication of use, lack of use, and bank risk management preferences and incentives. Many of these features potentially leave banks and investors with the impression that the Discount Window is a facility used when something has gone wrong—and bank management and markets are very averse to such signs. Another factor that potentially adds to stigma is that the Discount Window has a mix of market backstopping and Emergency Liquidity Assistance (ELA) objectives.[28] Primary Credit is more

[26] The Primary and Secondary Credit Facility margins are as of February 2020 and are subject to change by the FOMC and Federal Reserve banks.

[27] For details on eligible collateral and applicable haircuts and operational procedures see https://www.frbdiscountwindow.org/pages/collateral/discount%20window%20margins%20and%20collateral%20guidelines.

[28] Emergency Liquidity Assistance refers to the provision of liquidity in the event of an idiosyncratic shock affecting one or a few individual financial institutions. ELA has two principal objectives: to mitigate the risk that temporary illiquidity leads to insolvency and to avoid contagion. It may be required when one or a few individual financial institutions are unable to maintain or roll over funding (whether retail or wholesale). Managing systemic banking crises: new lessons and lessons relearned / prepared by an IMF staff team lead by Marc Dobler, Marina Moretti, and Alvaro Piris discusses the concept as used in this Technical Note. See https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2020/02/10/Managing-Systemic-Financial-Crises-New-Lessons-and-Lessons-Relearned-48626.

like a standard central bank standing credit facility aimed at capping interbank rates whereas Secondary Credit looks more like an ELA instrument.

62. CCPs designated by the FSOC as systemically important have access to Fed liquidity in extremis. Title VIII of the DFA allows designated CCPs access to Fed services including emergency credit. The DFA sets a high bar for advancing credit to a CCP, and the Fed expects CCPs to plan prudently to ensure they do not need recourse to the Fed for liquidity support. Practical arrangements to facilitate liquidity provision to a CCP are not fully developed. Designated CCPs have accounts at the Fed that could be used to receive funds and transfer securities for collateral purposes. The Fed has done internal planning but detailed operational arrangements (for example, the preparation of legal lending contracts, arrangements to receive collateral) are not in place. The Fed anticipates it would be able to act quickly to make such arrangements in the event it became necessary.

63. The ability for other nonbanks to receive bilateral liquidity support is much more constrained. The DFA and FRA restrict such support. The Fed has the legal authority to extend credit to other nonbanks through Section 13-3 of the FRA. However, this can only be the case in the context of a broad-based facility. Hence bilateral liquidity support arrangements of the types provided to Bear-Stearns and AIG in the GFC are no longer possible.

Market-wide Liquidity Provision: Open-Market Operations and Standing FX Swap Lines

64. The Fed has broad authority to use OMOs to support market-wide liquidity. The Fed has broad authority to operate in money markets in OMOs (Section 14 of the FRA) using U.S. government and agency securities for market liquidity support.[29] OMOs using repos are flexible and scalable as the 2019 experience illustrates.

65. The Fed lacks a well-defined framework for intervening to support key securities markets.[30] The potential for outright purchases securities markets is limited as the FRA does not allow for asset purchases outside of Treasuries- and Government-guaranteed agencies, except within the context FRA 13-3 program approved by the Treasury Secretary.[31] Instead, the Fed has the authority to provide collateralized credit to depository institutions or to special purpose vehicles whom may then purchase securities as opposed to directly purchasing a wide range of assets itself. The Fed notes that it was able to develop a range of programs in the GFC which helped liquefy

[29] Section 14 of the FRA also allows OMOs using short term foreign government securities and various classes of home loan agency, state and municipal short-term securities. In practice, OMOs are conducted using US government and Agency securities (with a government guarantee).

[30] See King, Brandao-Marques, Eckhold, Lindner and Murphy (2017) IMF Working Paper 17/152 https://www.imf.org/en/Publications/WP/Issues/2017/07/10/Central-Bank-Emergency-Support-to-Securities-Markets-45012 and a discussion of principles that might guide such a framework is available in Fisher (2010) at https://www.bankofengland.co.uk/-/media/boe/files/speech/2010/the-corporate-sector-and-the-bank-of-englands-asset-purchases-speech-by-paul-fisher.pdf?la=en&hash=038C517EE6E40C3E12835D79F1BC8E689670AC49.

[31] Geithner 2016 also notes this limitation in the FRA—see http://www.perjacobsson.org/lectures/100816.pdf.

securities markets. It expects it will be able to act quickly to develop a securities intervention approach, if required, in a future crisis.

66. The Fed's network of bilateral FX swap lines is an important source of market wide liquidity support. This network is critical given the prominent role that the U.S. dollar plays in global money markets and the highly integrated U.S. domestic and global money markets. The network has been scaled back since the height of the GFC to a set of five countries, but these lines are now permanent standing lines whereas during the crisis they were temporary. The FOMC has broad authority to deploy and extend the FX swap line network in a future stress event. But its focus is on market wide liquidity support and not country-specific or individual institution issues. Countries are expected to resort to their own FX reserves and official institutions for idiosyncratic U.S. dollar liquidity support.

67. Market-wide liquidity provision to nonbanks must adhere to the restrictions of FRA Section 13-3. The Dodd-Frank Act requirement that any 13-3 lending program be broad-based (interpreted as meaning that any facility offered needs to be available to five or more entities) potentially complicates the Fed's liquidity support options to the nonbank sector and securities markets. However, many market-wide liquidity support options deployed in the GFC could be used again (for example, the Term Asset-backed Securities Loan Facility). Depending on the details of the program, such programs can be supported by the Treasury via resources from the Exchange Stabilization Fund to provide the Fed a buffer from the increased risks associated with such programs. Also, 13-3 based programs need to be pre-approved by the Treasury Secretary and certain lending within such a facility reported to Congress within a week. These provisions mean that the Fed does not provide loans anonymously and can't provide liquidity assistance on a confidential basis which could make entities uncomfortable with using new 13-3 facilities, reducing their effectiveness.

Foreign Exchange Liquidity Provision

68. The framework for liquidity provision in currencies other than U.S. dollar appears less well developed. The FRB has not taken a public position on the FRA's authority to advance liquidity in currencies other than U.S. dollar and hasn't developed further its policy or operational framework. The sources of FX to meet a FX liquidity need include the Fed's FX liquidity swap lines but are not clear beyond those. FX liquidity provision could become important in the event of liquidity stress in a CCP, as these entities clear instruments in currencies aside from the U.S. dollar.

F. Response to Market Pressures Stemming from COVID-19[32]

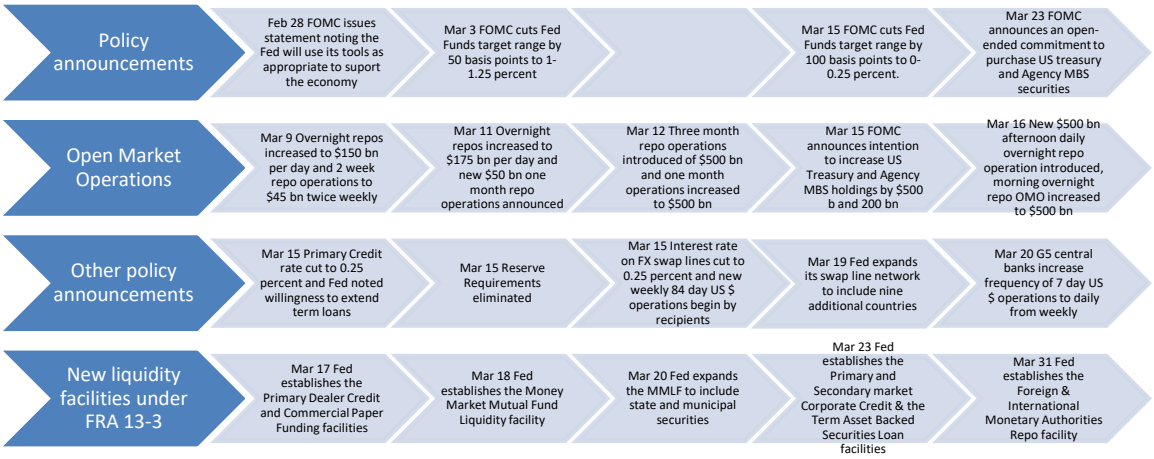
69. Markets were severely disrupted by the COVID-19 crisis from late February 2020 leading to an all-encompassing policy response. This section discusses the period from late

[32] Section F covers events since the conclusion of the FSAP on-site visits in early March 2020. The characterizations of the programs are based on public announcements by U.S. government agencies and do not reflect the depth of discussions and information-gathering as the rest of the document.

February 2020 when market concerns about the global spread of the COVID-19 spiked. The Fed responded quickly with a broad-based set of crisis management measures.

70. The Fed rolled out a comprehensive set of liquidity support measures to combat widespread market dysfunction and to enhance monetary policy transmission. Figure 5 shows the sequence of measures that combined significant monetary policy easing, outright long-term asset purchases, an expansion of standard repo OMOs, enhancement of the Primary Credit Facility, elimination of reserve requirements, and globally coordinated U.S. dollar liquidity provision through an expanded FX swap line network and the introduction of a panoply of crisis liquidity support measures using Section 13-3 of the FRA.

Figure 5. United States: Liquidity Measures in Response to COVID-19 Crisis as of end March 2020* **Error! Bookmark not defined.**



Source: IMF Staff

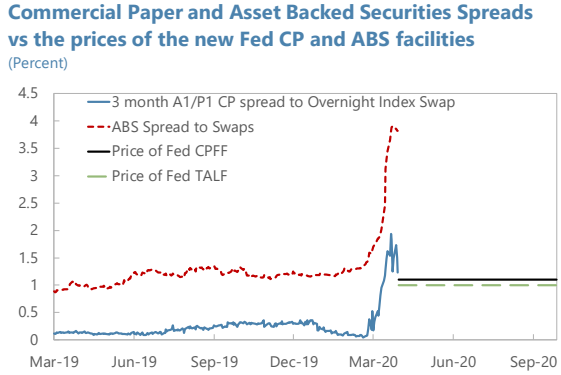
* The figure includes actions taken up to end March 2020. In April 2020 the Federal Reserve introduced new facilities to provide liquidity to provide liquidity to businesses via the Paycheck Protection and Main Street Lending Programs. The figure does not show other measures in the area of bank regulation and guidance that were also taken in March 2020 to increase the efficacy of these programs.

71. The focus of initial policy response was on combating extreme dysfunction in money and securities markets. Liquidity dropped significantly across a range of key money markets through March. Repo rates rose significantly, the Fed Funds rate moved to the top of the target range and commercial paper and asset-backed rates rose significantly, and volumes dropped. Cross currency basis swap margins to risk free rates rose significantly reflecting a global shortage of U.S. dollar liquidity. Securities markets exhibited extreme stress and became illiquid—even in core U.S. Treasury and U.S. Agency MBS markets—as evidenced by wider credit spreads and on-the-run off-the-run Treasury spreads (Figure 6).

72. Coordinated global central bank action helped stabilize FX swap markets. The Fed quickly enhanced and expanded its FX swap lines in order to provide U.S. dollar liquidity globally, helping reduce pressures on the domestic money market. The announcement of the new Foreign and International Monetary Authorities Repo facility further calmed markets by providing most foreign official institutions a mechanism to quickly raise funds from the Fed without resorting to outright securities sales in the stressed treasuries market.

73. Many GFC-era liquidity facilities were re-activated under Section 13-3 of the FRA with the support of the Treasury. Money market stress required the re-activation of the Primary Dealer Credit Facility to provide liquidity support to Primary Dealers. Support to securities markets was provided by re-activating the Commercial Paper Funding, Money Market Mutual Fund.

Figure 6. United States: New Fed Facilities



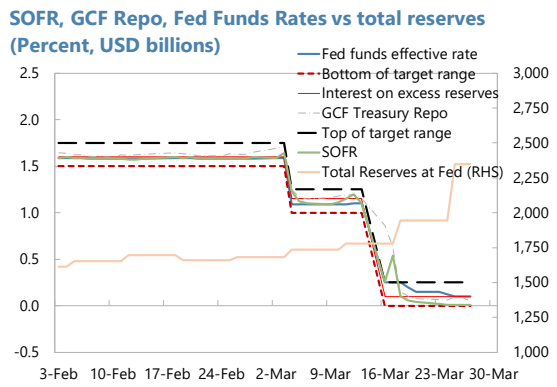
Sources: Federal Reserve Board

74. Liquidity, and the Term Asset-Backed Securities Loan facilities (Figure 6). New corporate securities support facilities were developed in the form of the Primary and Secondary market credit facilities. The elevated risks associated with these facilities was backed through an injection of US$105 billion of capital funding from the Treasury's Exchange Stabilization Fund and through the CARES Act. These securities market support facilities were operationalized through a set of single Special Purpose Vehicles.

75. The Fed's actions were effective in bringing markets under control. Much of the impact in March has been an announcement effect as few of the newly announced facilities were immediately operational implying high credibility of the Fed's timely measures. Money market volatility came down relatively quickly and repo and Fed funds rates moved back inside the Fed funds target range (Figure 7). Commercial paper and other securities markets took longer to respond reflecting the significant uncertainty about corporate credit quality and the underlying business environment.

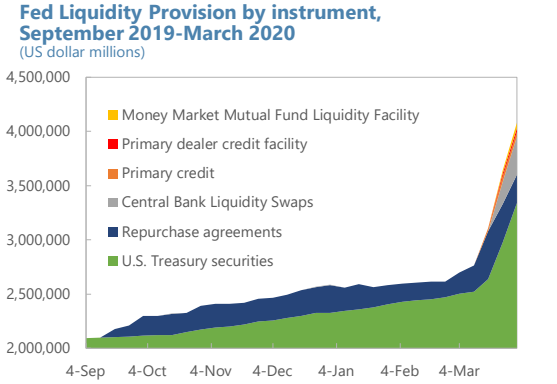
Figure 7. United States: Money Market Conditions and Fed Lending Programs in March 2020

Money market volatility spiked with COVID-19 concerns



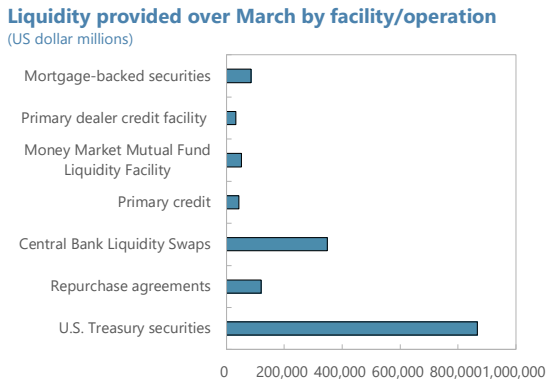
Sources: Federal Reserve Bank of New York, DTCC

The Fed quickly scaled up repo OMOs and asset purchases



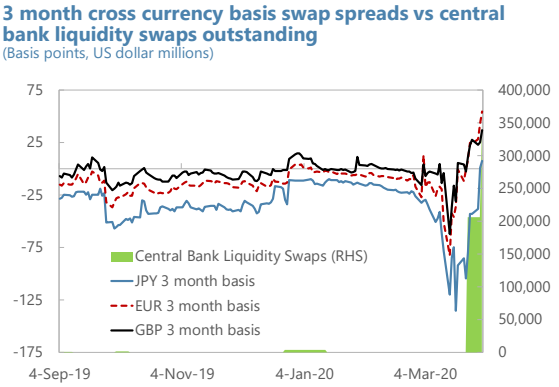
Sources: Federal Reserve Board

Markets heavily used the expanded Fed facilities



Sources: Federal Reserve Board

Global U.S. dollar provision was an important stabilizer



Sources: Bloomberg, Federal Reserve Board

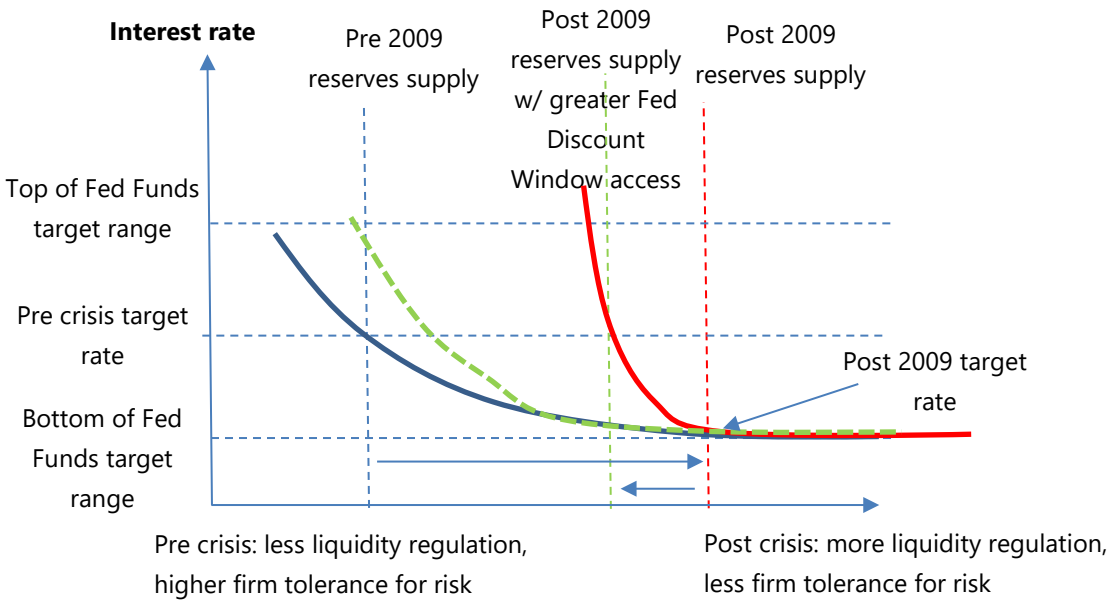
G. Recommendations

Preserving Bank Incentives to Intermediate Liquidity

76. Large firms' responses to regulatory constraints combined with greater conservatism in bank risk management have likely reduced large bank's willingness and capacity to provide liquidity in times of stress. Banks consistently cite a range of regulatory constraints that have changed their demand for cash and their incentives to act as intermediaries. The key issues center around intraday liquidity stress test requirements, resolution funding requirements, the GSIB surcharge and the Supplementary Leverage Ratio. To a significant extent, the issue is not the regulations themselves (which are largely silent on the composition of bank High Quality Liquid Asset (HQLA) holdings and focus more on the total required level of HQLA) but how firms have incorporated these regulatory requirements in more granular and sophisticated risk management frameworks. The net impact has been to both increase the demand for reserves as well as increase

its slope. Box 3 discusses how specific regulatory factors indirectly impact the supply and demand balance in the money markets. The overall implication is that the demand for reserves, and the volatility of money market rates for any given level of excess reserves has increased.

Box 3. Regulatory Drivers of Reserves Demand



Regulatory factors indirectly drive the demand for reserves through their impact on the precautionary demand for reserves of depository institutions. Two types of impact are possible: on the *level of demand* for reserves—i.e., on the position of the reserves demand curve relative to reserves supply; and on the *slope of the demand curve*—which relates to the degree of substitutability of reserves for other types of HQLA as the price of reserves varies relative to other HQLA. Most regulatory constraints interact with the risk tolerance of bank liquidity managers and the flexibility of their balance sheet management models and impact both the level of slope of the demand for reserves.

Factors that likely impact more on the level of demand are those regulatory factors than encourage firms to hold more HQLA in aggregate and cash in particular, due to its superior liquidity characteristics for meeting very short-term payments obligations. Firms may have limited ability to substitute between cash and other HQLA to meet these types of requirement hence the impact may be more on the level of the demand than its slope (which would generally be highly inelastic). Examples include:

- *Banks' internal intraday liquidity stress testing requirements* as these require firms to hold liquidity to meet very short horizon payments obligations. Non-reserves HQLA is generally unsuitable to meet such obligations if managers assume no access to the Federal Reserve Discount Window. Some parts of the firm may not have Discount Window access in any case (for example the BD affiliate of a GSIB).

Box 3. Regulatory Drivers of Reserves Demand (concluded)

- *Resolution funding requirements* as these also require firms to hold liquidity to meet payments obligations in situations where the degree of payments inflows may be uncertain and/or the firm's access to repo funding in the market may be uncertain. Larger, more complex firms require more resolution funding all else equal as liquidity needs to be prepositioned within each material entity within the group. Some entities within a group may not have access to financial markets to raise repo funding and as such need to hold cash to meet their operating needs in resolution.

Factors that impact the slope of the demand curve are those regulatory factors that cause interbank market frictions that reduce incentives to intermediate reserves. Frictions can be overcome if the price of reserves is sufficiently high to cover the intermediation costs associated with the frictions. Examples include:

- *The Supplementary Leverage Ratio* as this adds an extra capital cost for a leveraged broker-dealer to engage in the marginal dollar of financing activity. For a dealer to lend funds they must also borrow funds, thus increasing leverage which they need to be compensated for.
- *The GSIB surcharge* as this adds a very high capital cost on the entire firm if the marginal dollar of financing activity leads to the firm moving from one GSIB category to another. The impact will be most evident in December 31, when some of the balance sheet indicators will be measures. However, as firms preposition their balance sheets in the months leading up to the end of the year, some impact on the willingness to provide financing to customers will occur ahead of year end. Hence the slope of the demand curve may steepen in the latter part of the calendar year.

Both level and slope factors could be influenced by the specification of regulations and the terms under which the central bank offers liquidity to firms without relaxing or undermining the stringency of the regulations themselves (which are supposed to be agnostic on whether liquidity needs are met through reserves holdings or other HQLA). Improving firms access to the Discount Window (or providing an alternative standing repo facility) gives firms an option to use non-cash HQLA to meet cash needs as firms would have a better basis for assuming monetization of non-reserves HQLA. This would reduce the demand for reserves and potentially make its slope more elastic. Other initiatives that allow intermediation to occur without grossing up the balance sheet also help ease liquidity constraints. Examples include the expanded availability of cleared repo through sponsored repo which effectively allows intermediaries to do a greater volume of business within a given balance sheet.

The figure above illustrates the potential impacts. The impact of the post-crisis regulatory environment has been to shift the demand curve to the right and steepen the curve. The Fed supplies more reserves consequently to keep interest rates in the target range. Policies that are effective in providing firms more options to meet liquidity requirements than holding cash could both shift the demand curve back left and flatten the curve. The result would be a smaller Fed balance sheet and less sensitivity of interest rates to fluctuations in the supply and demand for reserves.

77. Complexity of large bank risk management frameworks combined with the push to optimize balance sheets has reduced the flexibility of large banks to quickly respond to shocks to liquidity demand. Large bank holding companies now have more complex and granular balance sheet management frameworks that are designed to ensure compliance with the panoply of regulatory requirements while also optimizing capital and liquidity usage as much as feasible. The impact is for the individual business areas of large firms to have some balance sheet capacity to meet expected customer demand but less flexibility to quickly respond to unexpected spikes in demand for liquidity—especially from other market participants. Changes in capacity to

accommodate new lending business or in the ability to alter the composition of the HQLA portfolio are possible but take time as any changes need to fit within the firm's aggregate balance sheet optimization framework. This means that large firms may not have much flexibility to scale up liquidity provision to the market or alter the HQLA portfolio unless the change in market demand is persistent and hence the potential for market volatility is elevated.

78. The U.S. authorities should take steps to promote the Discount Window as a tool firms can utilize to make reserves and Treasuries more fungible once conditions normalize. The reluctance for large firms to incorporate access to the Discount Window encourages a larger demand for reserves, and a less flexible response to unexpected changes in market demand for reserves. In the absence of usable liquidity backstops, market participants self-insure and demand more reserves ex-ante which, if the Fed does not provide, will result in increased interest rate volatility and the efficiency of monetary policy implementation will be reduced. Incentives to intermediate and provide liquidity are undermined as firms focus more heavily on meeting their own liquidity needs and are less interested in helping others meet their needs with market resiliency and financial stability implications. Increased fungibility of reserves and Treasuries would help reduce the slope of the reserves demand curve, reducing interest rate volatility and bolstering market resilience. A fall in the demand for reserves could also enable the Fed to operate with a smaller balance sheet. A reduced demand for reserves could be encouraged by the regulatory authorities clarifying that it is acceptable and desirable for regulated firms to assume access to the Discount Window (using U.S. Treasury securities as collateral) in a stress situation when planning for meeting resolution planning and intraday stress test requirements.[33] This could be achieved through clarifications to the Fed's Regulation A (which governs the Discount Window) and through revised interagency guidance to banks (for example in the areas of resolution funding and liquidity stress test requirements). This could be limited to the use of Treasuries in liquidity planning given that the Discount Window allows use a wider set of collateral including non-HQLA. Outreach to regulated firms would help encourage incorporation of this guidance into liquidity planning.[34] The Bank of Canada and the Bank of England provide recent examples of useful approaches. The measures taken by the Fed in the COVID-19 crisis period to reduce the cost of accessing Primary Credit, lengthening its maturity and by providing guidance to banks that use of Primary Credit are desirable and good examples of

[33] Any revisions to resolution liquidity requirements should not undermine the purpose of these requirements, which to ensure that material entities of US banking groups have adequate access to liquidity in a resolution scenario. See FSB "Guiding principles on the temporary funding needed to support the orderly resolution of a global systemically important bank" (2016) at https://www.fsb.org/2016/08/guiding-principles-on-the-temporary-funding-needed-to-support-the-orderly-resolution-of-a-global-systemically-important-bank-g-sib/ for a discussion of the relevant principles governing the forms that resolution funding might take. These Guiding Principles suggest that central banks could consider providing liquidity support to banks in resolution.

[34] Expanded recovery planning obligations on banks might provide an additional avenue that could complement efforts to destigmatize the Discount Window. Requiring banks to plan for access to central bank facilities is a required element of recovery planning in other major jurisdictions, such as the UK (see paras 2.31–2.35 here: https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/supervisory-statement/2017/ss917.pdf).

changes which might aid de-stigmatization. The tentative early evidence is encouraging as there has been a significant increase in use of Primary Credit in March (see Section F).[35]

79. Banks have an incentive to access funding from FHLBs, which increases interconnectedness. Funding from FHLBs remains relatively generously treated in the LCR, while FHLBs procure funding for advances by issuing short-term notes purchased by Money Market Funds (MMFs) and other investors.[36] FHLBs thus play an important intermediation and funding role in the money markets. Reconsidering the treatment of funding from FHLBs in the LCR to ensure a level playing field with other unsecured lenders in the Fed funds market would help reduce concentration risks on FHLBs (who themselves are subject to significant liquidity mismatches as the maturity of their advances is typically much longer than the short term funding received from MMFs) and enhance the resiliency of markets in situations where FHLBs themselves run into liquidity problems.

Designing the Fed's Operational Framework to Support Money Market Resilience

80. The Fed's ample reserves system could be more effective in supporting market resilience if supplemented with regular fine-tuning operations in normal times. The system is very robust to a wide range of supply and demand shocks; however, availability of reserves in aggregate does not assure access to reserves to individual institutions and especially nonbanks. The Fed's current preference to operate without regular liquidity providing operations reduces the liquidity insurance that the ample reserves regime could provide. Such a passive liquidity provision approach is different to how ample reserves regimes are operated elsewhere.[37] The Fed could better bolster the liquidity certainty it provides markets by adjustments to its operating framework by (i) restructuring the SOMA to include a higher proportion of short-term instruments (treasury bills, repo operations) that can be regularly rolled over, and (ii) regularly operating repo OMOs where the Fed varies the volume of OMOs offered in response to the revealed demand of markets. This would allow primary dealers regular access to Fed repo OMOs and those OMOs could be easily scaled up if bidding behavior suggested increased demand for Fed repo. The Fed could also explore conducting its repo (and reverse repo) operations via the FICC's cleared repo services as this could widen the reach of the Fed's OMOs, reduce pressures on dealer balance sheets (as repo operations could be netted) and there would be reduced reliance on the BNYM (see para 82 for further discussion).

[35] See https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/consultation-paper/2019/cp2719.pdf for details on the proposed Bank of England guidance.

[36] The treatment of FHLBs in the LCR rule has been assessed by the Basel committee in 2017 as part of the RCAP. See https://www.bis.org/bcbs/publ/d409.htm.

[37] Norway and New Zealand have the longest experiences of operating ample reserves regimes outside of Quantitative Easing periods. In both cases, these central banks incorporate regular OMOs of short term instruments into their liquidity management strategy that then gives the central bank the ability to scale up and down liquidity provision, as well as vary the terms under which liquidity is provided, in response to changes in the demand for liquidity. The U.K. proposed a similar strategy when consulting on their post-QE implementation regime in August 2018—see https://www.bankofengland.co.uk/-/media/boe/files/paper/2018/boe-future-balance-sheet-and-framework-for-controlling-interest-rates.pdf?la=en&hash=5698143A9EA823D16162E8EE8E1D3854A4A35AF4.

81. Such adjustments improve the Fed's liquidity insurance and would make the operational framework more robust to shocks. Liquidity more readily and regularly available in a de-stigmatized form thus providing liquidity insurance to markets as well as providing the Fed with regular information on the liquidity and resiliency of the money markets. Such an approach would be robust to changes in the demand for liquidity—for example of the nature that occurred in September 2019—as the Fed's operations could quickly scale up to meet market demand. The rapid scaling up and lengthening of the Fed's repo operations in the COVID-19 period is an example of where the Fed can more easily quickly and effectively respond to market pressures by regularly conducting repo operations (see Section F).

82. The Fed could explicitly include repo rates in its operational target to better guide liquidity provision. The focus on the Fed funds rate as the operational target guiding liquidity provision operations diverts attention from the more important repo markets that are key to price discovery and liquidity risk management for banks and nonbanks. While the transmission between the Fed funds and Repo markets runs both ways, in many cases shocks to liquidity demand are initially felt in the repo markets (for example if nonbanks need repo funding) and is then transmitted to the Fed funds market as banks, FHLBs and GSEs operate in both markets. The operating target could be adjusted by the FOMC reconsidering the nature of its operating target by including repo rates—either explicitly in their own right by referencing SOFR as the operating target or by specifying the operating target in terms of the general level of overnight wholesale market rates (thus incorporating the Fed funds rate and other unsecured wholesale market segments included in the Overnight Bank Funding Rate). The Fed aggressively responded to increased repo market pressures during the March COVID-19 crisis period even though there was less pressure in the Fed funds market. These actions were appropriate and would be clearer and more easily anticipated by market participants if repo rates were more explicitly included in the Fed's operational target.

83. Ample reserves systems should be focused on aligning market rates with a single central bank policy rate. It is unusual for central banks operating ample reserves (floor) systems to have a target range for short term rates as, usually, central banks use their main liquidity absorbing facility rate as their policy rate (the IOER in the Fed's case). Using a single policy rate does not mean that the Fed need manage volatility in market rates very closely. It is only necessary that overnight money market rates settle close to the policy rate on average over time to achieve adequate control. Short term volatility is acceptable and indeed valuable as it allows markets the opportunity to trade risk and conduct price discovery. A single policy rate could be expressed as the level at which both the ONRRP and IOER rates are set. Regular OMOs could then focus on providing whatever liquidity is required to keep overnight money market rates close to the policy rate on average over time.

84. If a standing repo facility were to be considered, important design tradeoffs would need to be confronted. Stigma is a challenge facing all central banks operating ample reserves regimes as in such regimes standing facilities are costly and rarely used. Market participants are only likely to be comfortable with using any new standing repo facility if it is priced close to normal market rates. This is problematic as the implication is a very narrow interest rate corridor with relatively little role for market-based price discovery. A standing repo facility may also need to be

more widely accessible than the current list of large primary dealers if there are concerns on the capacity of primary dealers to intermediate between the Fed and the wider nonbank repo market in times of liquidity stress. Introducing a new standing facility is best considered if strategies to destigmatize the Discount Window prove ineffective. The FSAP recommends that the authorities first try to get banks to incorporate the Discount Window in their liquidity planning (as discussed in paragraph 78) and move to introduce a new standing facility if destigmatizing the Discount Window fails, noting that some trade-offs in terms of counterparty access and pricing versus stigma as well as moral hazard risks need to be confronted. A new standing facility that uses U.S. government securities as the only eligible collateral might be constructed with a price somewhat closer to the top of the FOMC target range to try and induce more regular use. The facility could be made available to large banks who have a regular interbank market presence and broker-dealers (perhaps wider than the existing Primary Dealers if those dealers can meet the Fed's counterparty credit standards). The Fed's experience of the usefulness of changes to the Primary Credit facility and introduction of the Primary Dealer Credit Facility in the COVID-19 crisis period (see Section F) will be instructive in terms of the nature of reforms that will be most effective in the long term.[38]

85. The Fed could consider implementing a quota system for the payment of IOER to depository institutions to stimulate interbank activity. The central banks of New Zealand and Norway have implemented ample reserves systems for some time, and both use a quota or tiering system to try and stabilize the demand for reserves and disincentivize liquidity hoarding. These systems are effective and could be considered in the U.S., although the diversity of depository institutions might make developing a quota system challenging.[39]

Developing Liquidity Provision Options to Backstop Liquidity Needs at Nonbanks

86. The authorities need powers to provide bilateral liquidity support to systemically important nonbanks. The DFA restricts the Fed's ability to provide liquidity support to nonbanks and severely constrains the Fed's options to maintain financial stability in a situation where a large, interconnected nonbank faces liquidity difficulties. Such powers are a useful adjunct to the existing DFA Orderly Liquidation Authority and would allow scope for the Fed to act earlier to prevent liquidity problems at a solvent but illiquid systemically important nonbank from spilling over to the financial system more widely. Legislative changes should be enacted that return the power for the authorities to provide bilateral liquidity support to a FSOC designated systemic nonbanks should be explored.

87. Preparedness to operationalize liquidity provision to designated CCPs could be improved. The authorities have the power to provide liquidity support to FSOC designated systemically important CCPs, but the DFA appropriately sets a high bar to provide liquidity support to a CCP which is desirable from a moral hazard perspective. Additionally, the supervisory agencies

[38] Such a facility could be done under FRA section 14's OMO authority.

[39] It is possible that a simple system might be developed where the bulk of banks (for example with assets less than US$50 billion) were developed a de-minimis quota leaving the main task of allocating more specific quotas to larger firms based on their specific balance sheet and payments system characteristics.

of CCPs have well developed oversight arrangements that provide timely and granular information on the liquidity situation of CCPs. While CCP supervisors have taken steps to ensure that CCP liquidity resources will be adequate, even in stressed market conditions, there are still very extreme circumstances that could conceivably challenge the stressed liquidity plans. To better prepare for such circumstances it is recommended that the Fed enhance arrangements to provide emergency liquidity support to designated CCPs quickly if authorized.

88. A more comprehensive framework to guide market-wide liquidity support in securities markets should be developed to combat possible market dysfunction. Banks and nonbanks alike heavily rely on liquidity in key securities markets to manage liquidity and intermediate credit to the economy. The Fed deployed programs to support key securities markets in the GFC and COVID-19 crisis periods. Preparedness to provide such support in a future crisis would be enhanced if there was a more formal framework for determining which markets would be candidates for support and associated operational modalities to quickly facilitate support. The need for such support of securities markets is only emphasized by the Fed's actions in the COVID-19 crisis period (see Section F).

Preparedness for Providing FX Liquidity

89. FX liquidity provision protocols need development. The system of standing central bank FX swap lines provides a useful source of FX to finance FX liquidity provision, although it is less clear whether the FX reserves of the Treasury might be available for this purpose. It is recommended that the FRB develop its FX liquidity support protocols to both banks and CCPs.

Improving the Resilience of Repo Market Clearing and Settlement

90. The concentration of risks on BNYM is a significant concern that warrants structural change. The authorities should work with market participants to develop the capacity for repo clearing and settlement services to continue in the absence of BNYM, possibly involving direct settlement arrangements at the Fed. The resilience of the cleared FICC repo market could be enhanced if those cleared transactions could settle away from BNYM, at least as a backup. The Fed should also develop an effective option to conduct repo operations in the event of a protracted outage at BNYM. The FRB should undertake a simulation exercise to test a response to a tail risk of a protracted BNYM operational outage or reduction in BNYM capacity.

Managing Risks to Systemic Liquidity from the Transition from LIBOR to SOFR

91. The ARRC and the authorities have made great strides in developing and delivering on an ambitious transition plan but there is a need to move towards firm targets and deadlines. The U.S. authorities have been heavily engaged with the ARRC in promoting a fast and well managed transition away from Libor by end 2021. Efforts have been focused on raising awareness, using supervisory tools to prompt the disclosure and management of Libor-related risks and providing regulatory relief to facilitate the transition and international coordination. Most Libor-related exposures are in the derivatives markets where significant progress has occurred and where

new markets that reference SOFR are developing fast. Slower progress is evident in the corporate securities and loan markets where a wider variety of users are involved and where some more significant changes in the structure of instruments are required. Market participants need to continue to work hard to transition away from Libor as quickly as possible. Libor transition risks could be reduced by:

- The authorities remaining focused on ensuring regulated firms manage and disclose Libor related risks effectively.
- The authorities (Fed, SEC, and CFTC) moving to set hard targets with deadlines for firms to transition to SOFR based products. Such targets and deadlines could be supported by the use of supervisory tools and adjustments to collateral haircuts and eligibility to encourage firms to transition more quickly.
- The authorities could provide more guidance on best practices and common standards when structuring new SOFR-based products thus helping markets develop and transition faster.

Appendix I. FSAP 2015 Recommendations and Follow-Up

2015 FSAP Findings and Recommendation[1]	Current Status
Systemic Risk Oversight[2]	
Remit, Responsibilities, and Organization of FSOC	
To underscore the independence of FSOC, it would be helpful to clarify the organization and governance arrangements for each of the Committees in the Charters that are under development, ensuring that the expertise of each of the member agencies is drawn on appropriately. Moreover, it would be helpful to appoint Chairs for each of the supporting staff Committees, drawing upon the expertise of the member agencies.	**Partially implemented** Charters include suggestions that participants have the necessary experience.
The mandates and mission statements of each of the FSOC member agencies should be supplemented by addition of an explicit financial stability mandate. As an immediate step towards this goal, member agencies are encouraged to publish voluntary statements that the agency fully supports the work of the Council, subject to meeting the mandate and mission of the individual agency.	**Not Implemented**
Strengthening Systemic Risk Identification in the United States	
FSOC should set a clear short-term deadline to address outstanding obstacles to data sharing, and to agree a flexible, data sharing protocol across member agencies to support collective systemic risk oversight.	**Partially implemented** MoUs are in place across the FSOC membership.

[1] Based on the Financial System Stability Assessment and the technical note—pages 28–48).

[2] These issues were discussed in pages 9–28 of the technical note on systemic risk oversight.

FSOC should continue to direct the OFR to prioritize work to address data gaps in short-term wholesale funding markets, in nonbank financial intermediation (such as asset management) and in interconnectedness indicators across the financial system.	**Partially Implemented** Surveyed data on cleared repo is published but other areas have not been addressed.
FSOC should publish additional information on the monitoring framework underpinning systemic risk identification and on the work of the SRC, to aid transparency and accountability. The monitoring framework should set out the responsibilities for monitoring risks beyond the regulatory perimeter and risks from global financial developments.	**Not Implemented**
FSOC should publish additional guidance in each Annual Report on the materiality the Council attaches to each of the identified threats to U.S. financial stability, including a judgment on their likelihood and impact.	**Not Implemented**
Addressing Identified Threats to Financial Stability	
For each identified material threat to financial stability highlighted in the Annual Report, FSOC should publish specific follow up actions to address each identified priority threat, stating clearly where responsibility for delivery of the actions lies, and specifying an agreed timeline for implementation and reporting of the results.	**Partially implemented** The FSOC's Annual Reports discuss in a detailed manner each material threat identified, provide updates on regulations and other measures proposed or implemented in response to each threat, and outline the research agenda. However, specific timelines and responsible agencies are not identified.
To strengthen coordination and collective ownership of the risk mitigation actions, members should consult FSOC as standard practice on the development and implementation of major new regulatory rules that could impact financial stability	**Partially implemented**
At a point in the conjuncture where financial stability risks appear to be	**CCyB has been finalized.**

building, FSOC and its member agencies should prioritize the development of the U.S. macroprudential toolkit, focusing particularly on developing new time-varying measures to address the buildup of cyclical and sectoral risks and to strengthen the resilience of financial markets to run risks and fire sales.	
FSOC and its member agencies should ensure that the instruments are ready to use, and that the appropriate legal authorities are in place. Members should consult FSOC as standard practice on the potential new application of macroprudential tools.	**Not Implemented**
To provide clarity on the toolkit and on the readiness to deploy the instruments (as well as identifying remaining gaps), FSOC is encouraged to publish a summary of the U.S. toolkit identifying which tools are available to address particular types of risk and which agency/agencies have responsibility to deploy them, including the definition of triggers and the framework/approach to implementation. Updates should be published periodically as the toolkit is enhanced.	**Not Implemented**
Systemic Liquidity	
Tri-Party Repo Infrastructure An important next step to reducing the risks around tri-party repo is to reduce reliance on the two clearing banks, for example by developing options that might allow settlement in central bank funds.	**Not implemented** The Federal Reserve, in conjunction with an industry Task Force, was successful in reforming the tri-party repo infrastructure and market behaviors from 2010 through 2016 resulting several key accomplishments including: • All trades are matched prior to settlement • Reducing the provision of intraday credit from 100 percent uncommitted and unsecured to less than 1 percent secured and committed (including FICC GCF settlements)

	• Improved risk management practices across the industry Additionally, although there has not been a fulsome solution for the reduction of firesale risk, the market CCP has introduced several new products and enhancements to its existing services that have resulted in significantly more activity being introduced to central clearing. In 2016, JP Morgan (JPMC) announced its decision to exit Broker Dealer clearance and settlement (including collateral management) resulting in one dominant provider, BNYM. The transition from JPMC to BNYM occurred smoothly over a two-year period, concluding at the end of 2018. Federal Reserve and other regulators continue to monitor the market and supporting infrastructures as it continues to evolve. Federal Reserve has not taken additional steps to significantly change the infrastructure post 2016 or after the transition of JPMC activity to BNYM, including steps to settle in central bank funds.
Repo Safe Harbors The authorities are encouraged to consider reviewing the financial stability impact of allowing mortgage-backed securities and other illiquid loans and securities safe harbor from bankruptcy proceedings.	**Not implemented** The Federal Reserve has not taken any actions related to the scope of Repo Safe Harbors. Changes to the scope of Repo Safe Harbors would require legislative (not regulatory) action.
Broker-dealers Completion of the review of regulation at the broker-dealer level is a priority. The SEC should move to finalize and implement rule changes to contain risk taking thereby reducing the prospect of regulatory arbitrage in the future.	**Partially implemented** In June 2019, the SEC adopted rules establishing capital and margin requirements for security-based swap dealers for which there is not a prudential regulator (nonbank SBSDs).[3] Nonbank SBSDs also registered as broker-dealers (other than registered OTC derivatives dealers) will be subject to the pre-existing requirements in the capital rules that apply

[3] See Capital, Margin, and Segregation Requirements for Security-Based Swap Dealers and Major Security-Based Swap Participants and Capital and Segregation Requirements for Broker-Dealers, Release No. 34-86175 (June 21, 2019), available at https://www.sec.gov/rules/final/2019/34-86175.pdf.

	to broker-dealers, as amended to account for security-based swap and swap activities of broker-dealers. All other nonbank SBSDs will be subject to similar capital requirements in new Rule 18a-1 under the Securities Exchange Act of 1934. In June 2019, the SEC also adopted rules that, among other things, increase the minimum net capital requirements for broker-dealers that use internal models to compute net capital (Alternative Net Capital rule for BDs (ANC)). For example, under these rules, ANC broker-dealers will be subject to: (i) minimum tentative net capital requirements (tentative net capital equals net capital before deducting market and credit risk charges) of US$5 billion and (ii) a minimum net capital requirement that is the greater of a fixed-dollar amount of US$1 billion and an amount equal to 2 percent of the firm's exposures to its SBS customers, plus the existing ratio-based minimum net capital requirements in Rule 15c3-1 (either the 15-to-1 aggregate indebtedness ratio or the 2 percent of customer debit items ratio). In the June 2019 final rule, the SEC also increased the early warning notification requirement that requires an ANC broker-dealer to provide notification to the SEC if the firm's tentative net capital falls below US$6 billion. With respect to applying credit risk charges, the SEC also modified the existing portfolio concentration charge for ANC broker-dealers so that firms must take a capital charge equal to the aggregate amount of uncollateralized current exposures across all counterparties arising from derivatives transactions that exceed 10 percent of the firm's tentative net capital (a reduction from 50 percent of the firm's tentative net capital). The 10 percent cap was designed to limit the amount of a firm's capital base that comprises unsecured receivables. These assets generally are illiquid and cannot be readily converted to cash, particularly in a time of market stress. Permitting additional unsecured receivables to be allowable assets for capital purposes could substantially impair the firm's liquidity and ability to withstand a financial shock.

	In 2015, the Financial Industry Regulatory Authority (FINRA) also published Regulatory Notice 15-33 (http://www.finra.org/sites/default/files/Regulatory-Notice_15-33.pdf) which provides guidance on liquidity risk management practices directed to firms that hold inventory positions or clear and carry customer transactions. In the notice, FINRA noted that it expects that each firm would, among other things, rigorously evaluate its liquidity needs related to both market wide stress and idiosyncratic stresses; develop contingency plans for addressing those risks so that the firm will have sufficient liquidity to operate after the stress occurs while continuing to protect all customer assets; and conduct stress tests and other reviews to evaluate the effectiveness of the contingency plans. In 2016, the SEC approved a proposed rule change to amend FINRA's margin rule for broker-dealers to implement margin requirements for forward-settling agency mortgage-backed securities transactions, including to-be-announced securities.
Money Market Mutual Funds The authorities should consider reducing the risks of forced sales by restricting the repo collateral to securities that the MMFs are able to hold outright. Variable NAVs should be applied to all MMFs thereby aligning the treatment with other open-ended mutual funds.	**Not implemented –** authorities note that less than 7 percent of MMF collateral consist of securities that are not Treasury or government agency securities, which reduces the risk of forced sales. **Not implemented** Rules issued by the SEC that have been fully implemented require floating NAVs for institutional non-government MMFs. Retail and government MMFs meeting the conditions of the applicable rule are permitted to use the amortized cost method of valuation and the penny rounding method of pricing to maintain a stable NAV. Historically retail investors have been less likely to make large redemptions quickly in response to signs of market stress and government MMFs typically receive inflows, not redemptions, during times of stress due to their low risk characteristics. For retail MMFs, the rule also provides additional

	tools—liquidity fees and redemption gates—if historical redemption patterns change and any redemption pressures do occur in the future. MMFs are required to file Form N-MFP monthly, which includes information regarding, among other things, their portfolio holdings, market-based NAV, and levels of daily and weekly liquid assets. SEC staff monitors the information provided in these forms to, among other things, monitor changes and trends, such as trends in liquidity, credit quality, and portfolio composition. SEC staff also monitors this data to identify "outliers" based on, for example, investment exposures or liquidity profile, all of which can help to identify MMFs that may be susceptible to runs. MMFs also must conduct stress testing. MMFs must file, upon the occurrence of certain specified events (such as the default of a portfolio security), Form N-CR with the SEC.
FSOC could consider promoting commonly-agreed definitions of "cash and "cash equivalent," and metrics for judging the liquidity of assets.	**Not implemented**
Fed Exit and Financial Stability[4] During normalization: • Continue with the Fed funds rate as the operating target of monetary policy. • Announce that a floor system will be used during most, if not all, of the normalization period, and therefore the rate set on the IOER will equate with the Fed funds target.	**Partially implemented** Following the January 2019 FOMC meeting, the FOMC released a statement regarding monetary policy implementation and balance sheet normalization. This statement indicated that the FOMC would continue to view changes in the target range for the Federal funds rate as its primary means of adjusting the stance of monetary policy. The FOMC further indicated that it would implement monetary policy in a regime in which an ample supply of reserves ensures that control over the level of the Federal funds rate and other short-term interest rates is exercised primarily through

[4] Note that these issues were discussed in the FSAP technical note (Box 2 page 36) and expanded on in pages 65–88 of the Selected Issues Paper to the 2014 Article IV Consultation "USA Selected Issues Paper: The Operational Framework for Monetary Policy: July 2014".

	the setting of the Federal Reserve's administered rates, and in which active management of the supply of reserves is not required. A further statement about plans to maintain an ample level of reserves was issued in October.
• Use the ONRRP, with counterparty allotment caps, as the primary monetary policy tool to manage the Fed funds rate at or slightly above the IOER.	**Implemented** As noted on the website of the FRBNY, here have been a number of changes in the list of ONRRP counterparties since 2015.[5]
• Assess the need for further expanding the counterpart list if the ONRRP is not sufficiently effective.	A statement on the use of the ONRRP, including use per-counterparty limits per operation, is posted on the FRBNY website.[6]
• Manage the dis-intermediation and shadow banking risks of the ONRRP by announcing that it is unlikely that the instrument will be used post-normalization and that allotment caps may be changed to contain flows.	**Not implemented**
• Re-instate the single rate policy target; with the first modest move from the current 0–0.25 percent to 0.25 percent. Communicate the prospect that given abundant liquidity, there could be somewhat higher variation around the policy target than in the past.	**Not implemented**
• Explore the use of term sterilization instruments—deposits and reverse repos—to lessen operational risks. Small term premiums could be justified to reduce the burden of a daily rollover of large transaction volumes.	**Implemented**

[5] https://www.newyorkfed.org/markets/rrp_counterparties#additions-and-removals.

[6] https://www.newyorkfed.org/markets/opolicy/operating_policy_151216.html.

Post-normalization considerations: • Consider alternate operating targets after it is clear how markets have adapted to the regulatory changes. Consider de-emphasizing the importance of a single rate in favor of focus on the general level of money market rates, while highlighting what the Fed considers to be the most important indicators (e.g., GCRR, Fed funds rate).	**Implemented**
• Continue with the floor system.	**Implemented** In October 2019, the FOMC reaffirmed its intention to implement monetary policy in a regime in which an ample supply of reserves ensures that control over the level of the Federal funds rate and other short term interest rates is exercised primarily thorough the setting of the Federal Reserve's administered rates and in which the active management of the supply of reserves is not required.
• Withdraw the ONRRP: because the IOER will provide an effective floor once liquidity conditions tighten.	**Not implemented**
• Use short-term repos and reverse repos to manage the operating target close to floor.	**Not implemented**
• Abolish the reserve requirement, as it provides no benefit and is administratively cumbersome.	**Implemented** On March 15, 2020, the Board of Governors of the Federal Reserve announced that it had reduced reserve requirement ratios to zero percent effective on March 26, the beginning of the next reserve maintenance period.

Data Gaps Publish more granular data on tri-party repos—including on cash providers, repo maturities and collateral type and maturity.	**Implemented** Data on the triparty and GCF repo markets are published regularly. In February 2019, OFR adopted rules requiring daily reporting by covered central counterparties of centrally cleared repo transactions, comprising approximately one-quarter of all U.S. repo market transactions. In October 2016, SEC adopted new reporting requirements for registered investment companies, which include information about their securities lending activities. Registered investment companies were required to comply with requirements to provide annual information regarding securities lending beginning on June 1, 2018. Pursuant to the FRB's supervisory authority, the FRBNY collects trade-by-trade data on tri-party repo transactions on a daily basis from the Bank of New York Mellon. In February 2019, the OFR published a final rule that will require the Fixed Income Clearing Corporation (FICC) to report data on FICC-cleared repo transactions beginning in October 2019. The FRB will act as OFR's collection agent, with required data to be submitted directly to the FRBNY. (Currently, the FRBNY relies on a voluntary agreement with an FICC affiliate to obtain data regarding bilateral repos and General Collateral Financing Repo transactions that are cleared by FICC).
Liquidity Backstops • The Fed could create a facility open to well-capitalized depository institutions that are direct members of Fedwire, available from 3 p.m. onwards to address an institution's unexpected shortfall in receipts that may have arisen because of an overall shortage of reserves, with collateral limited to Treasury and agency securities.	**Partially implemented** The Primary Credit and Secondary Credit Discount Window lending facilities are available to depository institutions (including U.S. depository institution subsidiaries of a foreign bank and U.S. branches or agencies of a foreign banks) to meet shortfalls in reserves. These facilities are available all day until the closing of Fedwire. A wide variety of assets may serve as collateral. Policymakers have also discussed the possibility of a standing repo facility that could involve Treasury securities and/or Agency securities as collateral.

	Key design features for such a facility, including the fixed rate offered to counterparties, the set of eligible counterparties, and the range of securities eligible to be placed at the facility.
• Consider the systemic implications of the calibration of the LCR which allows for preferential treatment of FHLB funding; and the adequacy of FHFA liquidity and capital requirements imposed on the individual FHLBs, in light of the apparent increase in interconnectedness with banks.	**Partially implemented** In August 2018, the Federal Housing Finance Agency (FHFA) issued guidance[7] to the Federal Home Loan Bank (FHLBs) to strengthen their on-balance sheet liquidity. The guidance uses a countercyclical approach recommending that the FHLBs maintain a specified number of positive liquidity days ranging from 10 to 30 days. In addition, the guidance reduces or eliminates liquidity arbitrage between the regulatory regime applied to FHLBs and their depository members. The cash flow measure used in the new guidance generally precludes an FHLB from including inflows from maturing advances, which essentially is a 100 percent haircut, well above the 75 percent haircut in the Liquidity Coverage Ratio. The guidance increases the ability of the FHLBs to provide liquidity to their members during stress periods, reducing the funding risks of FHLB members. At this time, FHFA does not believe there is a need to adjust the capital requirements of the FHLBs. The FHLBs may appear to have low nominal capital ratios compared to other depository institutions; but in the context of their risk profile, it is more than adequate. Generally, 60 percent of the FHLB System's combined balance sheet is comprised of secured advances (over collateralized). Further, every FHLB holds multiples of their risk-based capital (RBC) requirement and all 11 FHLBs are able to meet their RBC requirement through retained earnings alone.

[7] Federal Housing Finance Agency, Federal Home Loan Bank Liquidity Guidance, Advisory Bulletin AB 2018–07, August 27, 2018.

• The broad-based eligibility criteria for Fed liquidity support in the Dodd Frank Act should be reviewed, with consideration given to allowing the Fed, at its discretion, to extend liquidity support to any solvent individual institution that is designated by the FSOC (DFA Title I) as being systematically important. The Fed would need to ascertain solvency before extending any such lending and is encouraged to complete the proposals and subsequently establish heightened prudential standards for designated nonbanks as required by DFA.	**Not implemented** In November 2015, the Federal Reserve approved a final rule specifying its procedures for emergency lending under Section 13(3) of the Federal Reserve Act. Since the passage of the DFA in 2010, the FRB's emergency lending activity has been limited to programs and facilities with "broad-based eligibility" that have been established with the approval of the Secretary of the Treasury. The rule provides greater clarity regarding the FRB's implementation of limitations to emergency lending, and other statutory requirements. The final rule defines "broad-based" to mean "a program or facility that is not designed for the purpose of aiding any number of failing firms and in which at least five entities would be eligible to participate." These additional limitations are consistent with and provide further support to the revisions made by the DFA that a program should not be for the purpose of aiding specific companies to avoid bankruptcy or resolution. Solvent nonbanks that have been designated as systemically important by the FSOC would be able to participate in these programs to the extent they satisfy the applicable facility eligibility requirements.
Investment Funds and Systemic Risk Settlement to exiting investors should accurately reflect sales prices of assets liquidated where asset sales are made to redeem the claims. This could include a change in settlement to sales date NAV instead of redemption-date NAV, and to actual sales price (the bid price) from mid-price. Where leverage is used to settle redemption claims, redemption fees could be increased to reflect the expected cost to the MF.	**Implemented** Under Investment Company Act rule 22c-2, open-end funds may impose redemption fees. Although funds often use these redemption fees to recoup costs incurred as a result of investors' short-term trading strategies (such as market timing), a fund may adopt a redemption fee under this rule to eliminate or reduce any dilution in the value of shares from shareholder transaction activity more generally. In addition, under a new SEC rule adopted in 2016 and effective in 2018, open-end funds are permitted to use swing pricing to mitigate shareholder dilution from shareholder transaction activity.

The pilot survey of the OFR, FRB, and SEC to collect and examine data on securities lending activities and the FSOC Request for Comments on Asset Management Products and Activities are very welcome. It is recommended to use insights from this exercise to extend data disclosure requirements on securities lending activities across the industry.	**Implemented** In early 2016, the OFR, FRB, and SEC completed a joint securities lending data collection pilot. The purpose of the pilot data collection was to collect information directly from seven securities lending agents that participated in the pilot project voluntarily. In April 2016, the Council expressed its view that without comprehensive information on securities lending activities across the financial system, regulators cannot fully assess potential financial stability risk, and encouraged enhanced and regular data collection and reporting, as well as interagency data sharing, regarding securities lending activities. Additionally, the Council encouraged efforts to propose and adopt a rule for a permanent collection of data on securities lending Relevant agencies continue to consult on these issues. In October 2016, the SEC adopted new reporting requirements for registered investment companies, which include information on their securities lending activities. Larger registered investment companies were required to comply with requirements to provide annual information regarding securities lending beginning on December 1, 2018. The compliance date for smaller entities was June 1, 2019.