



UNITED STATES

FINANCIAL SYSTEM STABILITY ASSESSMENT

August 2020

This Financial System Stability Assessment paper on United States was prepared by a staff team of the International Monetary Fund. It is based on the information available at the time it was completed on July 31, 2020.

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July 17, 2020

KEY ISSUES

Context: Much of the Financial Sector Assessment Program (FSAP) work was conducted prior to the COVID-19 pandemic. The lockdown of the economy has led to a massive growth shock. Following the precipitous fall, risk asset prices have rebounded, and financial conditions eased. The vulnerability analysis has been updated and largely captures this shock. Recommendations on strengthening policy and institutional frameworks remain pertinent. The approach to financial regulation and supervision was risk-focused given the high degree of compliance against international standards assessed during the 2015 FSAP.

Findings: The financial system entered the crisis with strong buffers, but the rise in corporate leverage and migration of risks to nonbank financial institutions compounded with ongoing economic disruption could result in a severe financial strain. Banks' capital depletion rates in the stress test are high, yet manageable, and limiting shareholder payouts would help conserve banks' capital. Most investment funds would be able to meet severe redemptions. Some life insurers face a significant capital reduction in the adverse scenario, but the valuation and capital framework largely mitigates the impact. The Federal Reserve's response to market dysfunction was timely and forceful helping to preserve financial stability. Relaxation of prudential requirements has led to fewer banks being subject to full Basel standards. There are few tools to deal with the ongoing migration of risks to nonbanks. Key insurance reforms remain outstanding. Recent changes require fewer banks to prepare recovery and resolution plans.

Policies: The development of macroprudential tools to deal with the growing risks in nonbanks is a priority. The overall stringency of prudential requirements for non-internationally active banks should be maintained. The Federal Reserve should take measures to durably bolster money market resilience and strengthen liquidity backstops. More comprehensive system-wide supervisory stress tests should be developed for central counterparties (CCP) and the consistency of risk management outcomes by CCPs should be strengthened. Group capital requirements should be developed for insurers. The Commodity Futures Trading Commission (CFTC) and the Securities and Exchange Commission (SEC) should be granted greater budgetary independence. The authorities should mitigate the impact of reduced firm-developed recovery and resolution plans through recovery plan requirements, their own resolution plans, and intensified crisis preparedness.

Approved By
**Aditya Narain and
 Nigel Chalk**
 Prepared By
**Monetary and Capital Markets
 Department**

This report is based on the work of the FSAP mission that visited the United States during October 22–November 8, 2019 and February 18–March 6, 2020. It has been factually updated to incorporate COVID-19-related events in March and April 2020. The FSAP findings were discussed with the authorities in May 2020.

- The team was led by Michaela Erbenová (Mission Chief) and included Peter Breuer and Darryl King (Deputy Mission Chiefs); Atilla Arda, Kelly Eckhold, Caio Ferreira, Tamás Gaidosch, Mindaugas Leika, Fabian Lipinski, Luc Riedweg, Dulani Seneviratne, Richard Stobo, Froukelien Wendt, and Peter Windsor (all MCM); Carlos Caceres (WHD); Steve Dawe, Kathleen Kao, and Nadine Schwarz (LEG); and Antoine Bouveret, Timo Broszeit, Rama Cont, Patrick Honohan, Klaus Löber, Jennifer Long, Ron Morrow, Lyndon Nelson, Stuart Wason, and Mark Zelmer (experts). Eva Yu (MCM) assisted research and analysis. Marina Agnese and Ramanjeet Singh (MCM) provided administrative support. Aditya Narain (MCM) provided oversight and joined selected meetings.
- The mission met with Under Secretary of the U.S. Department of the Treasury Brent McIntosh; Vice Chair for Supervision of the Board of Governors of the Federal Reserve System (FRB) Randal Quarles; Chairman and Chief Executive of the Commodity Futures Trading Commission (CFTC) Heath Tarbert; and a number of senior officials at the FRB, Consumer Financial Protection Bureau (CFPB), CFTC, Federal Deposit Insurance Corporation (FDIC), Federal Housing Finance Agency (FHFA), Securities and Exchange Commission (SEC), Office of the Comptroller of the Currency (OCC); Office of Financial Research (OFR), and other agencies at the federal and state level. The mission also met industry associations, banks, insurance companies, auditors, academics, market analysts, and fintech companies.
- FSAPs assess the stability of the financial system as a whole and not that of individual institutions. They are intended to help countries identify key sources of systemic risk in the financial sector and implement policies to enhance its resilience to shocks and contagion. Certain categories of risk affecting financial institutions, such as operational or legal risk, or risk related to fraud, are not covered in FSAPs.
- The United States is deemed by the Fund to have a systemically important financial sector according to Mandatory Financial Stability Assessments Under the Financial Sector Assessment Program—Update SM 11/18/2013, and the stability assessment under this FSAP is part of bilateral surveillance under Article IV of the Fund’s Articles of Agreement.
- This report was prepared by Michaela Erbenová, Peter Breuer, and Darryl King, with contributions from the FSAP team. It is based on information available as of May 15, 2020.

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Glossary

ACA	Affordable Care Act
AML/CFT	Anti-Money Laundering/Combating the Financing of Terrorism
BCBS	Basel Committee on Banking Supervision
BCP	Basel Core Principles for Effective Banking Supervision
BHC	Bank Holding Company
BIS	Bank for International Settlements
BNYM	Bank of New York Mellon
BO	Beneficial Ownership
Bps	Basis points
CAR	Capital Adequacy Ratio
CARES Act	The Coronavirus Aid, Relief, and Economic Security Act
CCAR	Federal Reserve's Comprehensive Capital Analysis and Review
CCB	Capital Conservation Buffer
CCFs	Credit Conversion Factors
CCP	Central Counterparty
CCyB	Countercyclical Capital Buffer
CET1	Common Equity Tier 1 Capital
CFPB	Consumer Finance Protection Bureau
CFTC	Commodity Futures Trading Commission
C&I	Commercial and Industrial (loan)
CLASS	Capital and Loss Assessment under Stress Scenario
CLO	Collateralized Loan Obligation
CME	Chicago Mercantile Exchange
CMG	Crisis Management Group
CPMI	Committee on Payments and Market Infrastructures
CPSS	Committee on Payment and Settlement Systems
DFA	Dodd-Frank Wall Street Reform and Consumer Protection Act
DFAST	Dodd-Frank Act Stress Test
DIS	Deposit Insurance System
EBITDA	Earnings before interest, taxes, depreciation, and amortization
ELA	Emergency Liquidity Assistance
EM	Emerging Market (mutual fund type)
EPS	Enhanced Prudential Standards
ETF	Exchange Traded Fund
FATF	Financial Action Task Force
FCA	Farm Credit Administration
FDIC	Federal Deposit Insurance Corporation
Fed	The Federal Reserve System
FFIEC	Federal Financial Institutions Examination Council
FHFA	Federal Housing Finance Agency

FHLB	Federal Home Loan Bank
FICC	Fixed Income Clearing Corporation
FinCEN	Financial Crimes Enforcement Network
FMI	Financial Market Infrastructure
FMU	Financial Market Utility
FRB	Board of Governors of the Federal Reserve System
FRBNY	Federal Reserve Bank of New York
FSAP	Financial Sector Assessment Program
FSB	Financial Stability Board
FSSA	Financial System Stability Analysis
FSOC	Financial Stability Oversight Council
FHLMC	Federal Home Loan Mortgage Corporation (“Freddie Mac”)
FSOC	Financial Stability Oversight Council
GAAP	Generally Accepted Accounting Principles
GCC	Group Capital Calculation
GFSR	Global Financial Stability Report
GDP	Gross Domestic Product
GECC	General Electric Capital Corporation, Inc.
GFC	Global Financial Crisis
GNMA	Government National Mortgage Association (“Ginnie Mae”)
GSE	Government-Sponsored Enterprise
G-SIB	Global Systemically Important Bank
GSS	Government Securities Settlement
HELOC	Home Equity Lines of Credit
HQLA	High-Quality Liquid Asset
HUD	Housing and Urban Development
HY	High Yield (mutual fund type)
ICC	Ice Clear Credit
ICPs	Insurance Core Principles
ICS	Insurance Capital Standard
IDI	Insured Depository Institution
IFS	International Financial Statistics
IG	Investment Grade (mutual fund type)
IHC	Intermediate Holding Company (of a foreign banking organization)
IOSCO	International Organization of Securities Commissions
IT	Information Technology
LAC	Loss-Absorbing Capacity
LCR	Liquidity Coverage Ratio
LIBOR	London Interbank Offered Rate
LLs	Leveraged Loans
M&A	Mergers and Acquisitions
MBS	Mortgage-Backed Securities

MFs	Mutual Funds
MMF	Money Market Fund
MPI	Macroprudential Initiative
MWCB	Market-Wide Circuit Breaker
NAIC	National Association of Insurance Commissioners
NAV	Net Asset Value
NFA	National Futures Association
NMA	National Mortgage Association (“Fannie Mae”)
OBFR	Overnight Bank Funding Rate
OCC	Office of Comptroller of the Currency
OFR	Office of Financial Research
OLA	Orderly Liquidation Authority
OMO	Open Market Operation
ORSA	Own Risk and Solvency Assessment
Non-GSIB	Non-Global Systemically Important Bank
OTC	Over-the-Counter (derivatives)
PBR	Principles-Based Reserving
PFMI	Principles for Financial Market Infrastructure
PMI	Private Mortgage Insurer
PMIERS	Private Mortgage Insurer Eligibility Requirements
PPNR	Pre-provision Net Revenue
PSPA	Preferred Stock Purchase Agreement
P&C	Property & Casualty (insurance firms)
QM	Qualified Mortgage
RAM	Risk Assessment Matrix
RBC	Risk-Based Capital
ROA	Return on Assets
ROE	Return on Equity
RRP	Recovery and Resolution Plan/Planning
RWA	Risk-Weighted Asset
SEC	Securities and Exchange Commission
SOFR	Secured Overnight Financing Rate
STA	Standardized Approach (to calculating risk weights)
TN	Technical Note
T-bill	Treasury bill
UPB	Unpaid Principal Balance
VA	Virtual Asset
VASP	Virtual Asset Service Provider
VAWG	Valuation Analysis Working Group
WEO	World Economic Outlook

EXECUTIVE SUMMARY

The longest expansion in the recorded U.S. history has come to an abrupt end. The economy will contract sharply in 2020 on the back of the COVID-19 outbreak and associated containment efforts, with significant lingering risks and a high degree of uncertainty. The economic rebound in 2021 is predicated critically on the pandemic fading and effective economic policy actions stemming widespread corporate bankruptcies, extended employment losses, and system-wide financial disruption. Banks have entered the crisis with strong buffers and households have deleveraged, but the rise in corporate leverage and migration of risks to nonbank financial institutions in recent years compounded with ongoing economic disruption could result in severe financial strain. The highly interconnected financial sector is also exposed to cybersecurity and operational risk events that could lead to distress in a major financial firm or market infrastructure.

The FSAP was conducted prior to the pandemic onset and has been factually updated to incorporate events that followed. Reflecting the post-mission developments, the economic growth projections have been significantly revised downward in the *June 2020 World Economic Outlook (WEO) Update*. The U.S. authorities implemented urgent measures to address health concerns, to safeguard economic and financial stability and to prevent adverse macrofinancial feedback loops. The assessment of the full impact of the shock and the effectiveness of mitigation policy measures would be premature. The FSAP's risk analysis nonetheless remains broadly relevant, with stress test scenarios aiming to capture wide uncertainty related to the time profile and other specifics of the COVID-19 shock. A combination of monetary, fiscal and financial sector policies may continue to be needed to support stability of the financial system and to preserve soundness of financial institutions, especially if economic activity remains paralyzed for longer than anticipated. The FSAP's recommendations on strengthening policy and institutional frameworks—including for regulation, supervision, contingency planning, and crisis preparedness and management—remain pertinent and should be considered once the crisis containment phase has concluded.

FSAP stress tests indicate that the financial system entered the crisis generally well-prepared to an array of severe shocks. Susceptibility of the U.S. banking system to inward spillovers remains limited, but it could become a source of contagion to foreign banking systems. Equity and bond market valuations appear stretched, while the assessment is hampered by the still unfolding events as markets remain vulnerable to new bouts of volatility. A marked rise in corporate stress would impact nonbank financial institutions, with a more moderate impact on banks. Given the sharp economic contraction, bank capital depletion rates are high in the baseline scenario yet remain manageable overall. With the uncertain duration of the shock, retaining earnings and limiting shareholder payouts would help preserve capital and limit recapitalization needs. Global systemically important banks' (G-SIBs') liquidity buffers are substantial, but high utilization of credit and liquidity facilities could lead to a liquidity shortfall at some banks. The financial stability risks stemming from the insurance sector appear contained for now. Some life insurers would face a significant capital reduction in the adverse scenario, but the valuation and capital framework largely mitigates the impact on statutory capital. Most investment funds would be able to withstand severe redemptions, though high yield and loan funds could face significant shortfalls.

The FRB’s response to the extreme market dysfunction was timely and forceful and has thus far helped preserve financial stability. Market resilience has been declining for some time and was severely tested in the March–April COVID-19 crisis period but was backstopped by a plethora of timely actions. Once the crisis abates, the FRB should take measures to durably bolster market resilience through permanent operational framework adjustments and by retaining some aspects of its crisis response that have improved access to its liquidity backstops—regular open market operations (OMOs) and encouragement to banks to explicitly allow for use of the Discount Window to monetize high-quality liquid assets (HQLAs) in their short-term liquidity planning. Other priorities include addressing the vulnerability from having a sole provider in the government securities settlement and tri-party repo markets, restoring the FRB’s ability to provide liquidity backstops to systemically designated nonbanks, developing the capacity for foreign currency liquidity backstops for banks and designated central counterparties (CCPs), and setting firm targets backed by supervisory action to promote transition from the London Interbank Offered Rate (LIBOR).

The Financial Stability and Oversight Council (FSOC) plays the leading role in systemic and emerging risk identification, and a broader toolkit would help bolster the authorities’ policy framework. Continuing full operational independence of all member agencies is critical, and providing them with explicit financial stability mandates would bolster the framework. The activities-based approach will help in addressing risks in nonbanks, but more clarity is needed on its implementation. The development of macroprudential tools for nonbanks is an important priority as is ensuring sufficient buffers are retained to accommodate macro-relevant vulnerabilities. Addressing remaining data gaps is key to enhancing the assessment of interconnections, vulnerabilities, and risks across the financial system. The FSOC and its member agencies should intensify crisis preparedness for decisive responses to contingencies.

Strong prudential regulation has contributed to a sound banking system, but certain requirements are being reduced at a time when financial stability risks are rising. For the U.S. G-SIBs, considered as internationally active banks by the authorities, capital and liquidity requirements meet and sometimes exceed the Basel standards. However, recent reforms emphasizing a tailored approach will require fewer banks (other than the G-SIBs) to be subject to the full set of Basel standards. Fewer banks are subject to annual supervisory stress tests while recent changes to the Comprehensive Capital Analysis and Review (CCAR) program and the implementation of the Stress Capital Buffer will likely lower capital requirements for some large banks. The 2018 statement on the role of supervisory guidance could create obstacles to the implementation of key supervisory expectations. Authorities should consider rewriting certain prudential guidance as regulation; and maintaining the overall stringency of prudential requirements for non-internationally active banks.

While much progress has been made since 2015, the size, complexity, and global importance of the U.S. capital markets call for continued reform and oversight strengthening. U.S. authorities have taken prompt action to maintain orderly functioning of securities and derivatives markets. Reform priorities include greater budgetary autonomy for the SEC and CFTC; completion of the work on market-wide circuit breakers; the deepening of joint work on new concerns, such as

leveraged loans; and the monitoring of financial stability risks related to mutual funds (including through SEC-led stress testing). Legislative action to enable greater scrutiny of new registrants, reducing reliance of the National Futures Association (NFA) on self-certifications, and a strategic review of the SEC's oversight of exchanges are all also priorities for the agenda.

Key reforms in the regulation and supervision of insurance are under development or remain outstanding. These include greater independence for the state regulators, strengthening of risk-based supervision, consistency in liability valuation methodologies for life insurers, implementation of a total balance sheet approach to risk and solvency assessment, and progress on the group capital requirements. Strengthening the solvency regime for insurers is particularly important. Regulatory responses to natural catastrophe risks need to capture the increasing risk to policyholders and incentivize risk mitigation measures and closing protection gaps.

The increased reliance of the financial system on financial market infrastructures (FMIs) underlines the importance of FMI resilience for the United States and global financial stability. FMIs appeared so far sufficiently robust to surges in volumes and volatility in financial markets. The regulation, supervision, and oversight of systemically important U.S. FMIs is broadly adequate; but there is room to strengthen the consistency of outcomes of CCP risk management practices. As in other countries, new nonbank players are entering the payments space with innovative services. A review of regulatory requirements for payments may be warranted so as to allow for a proactive, comprehensive, and risk-based response to the potential systemic risks that these new providers may bring.

The authorities have mainstreamed consideration of cybersecurity and other aspects of technological resilience into both regulation and supervision. Public-private partnerships enable information sharing. Both industry and supervisors have programs in place to improve resilience.

Financial integrity has been strengthened since 2015 in relation to beneficial ownership identification and verification. Addressing high-risk sectors and misuse of legal entities remain priorities, including by requiring beneficial ownership information to be collected upon company formation and ensuring that investment advisers, lawyers, accountants, and company service providers are effectively regulated and supervised in line with risks.

Considerable progress has been made with the largest and most-complex financial companies' resilience, recoverability, and resolvability; but recent changes could lower their focus and resource allocation on these matters. The reduction in coverage and frequency of firm-developed recovery and resolution plans (RRPs) could weaken the impact these plans have made on financial companies' management. The Federal Banking Agencies (FBAs) should continue to actively mitigate this challenge through recovery plan requirements, their own annual resolution plans, and intensified crisis preparedness. Further refinements relating to cross-border resolution framework also deserve attention. CCP recovery and resolution planning should include more firms.

Table 1. United States 2020 FSAP: Key Recommendations

	Responsible Authority	Horizon ¹
Systemic Risk Oversight and Macroprudential Framework		
Provide an explicit financial stability mandate to all federal FSOC members.	Congress	MT
Prioritize the development of macroprudential tools to address risks and vulnerabilities in the nonbank sector.	FSOC	MT
Intensify efforts to close data gaps, including reporting disclosures of holdings of collateralized loan obligations (CLOs) and repo markets, to reinforce market discipline.	OFR	I
Banking Regulation and Supervision		
Review prudential requirements for non-internationally active banks (Category III and IV) and ensure they are and continue to be broadly consistent with the Basel capital framework and appropriate concentration limits; and consider extending the full liquidity coverage ratio (LCR) to them.	FBA	ST
Streamline regulatory requirements and consider rewriting key prudential guidance as regulation.	FBA	MT
Introduce heightened standards on the governance of large and complex bank holding companies (BHCs), enhance the related-party framework, introduce rules on concentration risk management, and include more quantitative standards regarding interest rate risk in the banking book.	FBA	ST
Insurance Regulation and Supervision		
Increase independence of state insurance regulators, with appropriate accountability.	States	MT
Require all in-force life insurance business be moved to principles-based reserving (PBR) after a five-year transition period, adjust asset valuation approach to ensure consistency between assets and liabilities, and recalibrate risk-based capital (RBC) to the revised valuation approach.	NAIC and states	MT
Develop a consolidated group capital requirement similar to GAAP-Plus insurance capital standard (ICS) for internationally active groups and optionally for domestic groups in parallel with the development of aggregation approaches by the FRB and NAIC.	NAIC, FRB, and states	MT
Regulation, Supervision, and Oversight of FMIs		
Increase CFTC resources devoted to CCP supervision and strengthen rule-approval process to an affirmative approval with a public consultation.	CFTC	ST
Collaborate to analyze differences in outcomes of CCP risk management practices and adopt an appropriately consistent, conservative implementation of risk management standards across CCPs.	FRB, CFTC, SEC	ST
Develop and execute more comprehensive systemwide CCP supervisory stress tests.	FRB, CFTC, SEC	ST

Table 1. United States 2020 FSAP: Key Recommendations (concluded)

	Responsible Authority	Horizon ¹
Securities Regulation and Supervision		
Give CFTC and SEC greater independence to determine their own resources, with appropriate accountability.	Congress	ST
Assess financial stability risks related to mutual funds and stable net asset value (NAV) money market funds (MMFs), including through SEC-led liquidity stress testing.	SEC	I
Conclude implementation of new broker-dealer capital rules; finalization of market-wide circuit breakers, and delivery of the Consolidated Audit Trail.	SEC	ST
Increase scrutiny of new registrants and reduce reliance on self-attestations where applicable.	SEC, CFTC, NFA	I
AML/CFT		
Legislate to collect beneficial ownership information on formation of U.S. corporations, maintain it, and ensure timely access for authorities.	Congress	ST
Ensure that investment advisers, lawyers, accountants, and company service providers are effectively regulated and supervised for AML/CFT in line with risks.	Treasury	ST
Systemic Liquidity		
Promote the fungibility of Treasury Securities and Reserves by adjusting assumptions about firms' access to the Discount Window in liquidity metrics.	FRB	ST
Continue to operate regular fine-tuning OMOs.	FRB	I
Advance arrangements for providing liquidity to systemic nonbanks and CCPs under stress, and reconsider restrictions on bilateral emergency liquidity assistance (ELA) to designated systemically important nonbanks.	FRB, Treasury & Congress	ST
Develop robust and effective backup plans in the event the sole provider, Bank of New York Mellon (BNYM), is not able to settle and clear repo transactions.	FRB	MT
Enhance arrangements to provide liquidity support in foreign currencies to banks and designated systemically important CCPs.	FRB	MT
Crisis Preparedness and Management		
Intensify crisis preparedness.	FSOC, FBAs, UST	ST
Continue to use agency discretion actively to subject a wider array of firms to RRP.	FBAs	ST
Continue to undertake, at least yearly, Dodd-Frank Act (DFA) Title II plans, resolvability assessments, and crisis management group (CMG) discussions of RRPs and assessments.	FRB, FDIC	ST
Extend OLA powers to cover FBOs' U.S. branches; ensure equal depositor preference ranking for overseas branch deposits with domestic deposits; introduce powers to give prompt and predictable legal effect to foreign resolution measures.	Congress	MT
¹ I: Immediate; ST: short term= less than 1 year; MT: medium term= 1–5 years.		

MACROFINANCIAL SETTING

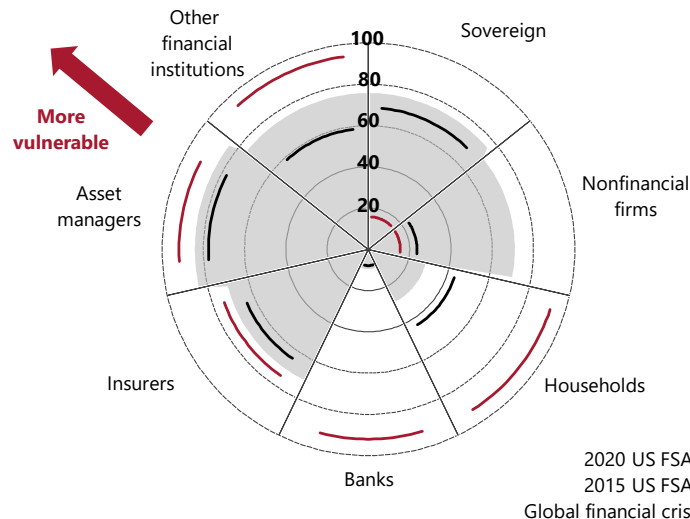
1. The FSAP takes place against the background of rising medium-term financial vulnerabilities and the COVID-19 pandemic. Following the longest expansion in its recorded history, the U.S. economy has decelerated sharply on the back of the pandemic outbreak. The containment measures introduced in March have brought large parts of the economy to a standstill, with growth in 2020 expected to decline by most since the Great Depression, followed by a partial recovery in 2021 (Table 2). The fiscal deficit is projected to exceed 20 percent of GDP, leading to a sharp increase in U.S. public debt, which was already on an unsustainable path before the crisis. Financial conditions tightened initially—reflecting a broad-based market correction driven by investors’ assessment of the impact of the virus and the collapse of oil prices—but have recovered somewhat on the back of a quick policy action. Nonetheless, the sharp economic deterioration will have a long-lasting impact on the financial system. The economic outlook is subject to an unusually high degree of uncertainty.

2. The extended period of easy financial conditions until early 2020 has been accompanied by a buildup of medium-term vulnerabilities. Overall, vulnerabilities have grown relative to the 2015 FSAP (Figure 1). The continued low interest rate environment has pushed investors to take more risks in the search for yield. While banks and household balance sheets have strengthened, vulnerabilities have grown in nonfinancial corporates and in the nonbank financial system. At the same time, bank capital and liquidity requirements have been eased for a large part of banking sector following the *2018 Economic Growth, Regulatory Relief, and Consumer Protection Act* and subsequent regulatory measures, which could reduce banks’ resilience in the downturn.

3. Corporate sector entered the current crisis episode with historically high debt relative to the size of the economy and leveraged finance growing rapidly. Nonfinancial business debt rose to almost 75 percent of GDP (about US\$16 trillion) toward the end of 2019—slightly higher than at the onset of the Global Financial Crisis (GFC). The largest portion (US\$10 trillion) relates to corporate sector debt, including corporate bonds and commercial paper (US\$6.5 trillion, about 80 percent at investment grade); bank and leveraged loans (about US\$1.5 trillion and US\$1.2 trillion, respectively); and other debt (less than US\$1 trillion). Increased financial risk taking and weakening underwriting standards have allowed less creditworthy firms to access capital markets and increase leverage (Figure 2). The leveraged loans¹ account for roughly 7 percent of total business sector debt (5 percent of GDP), comparable in size to the high-yield corporate bond debt market (Box 1). At the onset of the pandemic, these risks were mitigated by significant liquid assets on corporate balance sheets, and the fact that many firms have extended maturities, with most debt maturing after 2022, while the costs of financing have fallen.²

¹ Term loans to indebted and lower-rated corporates originated by bank syndicates and sold to institutional and other investors.

² See the Global Financial Stability Report (GFSR), Chapter 1, October 2019, <https://www.imf.org/en/Publications/GFSR/Issues/2019/10/01/global-financial-stability-report-october-2019>.

Figure 1. United States: Financial Vulnerabilities Radar Chart—COVID-19 Prologue

Source: IMF staff estimates.

Note: The chart is based on data available as of March 2020 and shows vulnerabilities in six sectors in the U.S. based on the pooled percentile rank as determined in the Indicator-Based Framework of the Global Financial Stability Report ([see Online Annex April 2019](#)). Vulnerabilities arise from leverage, liquidity, maturity, and currency mismatches and are shown relative to those of other 19 systemically important advanced economies and across time from 2000 onward.

4. Households have reduced their overall indebtedness post-GFC, but high unemployment could impair debt servicing capacity. Over the last decade, residential mortgage debt has decreased substantially across all income groups, with low delinquencies, falling debt servicing costs and extended maturities as households refinanced their mortgages (Figure 2). That said, the mortgage market is large, with outstanding mortgages exceeding US\$10 trillion (roughly 50 percent of GDP, or two-thirds of total household debt), and a deterioration in credit quality could impact financial stability. The government continues to play a central role in housing through the government-sponsored enterprises (GSEs), most notably Federal National Mortgage Association (“Fannie Mae”) and the Federal Home Loan Mortgage Corporation (“Freddie Mac”), which currently own or guarantee roughly half of outstanding mortgage debt and represent about 85 percent of the mortgage-backed securities (MBS) market. Student loans and some segments of consumer debt (e.g., auto loans) have been on the rise, albeit a large part of that growth accrues to households with prime credit scores. The COVID-19 outbreak has triggered unprecedented job losses. If persistent, high unemployment and falling income would put pressure on households debt servicing capacity.

5. The banking system entered the COVID-19 outbreak well-prepared, but additional challenges loom on the horizon. Banks accumulated considerable capital and liquidity buffers, maintained low levels of nonperforming loans and robust profitability (Table 3). Banks' exposures and funding remain to a large extent domestic. The share of stable funding increased reflecting growth of retail deposits and longer-term securities. The COVID-19 outbreak was followed by a significant immediate increase in provisioning, a decline in profitability, and use of accumulated buffers. The Federal Reserve System’s (Fed) actions supported credit flow to the real economy (Figure 3). In the short term, loan losses are likely to grow while bank profitability will be reduced,

leading to a further decline in capital buffers. In the medium to long term, the growing competition for deposits, fee revenues, and payment services from fintech companies will pose challenges to banks' business models and call for increased investments into information technology (IT).

6. The authorities acted decisively to counter the immediate effects of the pandemic and safeguard financial stability. Recent money market volatility has been forcefully responded to, and U.S. authorities have taken prompt action to maintain orderly function in the securities and derivatives markets. The comprehensive set of measures by the Fed included cutting the Fed funds rate to close to zero, ensuring an ample supply of reserves through scaling up term and overnight repurchase agreements, encouraging depository institutions to use the discount window, and plans to purchase unlimited amounts of Treasuries and MBS. The Fed also announced facilities to further support the flow of credit to corporates and to the broader economy. The Coronavirus Aid, Relief, and Economic Security (CARES) Act provided almost 10 percent of GDP in tax, spending, and liquidity support measures.³ Subsequent appropriations have boosted this support to about 15 percent of GDP, including measures for small businesses and hospitals. Nonetheless, the impact of COVID-19 has been far-reaching, with more than 30 million new unemployment insurance claims filed in the first six weeks of containment measures and a range of indicators pointing to an unprecedented contraction in output in the second quarter.

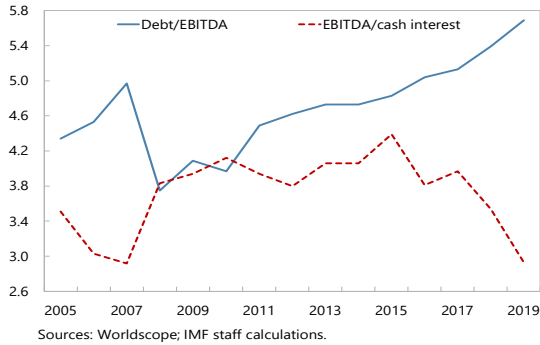
7. While the collapse in economic activity appears to have bottomed-out in May–June, there are sizable risks ahead. The principal risk a resurgence in the number of COVID-19 cases, which—in turn—could necessitate a renewed partial shutdown of the economy. Additional headwinds could come from potential fracturing of a range of employee-employer relations that will take time to repair, corporate bankruptcies, global supply chains disruptions, and tightening financial conditions. Large negative growth, earnings surprises, or an abrupt reversal of the partial recovery in financial market conditions also represent material risks. The most vulnerable segments include U.S. firms with high leverage, in particular those in the energy sector, small businesses, and workers relying on hourly pay to meet basic needs. Bouts of sell-off in risk markets, increased volatility and flight to quality make judgments on risk premia and financial assets valuations uncertain at the time of the completion of this report. Market valuations appear stretched across equity and corporate bond markets.⁴ Markets remain vulnerable to a decompression of risk and term premia, which could potentially close debt markets to new issuance, trigger deleveraging and create broader volatility. A combination of monetary, fiscal and financial sector policies may continue to be needed to support stability of the financial system and to preserve soundness of financial institutions, especially if economic activity remains paralyzed for longer than anticipated.

³ Under the CARES Act, US\$500 billion was appropriated to the Treasury for purposes of making loans, loan guarantees and other investments, including to support facilities established by the Federal Reserve under section 13(3) of the Federal Reserve Act. The CARES Act funds levered with Federal Reserve lending facilities may result in substantially greater lending capacity—more than US\$4 trillion—than the appropriated funds alone under the CARES Act.

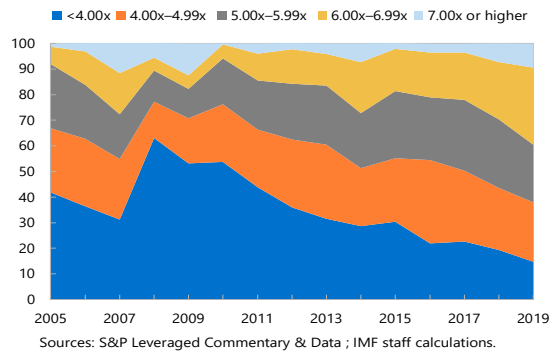
⁴ See Global Financial Stability Update, June 2020.

Figure 2. United States: Corporate Borrowing and Household Mortgages

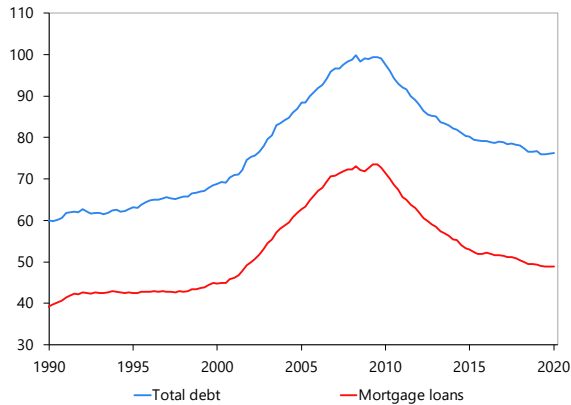
Average Leverage and Coverage Ratios on New Issue Leveraged Loans (Multiple)



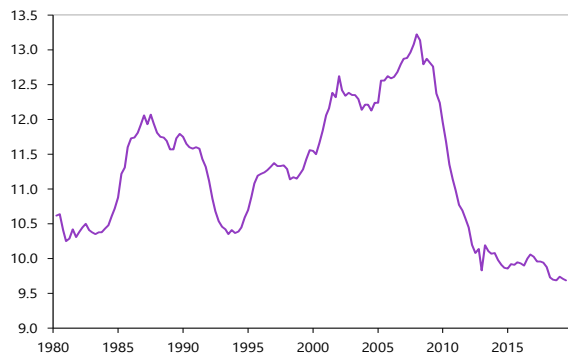
Leveraged loan Issuance by Leverage Multiple (In percent)



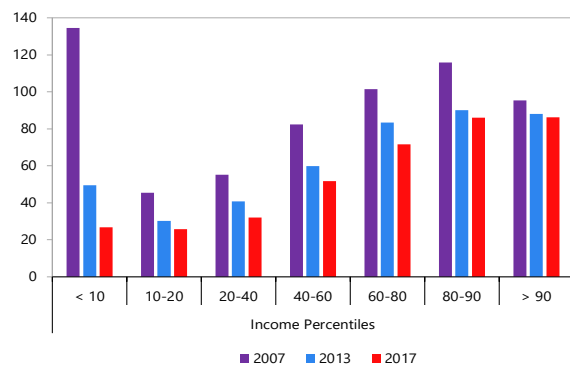
Household and Not-For-Profits Debt (In percent of GDP)



Household Debt Service Ratio (In percent of disposable income)



Mortgage Debt Across Income Distribution (In percent of gross income)



Consumer Credit Debt Ratio (In percent of disposable income)

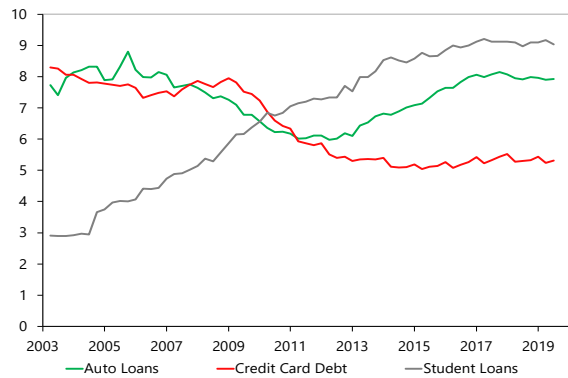
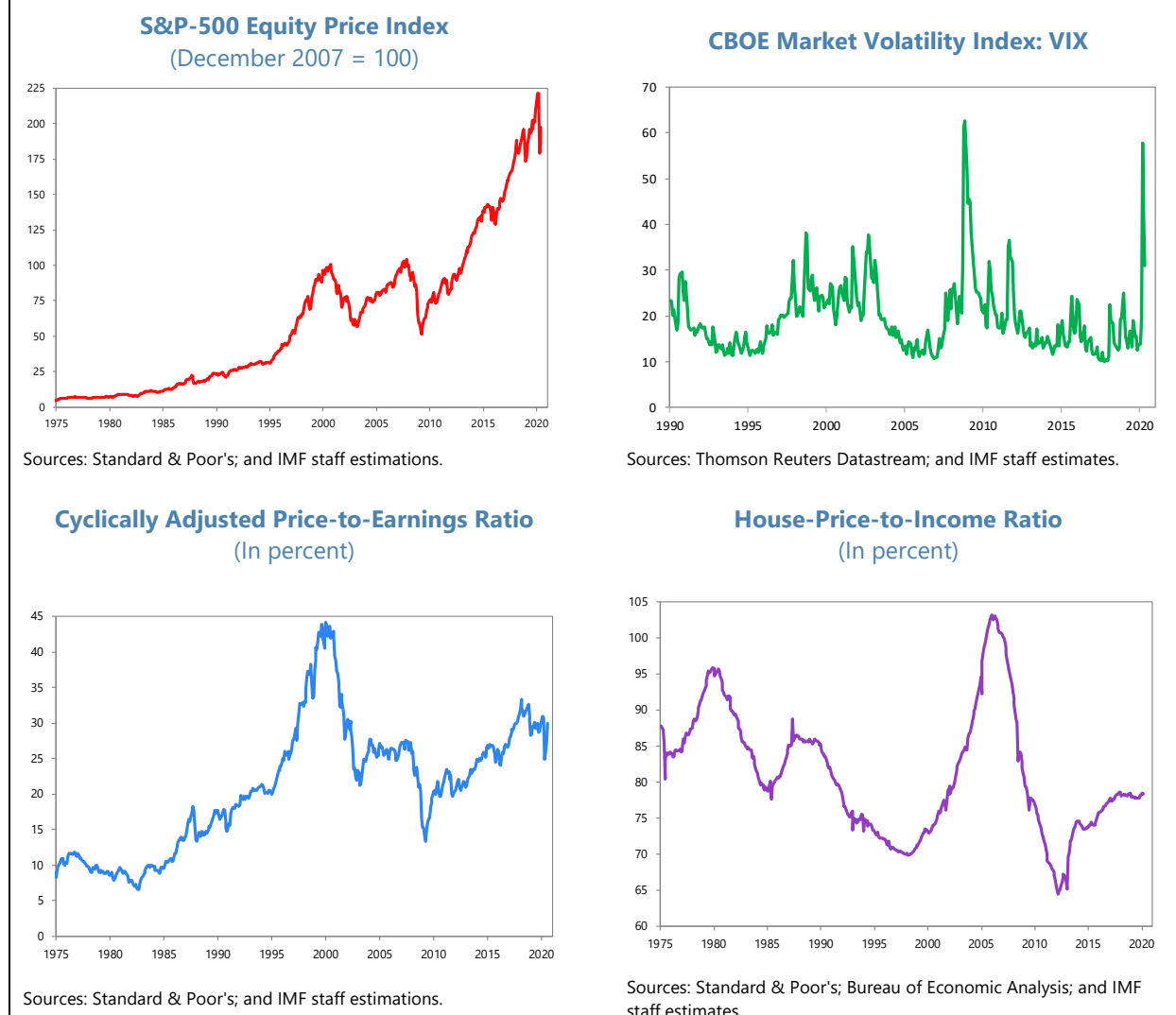


Figure 3. United States: Asset Valuations



RISKS AND VULNERABILITIES

A. What Are the Key Macrofinancial Risks?

8. The financial system faces domestic and external risks (Risk Assessment Matrix, Appendix I). The key external risks are tighter financial conditions, structurally weak growth in major advanced economies, and a significant slowdown in global growth—including, in the near-term, through a larger-than expected impact from the COVID-19 virus outbreak. On the domestic front, there is a risk of a sharper-than-expected and more-prolonged slowdown and a significant deterioration in corporate earnings, particularly if financial conditions tighten again for an extended period. A deterioration in market sentiment (e.g., prompted by a widening public health crisis, policy surprises, trade or geopolitical tensions) could trigger risk-off events. While these risks would

typically be considered as independent of one another, they may overlap in the present environment, potentially setting the stage for a perfect storm. These risks are further analyzed using an array of quantitative approaches. Risks that are addressed qualitatively by the FSAP include a failure of large globally significant U.S. FMI⁵, which could trigger a major market dislocation because of their quasi-monopoly position in the market. Increasing reliance on outsourcing, shared services, and cloud computing across interconnected platforms increases the risk that a cybersecurity event could have severe negative consequences for the provision of financial services. Other important risks are related to potential dislocations from the transition away from LIBOR.

9. Financial vulnerabilities in the corporate sector and among nonbank financial firms can amplify the impact of shocks.

- Corporate vulnerabilities are of concern due to high debt burdens and weakened underwriting standards. Following a shock to earnings or availability of new financing, highly leveraged corporates may experience significant stress, leading to higher credit spreads, potential downgrades, inability to refinance debt, and defaults. As corporates de-lever and reduce costs, lay-offs would accelerate, consumer confidence may decline, and the shock could impact other segments of the economy. Much of this risk is distributed in the form of leveraged loans, private loans and CLOs, including to overseas bank and domestic nonbank investors. Covenant protections for investors have weakened and the credit quality of new loans has been deteriorating. Important data gaps exist, particularly regarding direct and indirect exposures to leveraged and private loans across financial sub-sectors.
- Financial institutions could suffer via direct and indirect exposures to the highly leveraged corporate and COVID-19 affected household sectors, resulting in credit losses. Enhanced management discretion resulting from weaker covenant protections for leveraged loan investors could imply delays in corporate restructurings and a subsequent economic recovery. Funding liquidity stress, asset liquidations, and mark-to-market losses are to a large extent contained at this stage by the recent actions of the FRB and other central banks around the world.
- A long period of very low rates has contributed to a buildup of vulnerabilities among investment funds, pension funds, and life insurers. Low yields promote an increase in portfolio similarities among some types of investment funds, which may amplify market selloffs in stressed conditions. Pension funds may need to satisfy contingent calls arising from illiquid investments, which could constrain their traditional role of stabilizing markets during periods of stress. Low yields and guarantees are a risk for life insurers under a low-yield environment, with the former driving an increase in riskier investments by some insurers.

⁵ The U.S. authorities use the term Financial Market Utility (FMU), defined in Title VII of the DFA as any person that manages or operates a multilateral system for the purpose of transferring, clearing, or settling payment, securities or other financial transactions among financial institutions or between financial institutions and the person. FMUs, which do not include trade repositories, are generally referred to as FMIs outside of the United States.

10. The COVID-19 crisis added stress for an already leveraged corporate sector. Corporates face the effects of recent financial market volatility, oil price shock, tightening in financing conditions and, for many, a collapse in sales. Corporate short-term liquidity needs are large, notably for the energy sector; but most of these are concentrated in investment-grade companies whose debt markets are supported by the Federal Reserve liquidity facilities—including the so-called “fallen angels” that have recently lost their investment grade status. However, with the potential of a protracted economic slowdown and behavioral changes induced by evolving social-distancing norms, the long-term sustainability of certain business models could be challenged. Solvency risks could materialize, leading to large credit losses. Energy sector, entertainment and leisure services, retail, and durable-goods manufacturers appear to be among the most vulnerable.

11. Corporate sector stress tests suggest that potential losses could be significant (Box 1). Stress tests suggest that leveraged firms—those firms with a debt-to-EBITDA ratio higher than 5—are likely to experience relatively large solvency and funding pressures, representing about three-quarters of all firms with negative equity under the baseline scenario. In such a situation, and despite the relatively small size of the leveraged loan market, these firms would account for a large share of the potential losses (over 80 percent of the US\$400 billion in debt-related losses). In a more severe scenario, which assumes a second wave of infections toward the end of 2020 (c.f., FSAP *Sensitivity Scenario 3* below), losses from corporate debt could reach US\$675 billion (US\$465 billion related to leveraged firms). Although the losses are sizeable on aggregate, banks have limited direct exposure to these products.⁶ Indirect exposures and market dislocations combined with liquidity shortages could amplify the stress.

B. How Resilient is the Financial System?⁷

12. The United States has a highly diversified financial system, which is the largest and among the most developed in the world, with deep and liquid core funding markets (Figures 4–6). In 2019, total assets of financial institutions surpassed US\$100 trillion (around five times the GDP), while outstanding debt securities and stock market capitalization were more than twice the size of GDP, each. With an average daily turnover value in 2018 of US\$208 billion,⁸ U.S. equity markets are substantially larger than those of any other jurisdiction. Of the US\$3 trillion interest rate derivatives traded daily globally, US\$1.2 trillion is traded in the United States, more than in any other jurisdiction.⁹ The United States has the world’s largest single-country insurance market, with 28 percent of global direct premiums written in 2018. Exposure of foreign financial institutions

⁶ Banks hold slightly less than 20 percent of outstanding corporate bonds and loans, representing roughly one-tenth of their own assets.

⁷ This Section covers events after 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, like the scenarios and analysis discussed in this section, do not reflect the same depth of discussions and information-gathering as the rest of the document.

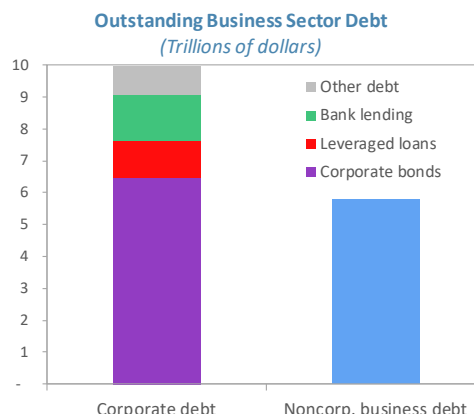
⁸ World Federation of Exchanges Annual Statistics Guide 2018, equity tables 1.1 and 1.6.

⁹ Bank for International Settlements, OTC single currency interest rate derivatives turnover by country and instrument in April 2016, “net-gross” basis, daily averages, at <https://stats.bis.org/statx/srs/table/d12.5?o=8:TO1>

Box 1. Corporate Sector Vulnerabilities

Business sector debt is at record highs relative to GDP.

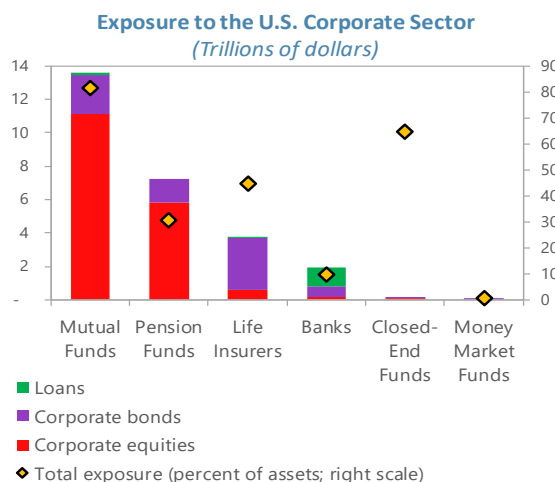
Following short-lived deleveraging after the GFC, nonfinancial business debt has risen rapidly, and now stands close to US\$16 trillion (roughly 75 percent of GDP). Most of this relative increase is due to the U.S. corporate sector—with overall indebtedness close US\$10 trillion currently having grown at an annual average of 5.4 percent since 2010—and the remaining accrued to noncorporate businesses, whose debt levels have grown on average by 4.2 percent, in line with the nominal GDP, over the past decade. Corporate debt consists of corporate bonds and commercial paper (US\$6.5 trillion)—of which roughly 80 percent is investment grade and 20 percent is high yield—bank loans (US\$1.5 trillion), leveraged loans (about US\$1.2 trillion), and other debt.



Source: FRB Financial Stability Report (November 2019); Financial Accounts of the United States; and IMF staff calculations.

Exposures are concentrated in the nonbank financial institutions.

Mutual funds have the largest direct exposure to the corporate sector (US\$13.5 trillion, representing over 80 percent of their assets). Life insurers and pension funds also hold relatively sizeable amounts of corporate securities. Banks' exposures are more limited, accounting for less than 10 percent of assets, a large part (about 60 percent) is in the form of loans. Corporate exposures of closed-end funds are small in dollar terms, but significant relative to assets.



Source: Financial Accounts of the United States; Haver Analytics; and IMF staff calculations.

Vulnerabilities in riskier debt markets increased, most notably in the leveraged loan market.

Leveraged loans are generally syndicated loans provided to highly leveraged firms (i.e., with high debt-to-EBITDA multiples), or with low credit ratings, and are mainly used for mergers and acquisitions (M&A), leveraged buyouts, recapitalization, or debt refinancing. The leveraged loan market has seen double digit growth in recent years, accompanied by weakening underwriting standards. The share of the "covenant-lite" loans has grown substantially over time. Lowering financial maintenance covenants may reduce the probability of liquidation bankruptcy, but in turn could delay corporate restructuring and reduce the recovery rate in case of default.

Securitization of corporate leverage through products such as Collateralized Loan Obligations (CLOs) has grown rapidly.

Most CLOs are issued offshore (e.g., the Cayman Islands), with those onshore issued mainly in Delaware. CLOs hold more than half (about US\$700 billion) of the total outstanding leveraged loans. CLOs themselves are held by a wide range of investors including domestic and foreign banks (US\$200 billion), insurers (US\$135 billion), and exchange traded funds (ETFs) and mutual funds (US\$130 billion).¹

Box 1. Corporate Sector Vulnerabilities (continued)

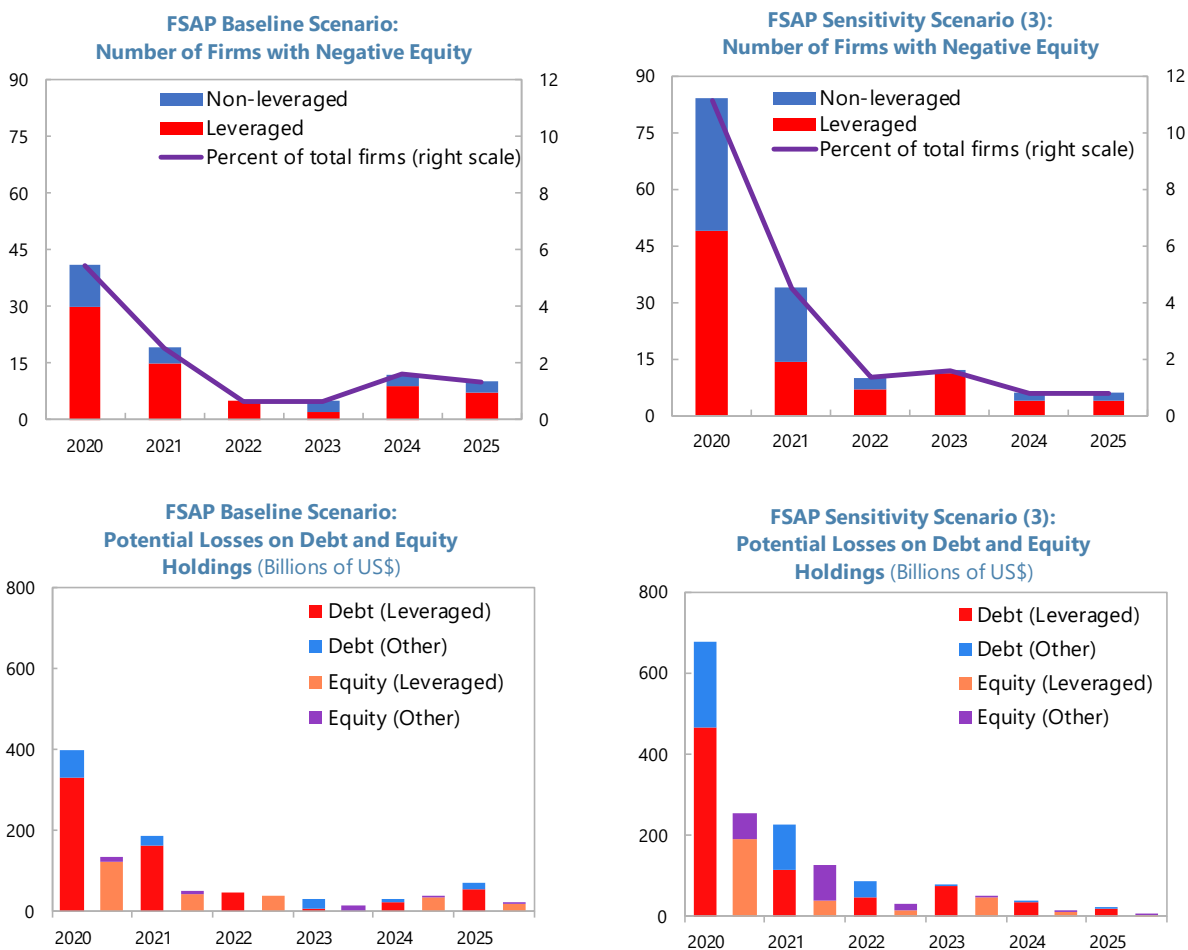
The U.S. banks have a multi-faceted exposure to this market. Bank exposures include retained portions in the loan book, credit lines and revolving lines of credit (revolvers), and warehousing some of the products (subject to “pipeline risk”). The largest U.S. banks hold mostly higher quality (AAA-rated) CLO tranches in their investment books. Lower-rated tranches are mainly held by both domestic and foreign asset managers, insurers, hedge funds, and structured credit funds.²

Maturity mismatches on investors balance sheet could pose challenges in a situation of stress. An advantage of the CLO structure is that it provides some stability to market liquidity pressures. CLOs usually have a relatively long (two year) “no-call” period, during which securities issued are non-callable. Moreover, CLOs are not required to mark-to-market their assets (except on any amount exceeding the 7.5 percent threshold on holdings of CCC-rated assets), and early investor redemptions are generally not allowed. These features make them less vulnerable to runs, and CLOs can thus act as potential stabilizers in the market. In contrast, institutions with daily redemptions could face significant liquidity pressures in times of stress, triggering asset liquidations and mark-to-market losses.

Stress testing suggests sizeable potential losses, particularly among leveraged firms. The sample covered about 2,000 U.S. nonfinancial firms active in the corporate bond and leveraged loan markets, with total debt outstanding of about US\$9 trillion. The tests were designed to assess corporates’ solvency and funding risks using the FSAP stress test scenarios over the period 2020–25³ Leveraged corporates appear to be more vulnerable in terms of profitability in the stress scenario and exhibit larger funding needs, making them more susceptible to solvency and funding pressures. Given the COVID-19 outbreak, the largest losses are concentrated in 2020. In the baseline scenario (corresponding to the *June 2020 WEO Update* projections), almost 5½ percent of the firms in the sample could fall into negative equity in 2020, with the majority the leveraged segment (accounting for 73 percent of all firms with negative equity in the stress scenario). In this scenario, the aggregate amount of outstanding debt of firms potentially in distress is about US\$400 billion. More strikingly, if a scenario entailing a second wave of COVID-19 infection were to materialize, about 11 percent of the corporates in our sample would fall into negative equity, accounting for about US\$675 billion of outstanding debt, and with an initial equity value of US\$256 billion. These potential losses are substantial, although they remain broadly covered by existing financial sector buffers, particularly in the case of banks which have a moderate direct. However, the growing size of these risky credit markets—particularly when adding the high yield and private debt markets to the leveraged loan market—combined with potential losses stemming from other sectors in a downturn (e.g., households, noncorporate businesses) calls for close monitoring.

Indirect losses and potential market dislocations from corporate stress could widen depending on market liquidity conditions, particularly industries affected by the COVID-19 outbreak and collapse in oil prices. In the short term, corporates will face a shock to their liquidity position both from the uncertain market appetite for new issuance—particularly for lower rated credits—and from an expected collapse in revenues. The energy sector will face significant near-term challenges: it accounts for 10 percent of investment grade loans and bonds (10 percent of the debt service due in the remainder of 2020) and 5 percent of non-investment-grade liabilities (11 percent of debt service), with total outstanding debt is US\$580 billion. Over the medium term, if rising spreads and corporate downgrades translate into system-wide asset liquidations under stress, then price impacts of fire sales and mark-to-market losses could reverberate through the system, leading to indirect losses even for the banks. Conversely, the availability of “dry powder” (e.g., from private equity investors) or structures with liability “lock-in” features could dampen potential contagion.

Box 1. Corporate Sector Vulnerabilities (concluded)



Note: the FSAP baseline scenario corresponds to the June 2020 WEO Update projections.

Source: IMF staff calculations.

¹ See Financial Stability Board report on “Vulnerabilities associated with leveraged loans and collateralized loan obligations”, published on December 19, 2019.

² See Federal Reserve Board’s “Financial Stability Report,” May 2019 edition.

³ See Caceres, C., Cerdeiro, D.A., Pan, D., and Tambunlertchai, S., 2020, “Stress Testing U.S. Leveraged Corporates,” IMF Working Paper, 20/XX (forthcoming), for a detailed description of the methodology.

to U.S. rate, credit, and equity market risk is substantial, acting as an amplification channel of adverse U.S. shocks.

13. Nonbanks play a vital role in financial intermediation. Domestic financial intermediation is diversified, and the system is highly interconnected. Mutual funds hold around a sixth of the U.S. corporate bond market and serve as a key source of funding for U.S. corporates and a major destination for U.S. household savings. The banking sector accounts for about 20 percent of overall financial system assets and—withstanding the presence of eight G-SIBs—is less concentrated

than in other advanced economies.¹⁰ FMIIs are highly concentrated and very interdependent; their global systemic importance has grown as a result of post-crisis internationally agreed reforms. Eight systemically important FMIIs, each dominating a particular market, are globally critical for U.S. dollar clearing, the clearing and settlement of U.S. Treasuries, and clearing of the exchange-traded or over-the-counter (OTC) derivatives (Figure 7).

14. The rapid expansion of nonbank mortgage lenders might lead to rising risks (Box 2).

These companies have become prominent in the origination and servicing of residential mortgages. They are highly leveraged and rely on short-term funding, often from banks, to finance their operations, including pipeline, day-to-day expenses, and backstops for borrowers' delinquencies. Balance sheet funding needs are limited, however, by the fact that nonbank mortgage lenders do not hold mortgages themselves. Their rapid growth, limited coverage within a federal regulatory perimeter, low transparency and disclosure requirements, multifaceted operations, and complex interlinkages with the rest of the housing finance market could lead to significant risk buildups with consequences for other financial institutions and GSEs. Adequate regulation and supervision of these nonbanks is important to support macrofinancial stability and to protect taxpayers

15. In 2019, the authorities announced recommendations for GSE reform that would limit taxpayer risk and allow for private competitors to develop.¹¹

The GSEs (under federal conservatorship since 2008) have fostered the widespread availability of the 30-year fixed-rate mortgages which improve access to credit and mitigate interest rate risks to households. The roadmaps include recapitalization and tailoring government support; more stringent capital and liquidity regulation; expansion of credit risk transfer to private investors; a resolution framework requiring GSEs to maintain a minimum amount of bail-in-able loss-absorbing capacity (LAC); scaling back GSEs non-core operations; and raising competition by allowing the FHFA to charter private competitors to the GSEs while eliminating GSEs' exemptions from certain CFPB requirements—most notably the Qualified Mortgage (QM) patch.¹² The authorities' plans articulate a reasonable approach broadly consistent with past staff advice. The implementation timeline remains unclear.

16. Reforms should seek to mitigate risks of mortgage and MBS market dislocations. At roughly US\$8.5 trillion (with average daily-trading volume over US\$200 billion), the Agency MBS market is one of the largest and most liquid fixed-income markets with important role in banks' liquidity risk management. A reduction in the GSE's footprint may reduce intermediation for various

¹⁰ G-SIBs account for about 57 percent of total banking sector assets and about 11 percent of total financial sector assets.

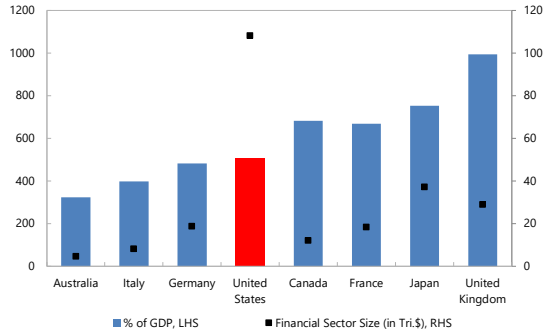
¹¹ The Treasury Housing Reform Plan <https://home.treasury.gov/news/press-releases/sm769> and the Department of Housing and Urban Development plan https://www.hud.gov/press/press_releases_media_advisories/HUD_No_19_135

¹²The CFPB QM rule provides a compliance standard for assessing a consumer's ability to repay a mortgage loan. Under the temporary QM patch, loans eligible to be purchased or guaranteed by GSEs receive a presumption of compliance as a Qualified Mortgage. These loans are not required to meet the CFPB's General QM standard, including the maximum 43 percent debt-to-income limit. The CFPB announced in July 2019 that the QM patch would expire in January 2021 or after a short extension. On June 22, 2020, the CFPB proposed two rules pursuant to this July 2019 advanced notice of proposed rulemaking.

Figure 4. United States: Large and Diversified Financial Sector

The U.S. financial sector is the largest among peers...

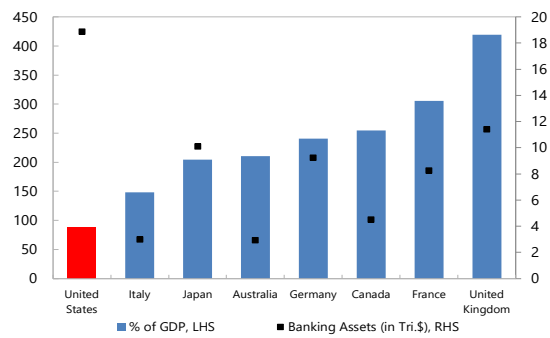
Size of Financial Sector Assets
(As of end-2019 or latest available)



Sources: Flow of Funds, Haver Analytic.

...including for banks, though not when scaled by GDP.

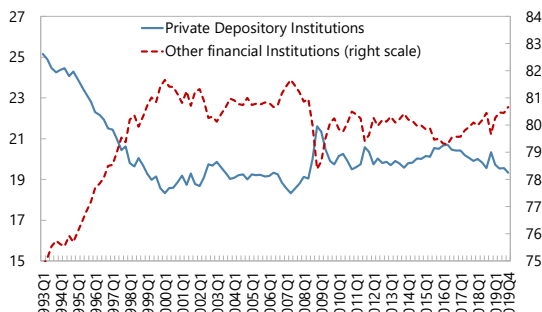
Size of Banking Sector Assets
(As of end-2019 or latest available)



Sources: FSI database, Haver analytic.

Financial intermediation is dominated by nonbanks...

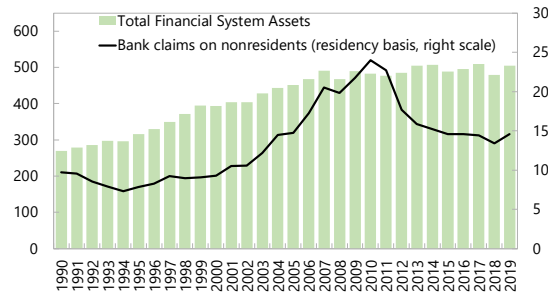
Share of Financial Sector Assets
(In percent of total)



Source: FRB, Flow of Funds; Haver Analytics.

...while total financial system assets have levelled off.

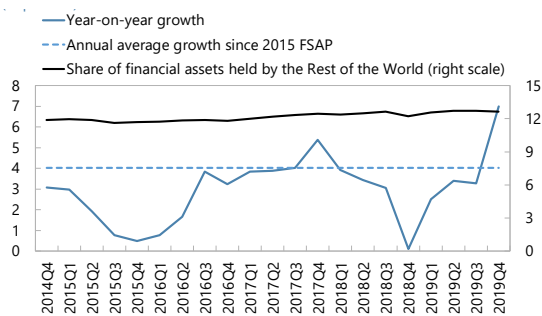
Financial System Size and Internationalization
(In percent of GDP)



Sources: FRB, Flow of Funds; BIS

Financial sector assets grew sharply by end-2019, while the share of financial assets held by the nonresidents remained stable.

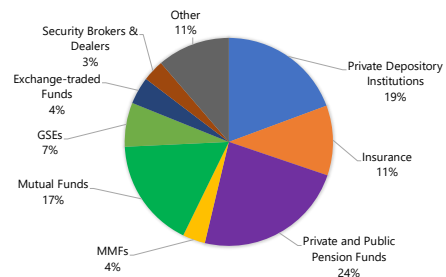
Financial Sector Asset Growth and the Share Held by the Rest of the World
(In percent)



Sources: FRB, Flow of Funds; Haver Analytics.

Financial intermediation is highly diversified.

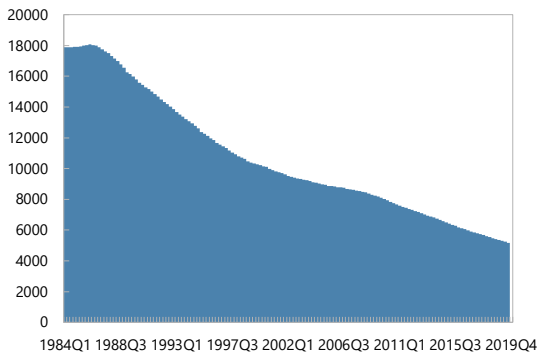
Financial Sector Composition^{1/}
(In percent of total)



Source: FRB, Flow of Funds; Haver Analytics.
1/ Data as of 2019:Q4. MMF stands for money market funds.

Figure 5. United States: Bank Funding, Shadow Banks, and Markets

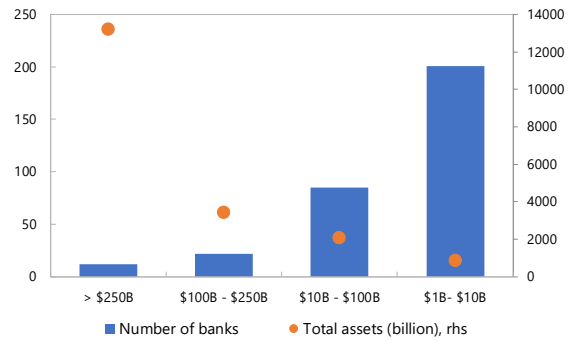
Number of Commercial Banks—FDIC Insured



Sources: FDIC.

Banks by Asset Size

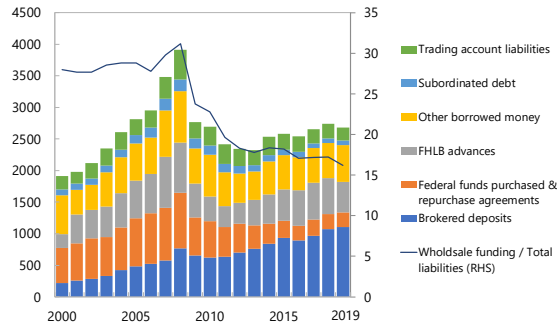
(left scale = unit; right scale = billions of US\$)



Sources: Flow of Funds.

Wholesale Funding: Commercial and Savings Banks

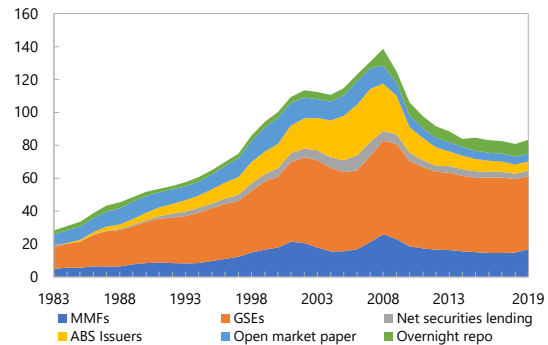
(left scale = billions of US\$; right scale = in percent)



Sources: FDIC.

Shadow Banking System

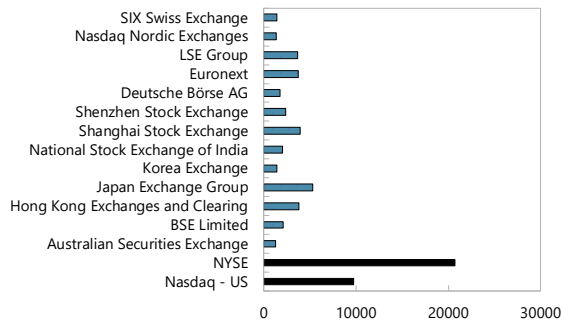
(In percent of GDP)



Sources: Flow of Funds.

Domestic Market Capitalization: Selected Exchanges

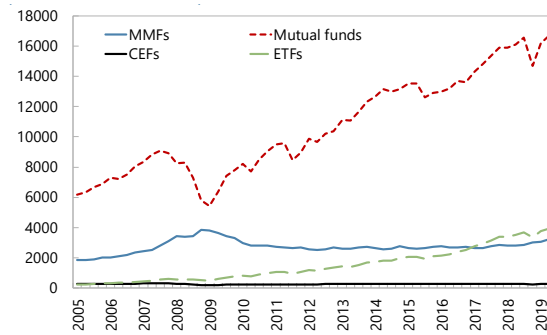
(US\$ billions; end-2018)



Source: World Federation of Exchanges Annual Statistics Guide 2018.

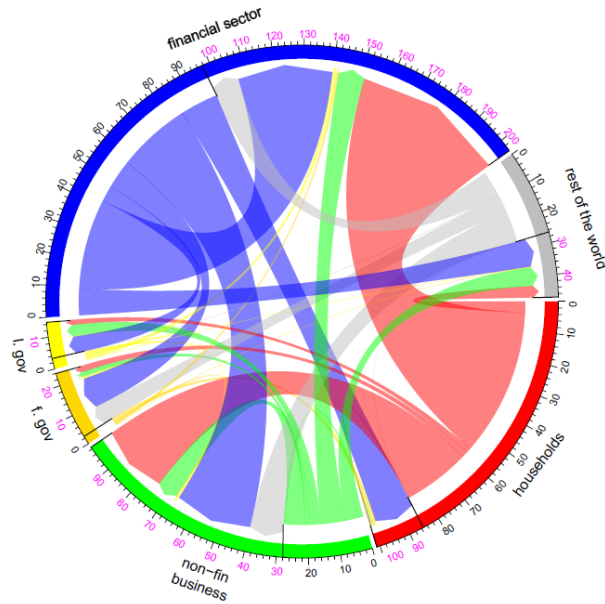
Mutual Funds Assets under Management

(US\$ billions)



Sources: Flow of Funds, Refinitiv Datastream.

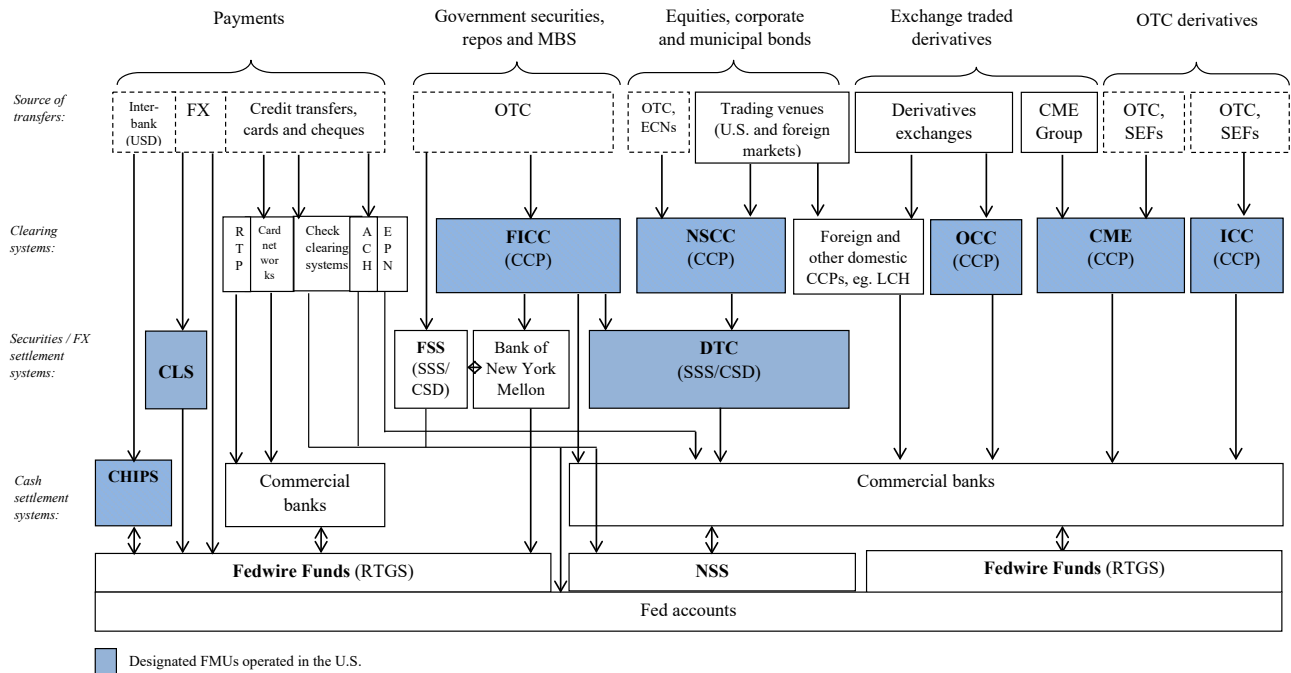
Figure 6. United States: Cross-Sector Interconnectedness



Sources: FRB, Flow of Funds, and IMF staff calculations.

Note: A claims (color A) on B. Size of the link reflects the relative significance of claims; therefore, each sector shows both assets and liabilities. The numeric values refer to values in trillions of U.S. dollars based on levels in U.S. flow of funds as of 2018:Q4. Numeric values in black-colored fonts correspond to assets of the respective sector, while numeric values in pink-colored fonts corresponds to the area with liabilities coming into the sector.

Figure 7. United States: FMI Landscape



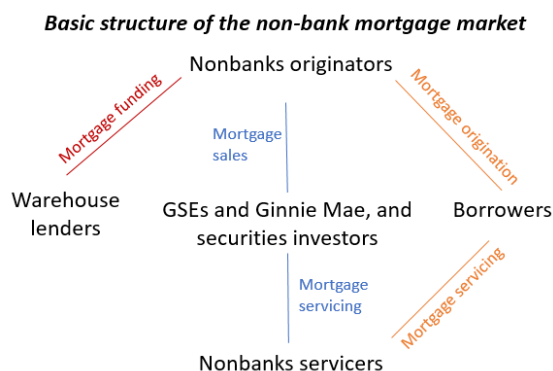
Source: IMF staff estimates.

Box 2. Nonbank Mortgage Lenders¹

Nonbank mortgage companies originate over half of residential mortgages, up from a quarter in 2007, and provide about half of mortgage servicing.² Quicken Loans is the largest, having originated some 6 percent of total home loans in 2018, followed by United Shore Financial Services LLC and LoanDepot LLC, with about 2 percent market share.³ This compares to Wells Fargo Bank with a 3.2 percent and JP Morgan Chase Bank 2.3 percent market shares, respectively.

Activities in a typical mortgage loan process

- **Origination.** Nonbank originators rely on short-term credit lines from warehouse lenders to extend mortgages. Mortgage originators seek to sell the mortgages on a timely basis to repay the credit lines.
- **Distribution.** Most of the loans are ultimately sold as securities guaranteed by GSEs and by Ginnie Mae (“agency MBS”), as the market for private-label residential MBS dried up post-GFC. Loans underlying these securities have to meet standards set by the GSEs and federal agencies that back loans in the Ginnie Mae pool. Ginnie Mae guarantees are explicitly backed by the government.
- **Servicing.** Servicers collect payments and forward them to tax authorities, insurers, and investors. These payments have to be made even if the loans are delinquent (“advances”).

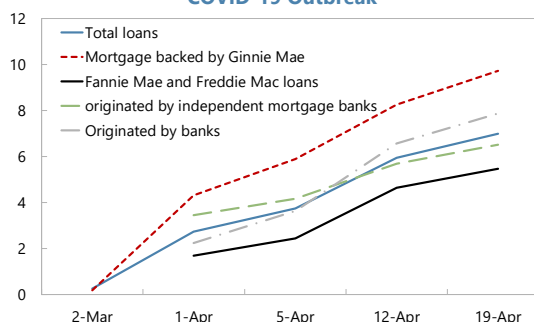


Multifaceted risks

Liquidity stress for servicers is a key risk. As borrower delinquencies increase, nonbank servicers will have to make advanced payments. Their liquidity buffers thus fall and their borrowing needs rise when financial conditions are tightening. Ginnie Mae servicers appear most vulnerable, these loans tend to have worse credit quality than GSE loans, and Ginnie Mae servicers generally cannot use the “advances” as funding collateral.

The ongoing COVID-19 pandemic is a real-time liquidity stress test for mortgage servicers. Mortgage servicers had been operating with low delinquency rates prior to the pandemic (0.65 percent for GSE loans, 1.92 percent for VA loans, and 3.47 percent for FHA loans in 2019).⁴ Mortgages in forbearance increased rapidly with the onset of COVID-19, implying that advance payments by servicers are multiple times their “normal” amounts. The sharp tightening in financing conditions in markets without official interventions makes it harder for servicers to obtain bridge financing. Even though the Federal Housing Finance Agency (FHFA) has subsequently allowed the GSEs to provide relief, servicers still generally need to make payments in the initial four months following the forbearance on a single-family mortgage. Whereas FHFA provided a degree of certainty to servicers as to the duration of the servicing advance requirement, Ginnie Mae opted to provide direct liquidity assistance to its servicers.

Share of Mortgage Loans in Forbearance following the COVID-19 Outbreak



Source: Mortgage Banker Association's Forbearance and Call Volume Survey.

Other risks include solvency and loss of market depth. Changes to the GSE regime could impact market depth. A slowdown in securitization could make it difficult for originators to repay the credit lines. Originators could incur valuation losses on unsold loans, and servicers losses in servicing delinquent loans. With the COVID-19 outbreak, some

Box 2. Nonbank Mortgage Lenders (concluded)

loans entered in forbearance before being sold to the GSEs. Even though GSEs made an exception to temporarily purchase such loans, a haircut of 5–7 percent to the loan value will be applied, representing a loss for originators.

Macrofinancial exposures and implications of disruptions to nonbank mortgage firms

- **Warehouse creditors.** Warehouse creditors (mostly large banks) could incur losses if originators fail to pay back the credit lines. Such potential losses are likely limited, as credit lines are secured by mortgages with a haircut. Moreover, the system's aggregate exposure to warehouse credit is relatively limited.⁵
- **MBS investors.** Even though investors in GSEs and Ginnie Mae securities are protected from losses, they could potentially be affected if mortgage servicers do not function properly. This is exacerbated by the concentration of the servicing market. Non-agency MBS investors bear the entire credit risk on their holdings of non-guaranteed mortgage loans, including those originated by nonbanks which tend to have lower credit quality than bank loans.
- **Shareholders of nonbank businesses.** Nonbank mortgage companies are typically organized as monolines but some are affiliated with other financial institutions (e.g., private equity firms). Some real estate investment trusts (REITs) hold mortgage-servicing rights. While shareholders serve as potential source of liquidity, they could be negatively impacted by losses of associated mortgage companies.

Widespread disruptions to nonbank mortgage firms could adversely impact broader housing market. Lower credit availability will likely affect Ginnie Mae's borrowers the most—nonbanks are currently originating about 90 percent of Ginnie Mae loans, most of which are to borrowers with lower credit score and lower income. Although a number of mitigators exist (e.g. loan-loss mitigation procedures and improved risk assessment practices by GSEs which will also benefit Ginnie Mae given their shared nonbank counterparties), a "moral hazard" risk remains important. Research found that the transfer of credit risk through the originate-to-distribute channel resulted in originations of inferior-quality mortgages, although securitized-loan quality has improved following the introduction of the Dodd-Frank Act.⁶ Higher GSE losses could pose challenges to the reform plans.

¹ This discussion excludes insurers.

² See "Reengineering Nonbank Supervision." Chapter three: Overview of Nonbank Mortgage, The Conference of State Bank Supervisors, September 2019.

³ See "Data Point: 2018 Mortgage Market Activity and Trends", The Consumer Financial Protection Bureau, 2019.

⁴ See "Global Markets Analysis Report, April 2020" by Ginnie Mae.

⁵ Data on aggregate exposure are not available. Assuming that mortgage loans usually sit on the credit line for about 15 days, a total mortgage origination by nonbanks of about US\$500 billion per annum would be backed by credit lines of about US\$20 billion.

⁶ See Purnanandam, A., 2011, "Originate-to-Distribute Model and the Sub-Prime Mortgage Crisis," The Review of Financial Studies, Volume 4, Issue 6, Oxford University Press, June 2011.

mortgage-related products, if not offset by increased private participation. The increase in interest spreads on long-term fixed-rate mortgages is often seen as one of the most important potential impacts. Changes to the GSEs' underwriting standards and rules may result in less access for lower-income borrowers. Requirement that the GSEs maintain a nationwide presence and preclusion from holding mortgages in their own portfolio beyond the level needed to facilitate their securitizations would lower the GSEs' profitability, making it potentially harder to attract private capital.

17. Changes to the GSE framework could impact Private Mortgage Insurers (PMIs) whose financial strength significantly improved post-GFC. GSEs are required by statute to obtain credit enhancement on all purchased mortgages with a loan-to-value ratio greater than 80 percent. More than 98 percent of this enhancement constitutes insurance with PMIs. In 2015, the GSEs put in place

Private Mortgage Insurer Eligibility Requirements (PMIERS)—further updated in 2018—which provide a comprehensive set of operational and risk-based financial requirements. PMIs must always meet PMIERS to be eligible to write mortgage guaranty insurance for mortgages acquired by the GSEs. PMIERS financial requirements are considerably stronger than the current minimum capital requirements by the states. Revised state requirements for PMIs are under development. When capital requirements for the GSEs are developed, further modification of PMIERS financial requirements would be necessary to avoid capital arbitrage.

Risk Analysis Approaches

18. Financial system resilience was assessed by analyzing solvency of banks and insurers; liquidity of banks, mutual funds (MFs), and money market funds (MMFs) under stress; and system interconnectedness (Figure 8, Appendices II–V). The FSAP approach recognizes high complexity and strong cross-sectoral linkages in the U.S. financial system, the relatively large number of G-SIBs, and the large number and size of MFs and insurers. Emphasis was put on the impact of delayed recovery from the COVID-19 outbreak and potential impact of additional containment measures due to a potential second wave of the pandemics. Parts of the analysis (interconnectedness, MFs) were finalized before the COVID-19 outbreak and focused on asset fire-sales, e.g., due to materialized risks in the corporate sector.¹³ The COVID-19 shock has introduced a considerable uncertainty about future economic developments and may lead to structural breaks in consumer and corporate behaviors. A number of indicators are pointing to a possibility of a stronger output contraction in 2020 and an elevated level of unemployment remaining for longer. The stress testing results should therefore be interpreted with caution.

Figure 8. United States: FSAP Systemic Risk Assessment Framework

USA FSAP Systemic Risk Assessment Framework: systemic risk analysis				
Solvency of Banks	Solvency of Insurers	Liquidity of banks, mutual and money market funds	Interconnectedness	Scenario design and sectoral risk assessment
Balance-sheet regulatory approach based on exposures (domestic/foreign).	Balance-sheet regulatory approach based on exposures Aligned with macrofinancial scenarios used for the banking ST.	Bank liquidity Limited analysis using public data (LCR disclosure reports) 33 banks: 8 G-SIBs; 9 subsidiaries of foreign banks and 16 other domestic banks.	Cross-Sectoral exposures Flow of funds among the different econ sectors: financials, households, corporates, public sector, foreign entities	Scenario design and macro conditions COVID-19 Baseline and the three Adverse scenarios based on duration of containment measures and a second wave of contagion.
Forecast of balance sheet and income statement items. 57 equations based on the refined CLASS model. Three or five year ST horizon.				
Sensitivity analyses (e.g., Real estate price risk). Risks from common exposures (fire-sales of assets).	Sensitivity analyses (e.g., interest rate shocks, default of largest banking counterparties). Coverage: 70 insurance groups.	Mutual funds Fund liquidity: redemption on shocks. Emphasis on US fixed income and mixed funds.	Exposure based analysis US interbank, cross-border (incl. aggregated cross-border exposure analysis)	Housing sector analysis Expansion of non-bank mortgage lenders
Top-down: 34 banks (8 G-SIBs; 11 subsidiaries of foreign banks and 16 other domestic banks).		Money market funds Fund market risk: interest and credit spread shocks.	Market-data based Interconnectedness analysis (domestic and foreign linkages)	Corporate vulnerabilities Leveraged lending Securitization and CLOs

Source: IMF staff analysis.

¹³ Further description of the models, methodologies, and stress test scenarios in the Technical Note on *Risk Analysis and Stress Testing the Financial Sector*.

Scenarios

19. The following scenarios have been used for the stress tests (Figure 9):

- The FSAP *Baseline scenario* follows the *June 2020 WEO Update* projections.¹⁴ It entails a sharp contraction (mainly in 2020:Q2) owing to containment measures in response to the COVID-19 outbreak, and subdued activity and reduced demand in sectors affected by social-distancing norms. This is then followed by a tepid economic recovery as the economy starts to open again, but private sector balance sheet deterioration—with the unemployment rate peaking at 13½ percent in 2020:Q2—combined with long-lasting behavioral changes, keeping GDP below its pre-crisis (i.e., 2019:Q4) level through end-2022. Asset prices face a commensurate short-term fall, and then recover back to their previous levels within two-year horizon.
- Three alternative sensitivity scenarios are also considered, which assume different length of containment and de facto mobility measures:
 - (i) *Sensitivity Scenario 1*: relative to the baseline, this scenario assumes that the reduced de facto mobility observed during the containment period lasts for the entire second quarter of 2020. Output losses during this period are assumed to be 25 percent (non-annualized) relative to pre-COVID levels. In other words, the level of economic output in 2020:Q2 is equivalent to 75 percent of the pre-shock quarterly output level. This is then followed by a slower economic recovery relative to the baseline, hysteresis losses are assumed to be commensurately larger. The fall in financial asset prices is proportionately adjusted to the severity of the output losses embedded in the scenario.
 - (ii) *Sensitivity Scenario 2*: this scenario follows the same logic as *Sensitivity Scenario 1*, but the containment measures and reduced mobility are assumed to last for another quarter. In other words, output levels in both 2020:Q2 and 2020:Q3 are only 75 percent of the pre-crisis level. This would lead to larger employment, income, and business losses, thus also translating into larger and longer-lasting economic “scarring” relative to the previous two scenarios.
 - (iii) *Sensitivity Scenario 3*: initially, this scenario follows the same pattern as *Sensitivity Scenario 1*, but assumes another wave of increased infections followed by a new containment period in the first quarter of 2021. This leads to a “W-shaped” path of the level of output, triggering more economic and balance sheet losses for longer. Consequently, economic activity recovers even slower in this scenario in subsequent years.

20. Compared to historical patterns observed in previous economic crises, the economic losses in the FSAP scenarios are unprecedented, reflecting the unprecedented nature of the ongoing pandemic. The sharp real GDP contraction in 2020:Q2 in the *June 2020 WEO Update* is equivalent to 12 times the historical standard deviation of the quarterly GDP growth series recorded

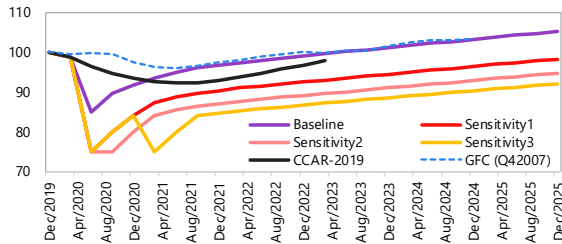
¹⁴ <https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020>.

since the end of WWII. This same variable's path corresponds to 17 standard deviations in the case of the adverse scenarios. The FSAP stress test scenarios of financial variables are adjusted proportionately to the severity of the output losses. This includes large shocks to corporate risk premia, stock market prices, and real estate prices (which tend to exhibit a more delayed response).

Figure 9. United States: Stress Test Scenarios

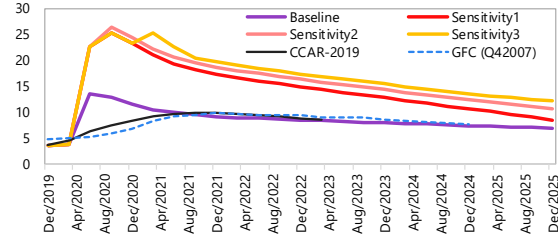
Delayed recovery leads to subdued activity

Real GDP Levels
(Index: 2019Q4=100)



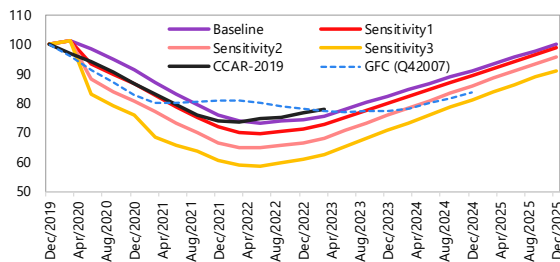
... and more persistent unemployment

Unemployment Rate
(In percent)



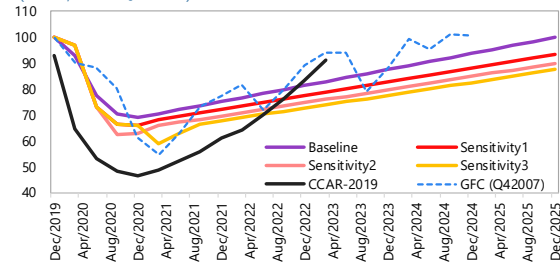
House prices fall...

House Price Index
(Index; 2019Q4=100)



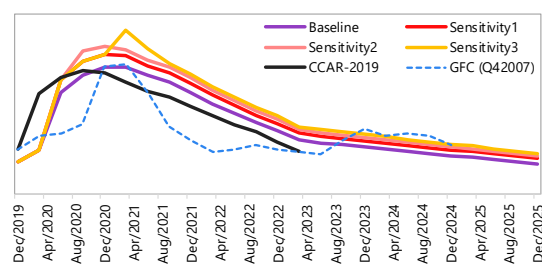
...following a contraction in the stock market

Stock Market Index
(Index; 2019Q4=100)



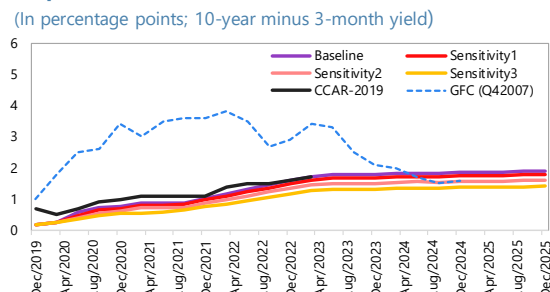
Risk premiums go up, especially for lower rated corporates....

BBB Corporate Spread
(In percent)



...despite policy rates expected to remain low for longer

Slope of the Yield Curve
(In percentage points; 10-year minus 3-month yield)



Sources: FRB, CCAR scenarios; Haver Analytics; IMF staff estimates.

Note: The FSAP Baseline Scenario refers to the June 2020 WEO Update projections.

Banking Sector Resilience

21. The banking system entered COVID-19 crisis with sizeable capital buffers, though future capital depletion is subject to multiple sources of uncertainty, including duration and intensity of COVID-19 containment measures. Solid buffers allowed banks to extend credit lines to cash strapped corporates and households. Were the macroeconomic forecasts produced before the COVID-19 outbreak to materialize, banks would maintain high capital buffers and profitability. The uncertainty around the duration of the crisis required simulation of several adverse scenarios—complementing the already severe baseline—and utilization of ad hoc assumptions to analyze sensitivity of capital positions to different duration of containment, assumptions about payouts to shareholders, dynamics of non-interest expenses, and credit portfolio growth. The stress tests, however, were not able to fully incorporate the impact of various fiscal measures in the CARES package and the temporary postponement of loan repayments granted to banks' borrowers.

22. The FSAP corporate stress analysis and market data informed calibration of corporate and commercial real estate (CRE) loss rates. The corporate and commercial real estate loan portfolios were hit by an unprecedented shock of the containment measures, with expected losses far exceeding observed banks' loss rates during previous cyclical downturns. Further, historic commercial and industrial (C&I) loan loss data may not reflect the structural break related to the rapid growth of leveraged loans with few covenants in recent years. Thus, C&I loan losses follow the path derived from the above corporate sector stress test results. The potential loss rate from the C&I loans under the *Baseline scenario* reaches 11.2 percent and is four times higher than the rate observed during the GFC; losses under the *Adverse Sensitivity Scenario 1* reach 14.9 percent and are five times higher than those observed during the GFC. Projections of CRE loan losses are based on market sources, with the COVID-19 impact up to three times larger than the CRE loan losses in 2008–09.¹⁵

23. To gauge the sensitivity of the results to behavioral assumptions, the stress test considered two options for shareholder payouts. The main set of simulations involved an assumption that banks would continue shareholder payouts at historic average rates (i.e., at approximately 40 percent of net earnings, excluding share buybacks) and will reduce other expenses, while balance sheets will grow at the rate of up to 4 percent per year reflecting lower demand for credit compared to average growth rates of 7.5 percent recently. An alternative set of simulations assumed that banks would temporarily reduce shareholder payouts to zero for the duration of the crisis. Based on these assumptions and the four scenarios, eight simulations were performed in total.¹⁶

¹⁵ See Moody's report: "Coronavirus (COVID-19): Credit Risk Impact on Commercial Real Estate Loan Portfolios." <https://www.moodysanalytics.com/-/media/article/2020/covid19-credit-risk-impact-cre.pdf>

¹⁶ The bank solvency stress test uses public data and the Capital and Loss Assessment under Stress Scenario (CLASS) top-down model developed by the Federal Reserve Bank of New York and augmented by the FSAP team.

24. Capital depletion rates are high in the *Baseline scenario* yet remain manageable

(Figure 10, Appendix VI provides sample grouping). The impact of COVID-19 plays out mainly via two channels: (i) immediate increase in credit losses, especially exposures to credit cards (losses of up to 3 percent of risk-weighted assets (RWAs)) and C&I loans (losses of up to 1.8 percent of RWAs); and (ii) growth of RWAs due to a utilization of credit and funding lines leading to an additional depletion of CET1 of up to 1 percentage point¹⁷ Net interest income offsets the majority of losses, but declining margins resulting from low policy rates reduce pre-provision net revenue.¹⁸ Policy rates have a small additional positive effect on funding costs but a significant negative one on loan interest rates. Cumulative five-year gross interest income goes down from 15.5 percent to 12.2 percent of total assets when compared to the pre-crisis level. This leads to a 360-basis point annual capital uplift from net interest income compared to 420 basis points (bps) estimated before the COVID-19 outbreak. If shareholder payouts remain at a historic level, up to four banks in the sample (none of which is one of the eight G-SIBs) would need additional capital to meet the 4.5 CET1 hurdle requirement within the three-year horizon, with aggregate recapitalization needs amounting to 0.4 percent of GDP. No G-SIB would fall below the 4.5 CET1 hurdle also over the five-year horizon, while a total of five non-GSIBs would require additional capital of about 0.8 percent of GDP in aggregate. If shareholder payouts were zero for the stress test horizon, only four non-GSIBs would need additional capital with the recapitalization needs falling to 0.6 percent of GDP over the five-year horizon.

25. Banks with a high share of retail funding, diversified asset portfolios, and high initial CET1 capital buffers are more resilient.

G-SIBs¹⁹ with diversified business lines fare well, with trading banks²⁰ experiencing a limited impact on their balance sheets, mainly due to prompt actions from the FRB setting up the lending facilities to stabilize market liquidity. Non-GSIBs²¹ and some foreign-owned banks with considerable exposure to C&I loans, lower capital buffers, and large shareholder payout ratios are relatively more vulnerable to shocks. Non-GSIBs are primarily exposed to losses from unsecured lending to households (e.g., credit cards), secured loans (e.g., residential mortgages), and C&I loans, as well as commercial real estate lending. Some smaller non-GSIBs have high exposure to consumer lending, such as credit cards. Moreover, banks differ in terms of exposures to various sub-segments of consumer credit, with some banks having targeted lower-income households, which were particularly strongly hit by the crisis.

¹⁷ Assuming a system-wide expected utilization of 20 percent and a credit conversion factor of 50 percent.

¹⁸ Non-interest expenses show high historic volatility stemming from large one-off litigation costs or operational risk events, adding to the overall model estimations uncertainty. These have been capped in the stress testing model.

¹⁹ For the stress test purposes, G-SIB group includes four universal banks designated as G-SIB (Bank of America Corporation, Citigroup Inc., J.P. Morgan Chase & Co, and Wells Fargo & Company) and excludes the other four G-SIBs, which fall under the trading banks category due to the underlying business model.

²⁰ Trading banks group includes banks with a high share of trading-related income and trading assets, *inter alia* also four G-SIBs (Bank of New York Mellon, Goldman Sachs Group, Inc., Morgan Stanley, and State Street Corporation).

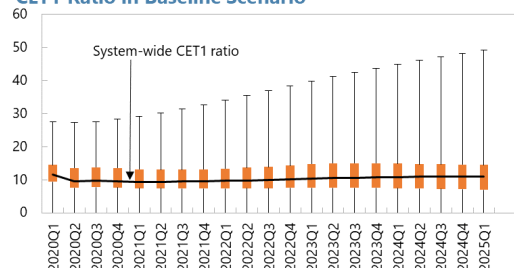
²¹ This group includes large banks with consolidated total assets above US\$100 billion, excluding U.S. G-SIBs and Intermediate Holding Companies. See Appendix VI.

Figure 10. United States: Bank Solvency Stress Testing Results—IMF Baseline Scenario

Banks started with strong capital position to support further growth of balance sheets, but declining interest margins coupled with high credit losses could lead to four non-GSIBs falling below minimum requirements...

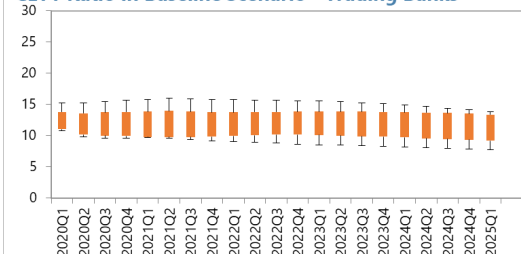
...G-SIBs have enough buffers to continue expanding loans yet the shareholder payouts at the current rates would reduce buffers going forward...

CET1 Ratio in Baseline Scenario



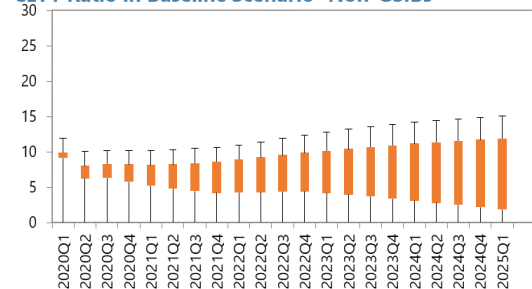
...as do trading banks, which have low exposure to consumer loans.

CET1 Ratio in Baseline Scenario - Trading Banks

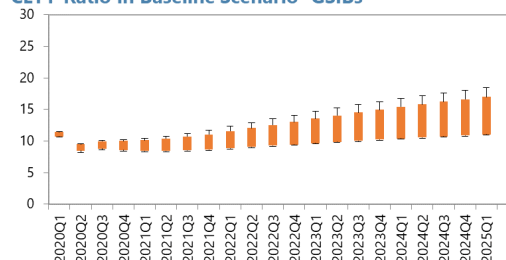


...as do non-GSIBs, which started with lower levels of capital and profitability and have less diversified credit portfolios.

CET1 Ratio in Baseline Scenario- Non-GSIBs

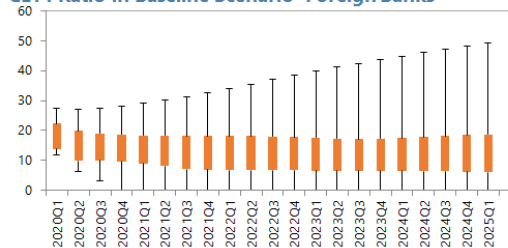


CET1-Ratio in Baseline Scenario- GSIBs



Foreign banks fare relatively well, though some with significant retail exposures face a challenge...

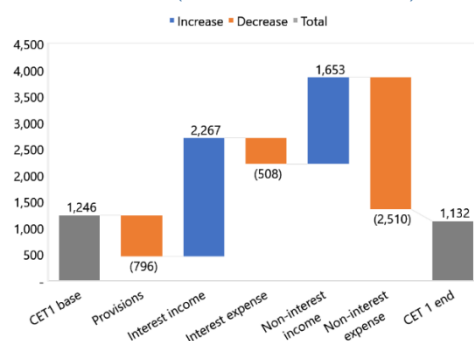
CET1 Ratio in Baseline Scenario- Foreign Banks



Non interest expenses may be further optimized: cost optimization, lower shareholder payouts would help in preserving capital base.

Contributions to CET1 Base

(In billions of U.S. Dollars)



Sources: IMF staff estimates.

Note: See Appendix VI for bank grouping. The box plots illustrate the interquartile range through the orange rectangular shaped objects, while the whiskers denote upper and lower bounds (latter is set to zero). The Baseline Scenario assumes shareholder payouts at 40 percent.

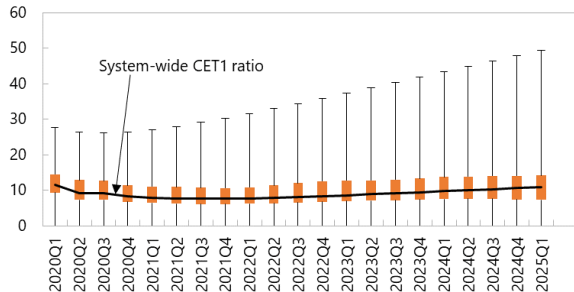
26. A more prolonged economic disruption would lead to a further depletion of banks' capital buffers, yet no G-SIB falls below the minimum required CET1 level within the three years (Figure 11). Focusing on the three-year period, up to six banks (all of them non-GSIBs) would need additional capital in the *Adverse Sensitivity Scenario 1*, though capital gap would be small and amounts to 0.5 percent of GDP.

Figure 11. United States: Bank Solvency Stress Testing Results—Adverse Sensitivity Scenario 1

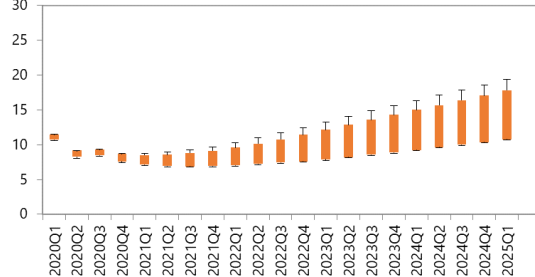
Most of the banks would stay above 4.5 percent CET1 minimum within the first year of the scenario.

G-SIBS show greatest resilience due to the diversified nature of their business models and high initial capital buffers...

CET1 Ratio in Sensitivity Scenario 1



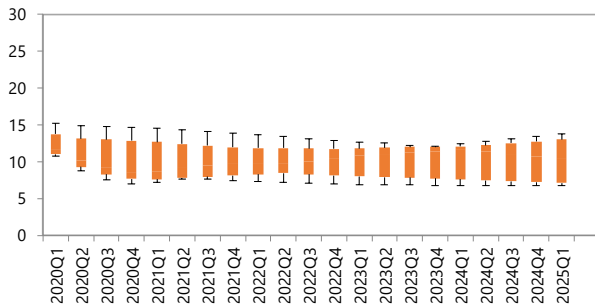
CET1-Ratio in Sensitivity Scenario 1- GSIBs



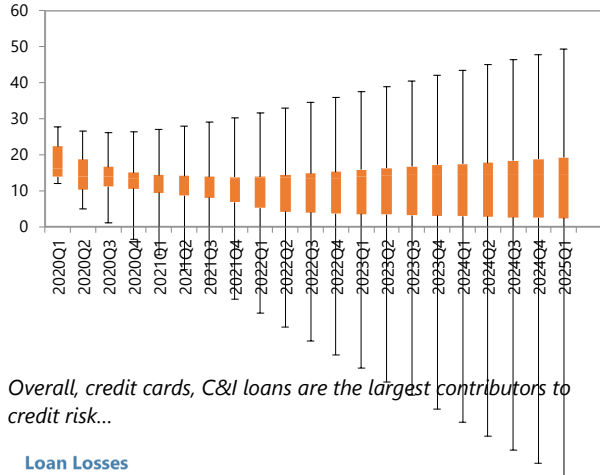
...while banks focused on market trading are hit less because of higher relative exposure to market and counterparty risks, which are not assumed to materialize due to monetary and market support measures.

Some foreign banks would need additional capital buffers, especially those exposed to consumer lending segment...

CET1 Ratio in Sensitivity Scenario 1 - Trading Banks



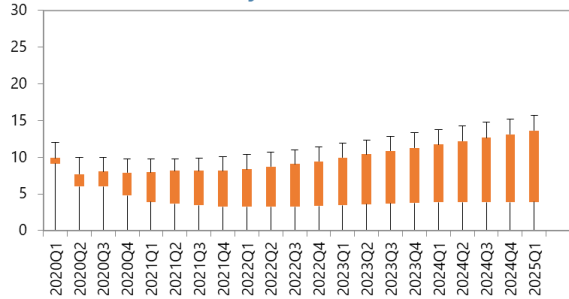
CET1 Ratio in Sensitivity Scenario 1 - Foreign Banks



...as would Non-GSIBs, especially those with lower initial capital buffers and higher exposure to consumer and C&I loans

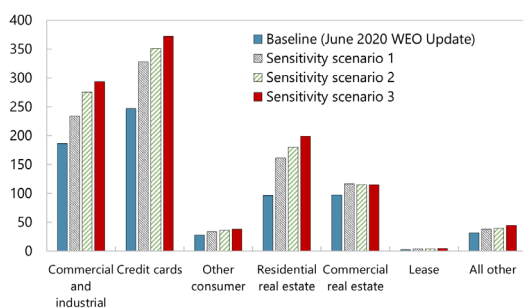
Overall, credit cards, C&I loans are the largest contributors to credit risk...

CET1 Ratio in Sensitivity Scenario 1- Non-GSIBs



Loan Losses

(In billions of US dollars)



Sources: IMF staff estimates.

Note: See Appendix VI for bank grouping. The box plots illustrate the interquartile range through the orange rectangular shaped objects, while the whiskers denote upper and lower bounds (latter is set to zero).

27. Sensitivity analysis using different assumptions about duration of the current crisis and a hypothetical second infection wave indicates a range of impact on banks’ capital positions. An additional quarter of lockdown in *Sensitivity Scenario 2* results in a system wide CET1 ratio falling on average by additional 90 bps (2022:Q2); up to eight non-GSIBs would need additional capital with the overall capital shortfall against the 4.5 percent CET1 hurdle of about 0.6 percent of GDP. In case of a second wave of infections and subsequent reactivation of full containment measures under *Sensitivity Scenario 3*, the CET1 declines by additional 450 bps in the third year compared to the *Baseline*. Overall, this would lead to 10 non-GSIBs failing to meet minimum CET1 hurdle within the first three years of the crisis with the aggregate capital shortfall of about 0.8 percent of GDP. The recapitalization needs would be on average 0.1 percentage point lower in the scenarios that assume that shareholder payouts are zero during the simulated crisis period.

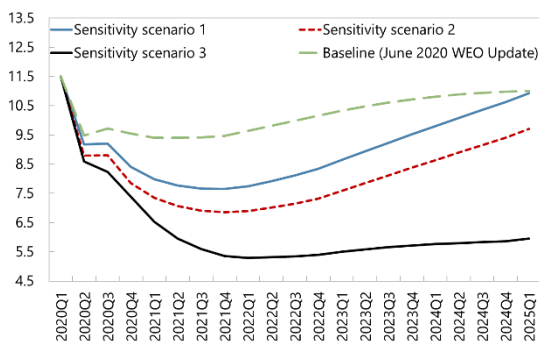
28. Even under the adverse scenarios most of the banks earn enough interest income to offset credit risk-related losses, and non-interest expenses drive the overall impact on capitalization (Figure 12). U.S. banks have a track record of reducing operational expenses quickly by closing branches and reducing workforce and staff compensation. However, were the longer duration of stress to materialize, further growth of the loan portfolio in the adverse scenarios would require a higher share of earnings to be retained. This would also help banks to maintain staffing ensuring robust business continuity. In particular, by keeping shareholder payouts at zero for the duration of the crisis, banks would save an average of 60 bps of CET1 by 2022:Q2 in the *Baseline Scenario*.

Figure 12. United States: Solvency Stress Testing Results—Sensitivity to Assumptions about Shareholder Payouts

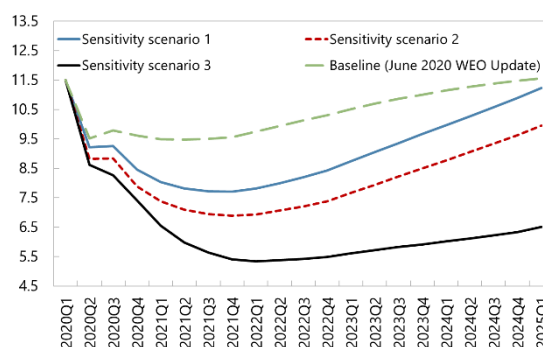
Systemwide CET1 ratio would remain above the 4.5 percent CET1 minimum within the stress test horizon...

...and retaining all earnings would help to conserve additional capital in case of an extended duration of the current pandemics.

CET1 Ratio—With Historic Level of Payouts
(In percent of risk-weighted assets)



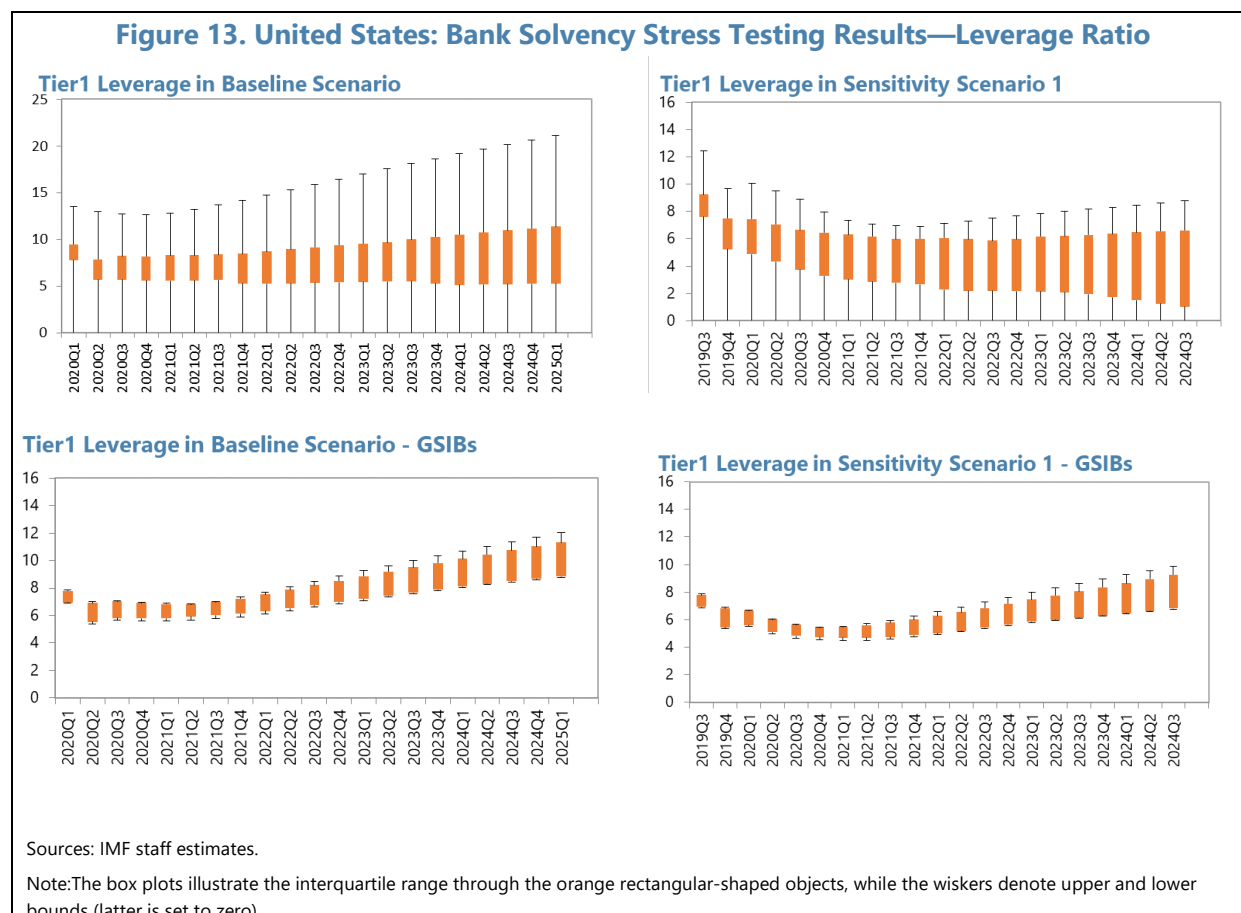
CET1 Ratio—Without Payouts
(In percent of risk-weighted assets)



Source: IMF staff estimates

Note: In panel 1, payouts include forecasted dividend payouts but exclude share buybacks.

29. Most of the banks would be able to maintain leverage ratios above the minimum requirement (Figure 13). Some trading banks designated as G-SIBs would face a challenge in maintaining a 6 percent supplementary leverage ratio without reducing the dividend payout ratio or asset growth.²² Foreign banks and some non-GSIBs, which are not subject to the supplementary leveraged ratio rule, would need additional capital to remain within the minimum Tier 1 leverage ratio of 4 percent.

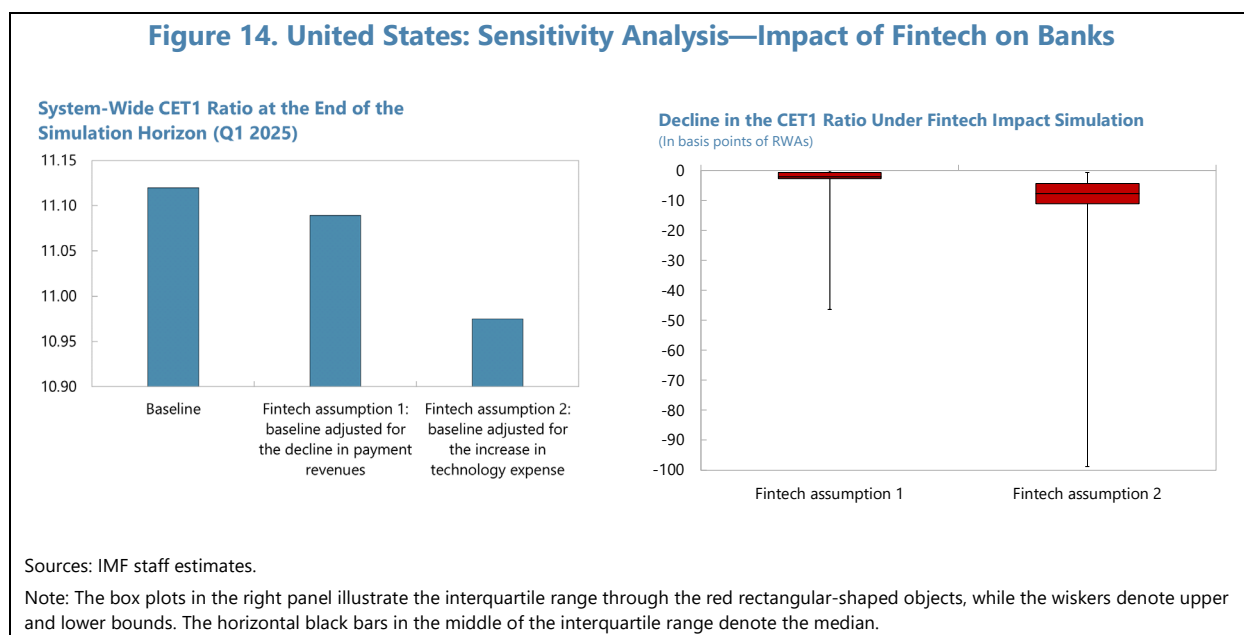


30. The potential impact of competition from fintech companies is relatively small for now (Figure 14). Applying assumptions derived from industry surveys and rating company reports, a sensitivity test leads to a 10-basis point decline in potential CET1 ratio.²³ The growing competition for deposits, fee revenues, and payment services from fintech companies will pose risks to banks’ business models in the medium term, unless banks increase their spending on IT and innovative technologies. Non-GSIBs are the most vulnerable given their market share in deposits. The analysis

²² The analysis did not take into account the temporary rule announced in April, which excludes U.S. Treasury securities and deposits at Federal Reserve Banks from the calculation of the supplementary leverage ratio and will be in effect until March 31, 2021. See <https://www.federalreserve.gov/newsevents/pressreleases/bcreg20200401a.htm>.

²³ See *Technical Note on Risk Analysis and Stress Testing the Financial Sector* for details on assumptions and methodology. The sensitivity analysis was performed using 2019:Q3 data.

was conducted before COVID-19, and the impact of COVID-19 on digitalization of retail banking and pressures for cost cutting via closure of physical branches may accelerate further.

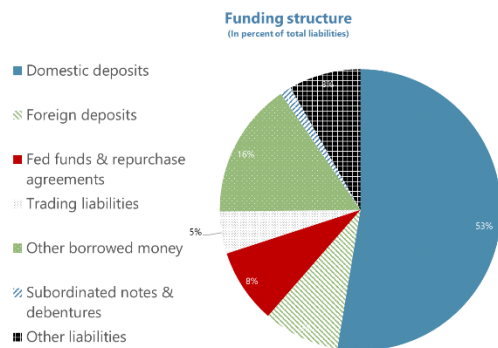


31. Based on public disclosures, banks' liquidity risks appeared moderate at the crisis onset (Figure 15). The banks in the sample obtain more than half of their funding from domestic deposits. The COVID-19 crisis and market liquidity support by the FRB led to a significant (US\$1 trillion) increase in bank deposits by households and corporates in 2020:Q1. Some foreign banks do depend on repo markets for their short-term funding and are thus more exposed to wholesale funding shocks. All banks held enough high-quality liquid assets (HQLA) to fund projected cash outflows for 30 days: average Liquidity Coverage Ratio (LCR) was 133 in 2019:Q3. Their total contractual 30-day funding gap was relatively modest, and mostly driven by off-balance sheet financing commitments. On-balance sheet inflows and outflows over a 30-day period constituted on average around half of banks' balance sheets. Off-balance sheet credit and liquidity facilities constituted another 25 percent of total assets. Most of these commitments are credit lines to corporations (revolvers) and households (credit cards, mortgages), and loans to other financial institutions—including mutual, investment, and hedge funds.

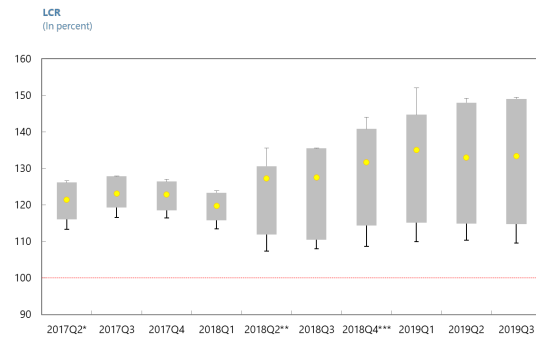
32. An increased utilization of credit and liquidity facilities could lead to a significant shortage of liquidity and a substantial decline in CET1 ratios (Figure 16). As evidenced in previous crises and during the COVID-19 stress period, nonfinancial corporates and households increase their utilization of bank facilities. If drawdowns exceeded 30 percent, many banks (including G-SIBs) would need additional liquidity to provide funding to distressed corporates and other

Figure 15. United States: Bank Structural Liquidity Ratios

Domestic deposits are the largest funding source for banks.

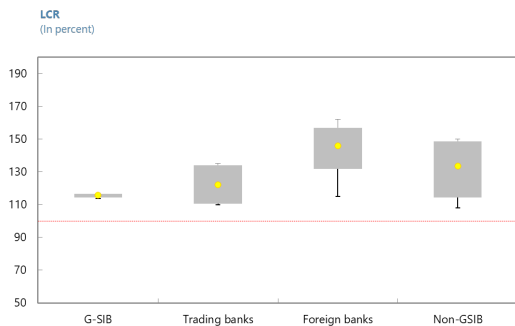


The median LCR ratio has increased since 2018 and all banks have buffers above 100 percent...

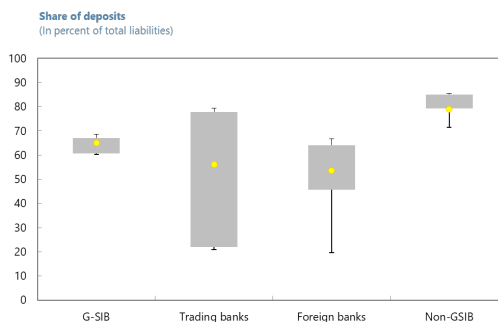


~Data for 8 banks **Data for 17 banks; 2019 and onwards: data for 33 banks

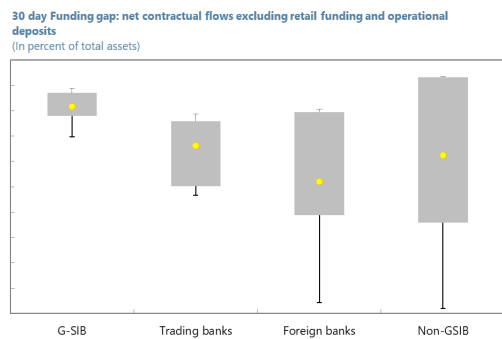
...although non-GSIBs' LCR ratio is higher due to a 70 percent cap on outflows...



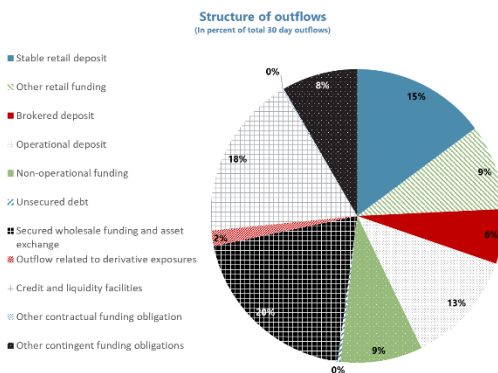
...and the highest average share of deposit funding among the peer groups of banks.



System-wide liquidity risk exposure is modest: 30-day funding gap is close to 35 percent of total assets...



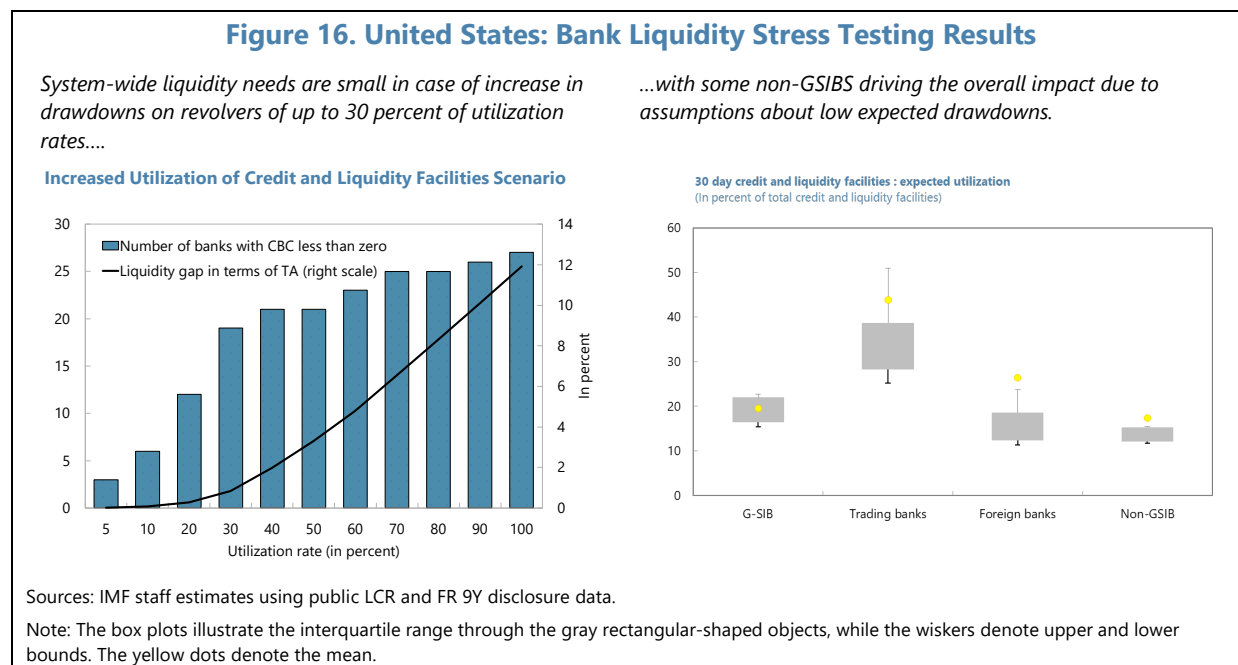
...with off-balance sheet funding and liquidity facilities being the key contributing factors among unsecured liabilities in the 30-day time horizon.



Sources: IMF staff estimates using public LCR and FR 9Y disclosure data.

Note: The box plots illustrate the interquartile range through the gray rectangular-shaped objects, while the whiskers denote upper and lower bounds. The yellow dots denote the mean.

institutions in times of wholesale funding stress or adverse market conditions market.²⁴ Depending on the share of committed and uncommitted credit lines, assumed credit conversion factors—additional depletion of CET1 ratios due to the increase in RWAs—would be from 20 bps (minimum of 5 percent drawdown) to 250 bps if banks were to allow full drawdown of the lines. Failure to grant credit lines would lead to various non-linear feedback effects within the financial sector and further defaults of cash-strapped corporates. While post COVID-19 Fed actions helped to shore up liquidity, it is important that banks maintain high enough liquidity buffers and predictable access to central bank liquidity facilities going forward.



33. Additional cash flow-based stress tests assessed funding and market liquidity risks in the network of U.S. G-SIBs.²⁵ The test focused on two scenarios: (i) the LCR-based shock scenario, which used LCR stress parameters but assumed more severe outflow rates on contingent liquidity items, such as credit and liquidity facilities, derivatives, and loss of rehypothecation rights; and (ii) the LCR-based shock scenario coupled with the assumption of a closure of repo markets (i.e., repos with MBS, agency and corporate securities not possible) and outflow rates on selected cash flow items the same as in scenario (i).

34. G-SIBs appear to have enough liquidity to withstand a severe LCR-like liquidity shock coupled with additional contingent liquidity and committed line outflows over a 1-, 5-, and 30-day horizon. Compared to the results of the analysis above conducted for 35 banks using public

²⁴ The test assumed that banks' inflows/outflows follow LCR rates, except for higher (standardized for all banks) utilization rates for credit and liquidity facilities. The full amount of HQLA without haircut is used to cover the gap. The test does not distinguish between committed/uncommitted lines.

²⁵ The analysis was performed by the FRB staff using IMF scenarios and models in March 2020, and it does not reflect the views of the U.S. regulators.

LCR data (where a number of non-GSIBs were illiquid), the G-SIBs do not have a gap after HQLA asset sales and do not need to repo assets. The liquidity gap and impact on CET1 is thus zero across all scenarios and maturity horizons. There is also no further transmission of funding risk in the network due to counterparty exposures among the G-SIBs.

35. Closure of the repo market for non-Treasury securities would lead to a small and short-lived cash flow gap in several G-SIBs, but the system-wide impact from asset fire-sales is small. Unless daily asset trading volume exceeds five times the historic average, an immediate closure of the non-Treasury repo markets affects banks during the one-day to five-day horizons (Figure 17). The worst observed cash flow gap (before a bank needs to repo treasury securities) would be from 0.09 percent of total assets (one day) to 0.27 percent (one week). This gap is fully covered by other inflows on the 30-day horizon (i.e., no shortage of liquidity is observed). If affected banks liquidate assets in stressed markets, this would lead to an insignificant 9 bps decline of CET1 on average (because the assets liquidated are Treasury securities). No G-SIB would become technically illiquid and there would be no additional losses due to interconnectedness among G-SIBs. It is worth noting that in case of a complete closure of repo markets (i.e., including Treasury securities), affected banks would face higher asset liquidation needs, although the probability of such a scenario is very low. Withdrawal of funding from Federal Home Loan Banks (FHLB)—an important source of HQLA—would not lead to a cashflow gap.

36. Closure of repo markets may lead to illiquidity of a G-SIB when this severe shock is combined with an increased utilization of credit and liquidity facilities by other financial institutions or corporates. The stress test found one G-SIB illiquid, albeit under an assumption of very high outflow rates from the credit and liquidity facilities (40 percent and above) and only under a 30-day test horizon. Overall, the impact of an asset fire-sale, including repricing of remaining assets on affected G-SIBs balance sheets, is small with a similar decline in CET1 capital by 9 bps as in the previous case, and funding gap of only 7 bps of total assets in the worst-case scenario.

Mutual Fund Resilience

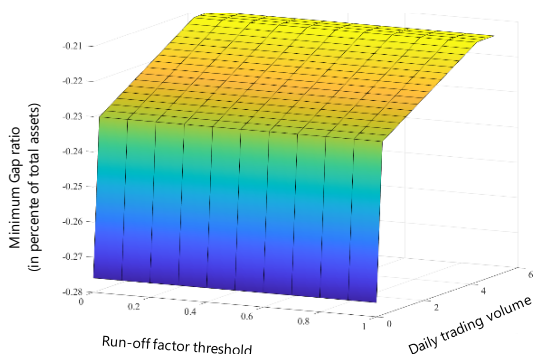
37. Given the market footprint of MFs, asset sales by managers could have a sizeable impact on market prices, thereby transmitting shocks to the financial system. FSAP liquidity tests examined funds' ability to meet severe-but-plausible redemption shocks and the extent to which funds can transmit shocks through asset sales. Using commercially available fund-level data on all U.S. fixed income and mixed MFs (2,734 funds with total net assets of US\$6.4 trillion), potentially vulnerable funds were identified on the basis of historical redemption data and their ability to meet redemption shocks with highly liquid assets using assumptions about investor and manager behavior, and excluding managers' use of liquidity management tools. In this context, the price impact of asset sales under different liquidation strategies was considered. A sensitivity analysis of a small set of funds (10) with large derivatives exposures to foreign exchange and shocks to term premium was also conducted. Further, the potential for funds to transmit shocks in distress, including through fire sales that would affect other parts of the financial system, was assessed.

Figure 17. United States: Liquidity and Asset Fire-Sales Scenario for U.S. G-SIBs

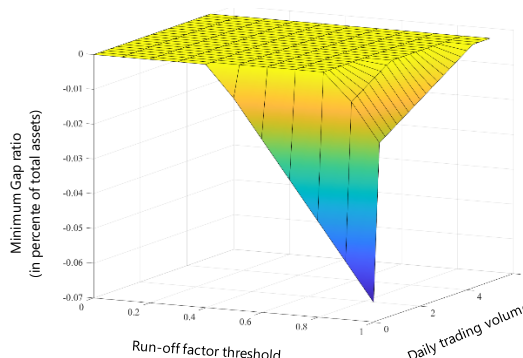
Impact of the closure of the repo market is small, and on its own will not lead to illiquidity of banks (one-week horizon is shown), especially if they can sell multiple amounts of liquid securities (five times average daily trading volume in the figure below means that the gap becomes zero).

Under the 30-day scenario, all G-SIBs would retain positive cash flow gap if outflow shock on credit facilities would remain below 40 percent.

Minimum Gap Ratio after Liquidation
(In percent of total assets; horizon = 1 week; liquidation strategy for funding shocks = slicing; stress regime = stress; repo threshold = 1 times estimated threshold)



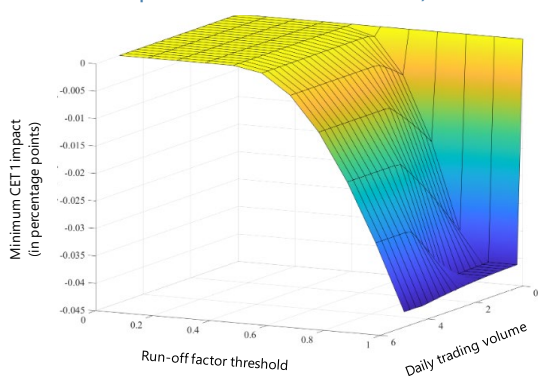
Minimum Gap Ratio after Liquidation
(In percent of total assets; horizon = 30-days; liquidation strategy for funding shocks = slicing; stress regime = stress; repo threshold = 1 times estimated threshold)



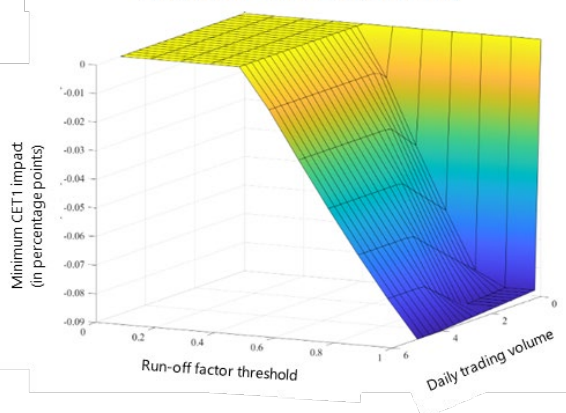
CET1 capital impairment solely due to liquidation losses is around 4.5 basis points (bps)...

...while mark-to-market losses are around the same level, yielding a combined CET1 impact of 9 bps.

Minimum CET1 Impact: Liquidation Loss Only
(Liquidation strategy for funding shocks = slicing; stress regime = stress; repo threshold = 1 times estimated threshold)



Minimum CET1 Impact: Liquidation Procedure Only
(Liquidation strategy for funding shocks = slicing; stress regime = stress; repo threshold = 1 times estimated threshold)



Sources: IMF calculations performed by the FRB staff in March 2020 based on FRB supervisory data.

38. While nearly all funds would be able to withstand severe redemptions in the FSAP stress test, high yield and loan MFs would face significant shortfalls. More than 90 percent of funds (measured by assets under management) would have enough highly liquid assets to meet investors' redemptions. However, funds exposed to high yield and leveraged loans would need to sell less-liquid securities in their portfolio (assuming that they do not use any liquidity risk management tools), potentially giving rise to fire-sale dynamics (Figure 18). These results remain valid whether shocks are calibrated based on historical data at the fund category level (homogeneity) or at the individual fund level (heterogeneity). Two behavioral scenarios of the asset

sales were analyzed. Under the slicing approach—where funds sell securities in proportion of their weights in the portfolio—the price impact from MF sales ranges from 50 to 200 bps in normal times and between 150 and 700 bps during stress periods. In addition, funds with large exposures to derivatives could face significant liquidity demand stemming from variation margin. The illustrative analysis shows that a 1 percent depreciation of the U.S. dollar and a 50-basis point increase in the interest rates would prompt margin calls on the derivatives portfolio ranging between 3 and 10 percent of the net asset value (NAV).

39. When certain fund categories are in distress, other fund categories may be in distress at the same time. Such categories include investment-grade corporate, multi-strategy bond funds and to a lesser extent municipal bond funds, mixed funds and global funds (Figure 18). Emerging market bond funds may be likely to experience large outflows when other fund categories are in distress. Fund categories which are most exposed to liquidity risk under the FSAP analysis include high yield (HY), emerging market (EM), and loan funds are not systemic in the sense that when they are in distress other fund categories do not experience large outflows. This is partly due to substitution effects, whereby in periods of stress investors may move out of the HY, EM, and loan funds (which are a smaller share of the market) into safer government or investment-grade (IG) corporate bond funds.

Money Market Fund Resilience

40. As part of the 2014 MMF reform rules, the SEC requires MMFs to perform regular stress tests. MMFs using stable NAV must be able to maintain a mark-to-market NAV within 0.5 cent of US\$1.00, i.e., the shadow NAV must not fluctuate by more than 0.5 percent.

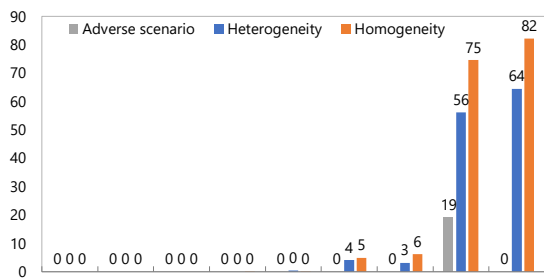
41. Stress tests by the FSAP indicate that all MMFs using stable NAV would be able to withstand large interest rate and credit spread shocks. A sample of 208 MMFs, covering 95 percent of the universe were subject to 100-bps interest rate and credit spread shocks. Results show that the NAV of MMFs would not fluctuate more than 0.16 percent for the interest rate shock (well within the 0.5 percent allowable range) and no more than 0.27 percent for a combined 100-bps interest rate and spread shock. Very large shocks would be required for MMFs to “break the buck” (more than 350 bps). The stress tests did not assess the liquidity of MMFs, which do not use stable NAV (Institutional Prime MMFs). During the beginning of the COVID-19 outbreak in March 2020, Institutional Prime MMFs experienced very large outflows from investors (Figure 19). At the same time, Prime MMFs faced challenges in selling their assets due to strains in the short-term money markets. As a result of those combined asset and liability shocks, some Prime MMFs required sponsor support in March. Two sponsors purchased assets from the MMFs to ensure compliance with their daily and weekly liquidity requirements while allowing investors to redeem their shares. Following the FRB support to the commercial paper market and to MMFs, stress receded and prime MMFs saw inflows starting early April.

Figure 18. United States: Mutual Funds Stress Tests Results

MFs have enough highly liquid assets, except HY and Loan funds.

Asset sales by MFs can have a sizeable impact on the market.

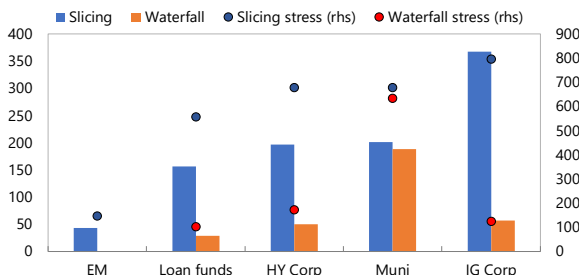
Share of Funds with a Liquidity Shortfall



Note: Share of funds (by category) whose Redemption Coverage Ratio (highly liquid assets to redemption) is below one.

Sources: Morningstar, IMF staff.

Price Impact of Asset Sales on Underlying Market



Note: Price impact of asset sales by liquidation strategy, in bps. The chart shows the impact of sales for each category of funds on its underlying market (EM bond fund sales impact on EM bond market etc.)

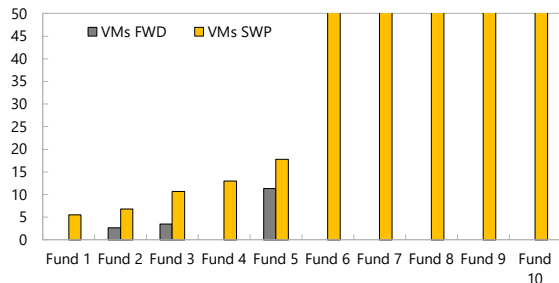
Sources: Morningstar, IMF staff.

Liquidity demands for MFs using derivatives can be large.

When IG and mixed MFs are in distress, other fund categories are also affected, while EM funds are particularly vulnerable.

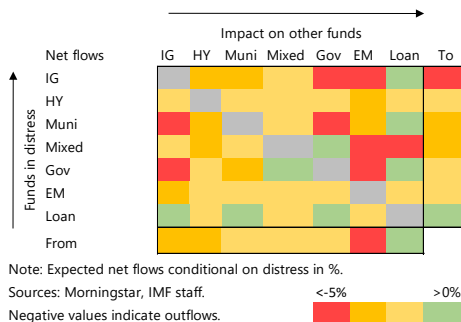
Variation Margins

(In percent of cash and cash equivalents)



Note: Variation margins in % of cash and cash equivalents as reported in B.2.f. Sources: SEC form N-PORT IMF staff.

Potential Flow Spillovers among Fund Categories



Note: Expected net flows conditional on distress in %.

Sources: Morningstar, IMF staff.

Negative values indicate outflows.

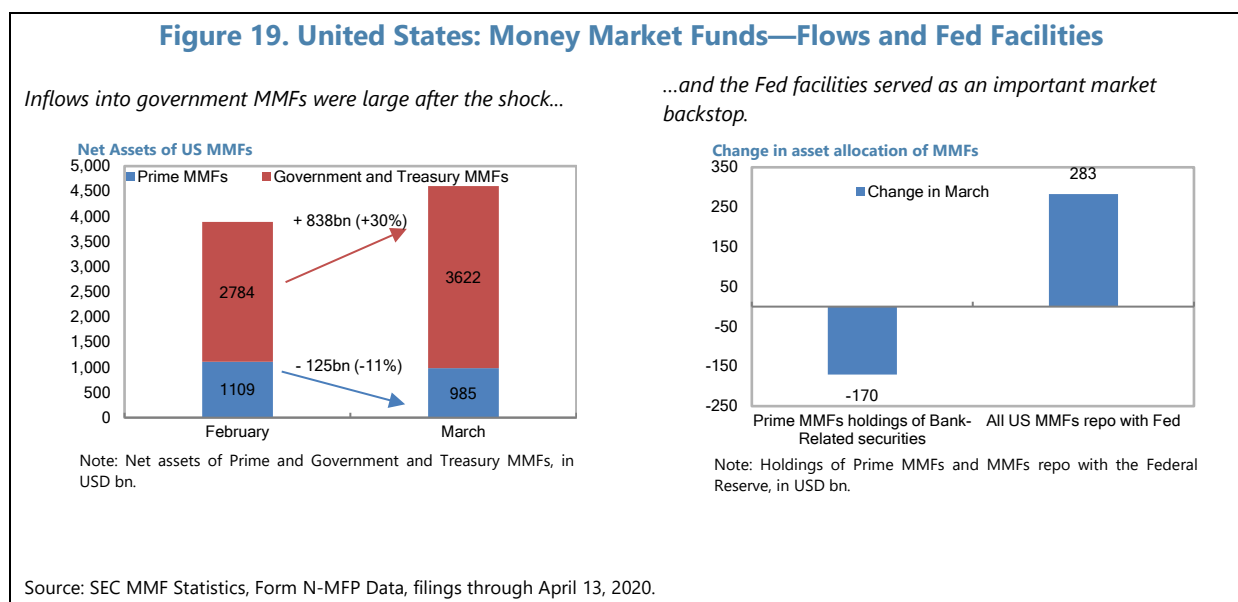
Legend: <-5% (Red), >0% (Green)

Insurance Sector Resilience

42. The FSAP used a broad range of scenario analyses, sensitivity tests, and exposure analyses to quantify insurance sector risks. The scenario for the top-down stress test built on the narrative and severity of the banking sector stress test, focusing more on market shocks, assumed to occur instantaneously. Additional sensitivity analyses included (i) prolonged low interest rates, (ii) higher lapse rates with liquidity outflows, (iii) the default of the largest banking counterparty, and (iv) a stock-take on carbon-intense assets. Publicly available data of 50 insurance groups and more granular investment data provided by the NAIC were used for the analysis.²⁶ The COVID-19 pandemic will impact the insurance industry primarily through the impact on investments and to a lesser extent through changing claims patterns (Box 3). At the time of this report finalization, these

²⁶ The test covered 21 life, 22 property & casualty, and 7 health insurers and was finalized in March 2020. Shocks were slightly adjusted to make them more operational for the insurance stress test and recalibrated to be meaningfully applicable at end-2018 when equity markets were temporarily depressed.

do not invalidate stress testing conclusions. The stress test, however, does not include a scenario with major rating downgrades in the financial and corporate sector, which would increase insurers' capital requirements, especially when assets lose IG rating.



43. In the adverse scenario, some life insurers would face a significant statutory capital reduction in the adverse scenario, but the current valuation and capital framework largely mitigates the impact (Figure 20). The aggregated loss in capital of US\$226 billion equates to a 31 percent reduction (3.9 percent of consolidated balance sheet assets), mostly driven by shocks to non-IG corporate bonds, stocks, and other investment assets. In the life sector, aggregated capital declines by US\$74.3 billion (-35.7 percent), in P&C by US\$149.8 billion (-32 percent), and in the health sector by only US\$1.4 billion (-2.8 percent). Unlike in a fully market-consistent valuation, sizable parts of the balance sheet are not sensitive to market price fluctuations. The absence of a consolidated group capital framework complicates estimating the stress impact. Nonetheless, as solvency ratios of U.S. solo companies tended to be well above regulatory thresholds, it can be expected that even in this adverse scenario the vast majority would still continue to meet capital requirements based on the current calibration of risk-based solvency regime.²⁷

A few life insurers would need to liquidate sizable parts of their bond portfolio to meet cash outflows after a large increase of lapse rates. Assuming a sharp interest rate hike, policyholders would be incentivized to terminate those policies that can be terminated at book value or those with

²⁷ At end-2018, about 94 percent of U.S. life insurers (at the solo level) had an RBC coverage of more than 200 percent, i.e., they could withstand a 50 percent decline of capital without violating the regulatory threshold. Those life insurers which had a decline of more than 50 percent of their available capital in the FSAP stress test reported an RBC coverage (at the level of the largest solo entity) well above 300 percent.

Box 3. COVID-19 Impact on the Insurance Industry

The insurance sector is affected by the pandemic mainly through higher claims, operational challenges, and lower investment returns. Claims will be made under various types of household and commercial insurance. Revenues are expected to decline, at least temporarily, as the demand for insurance coverage declines. Changes in operating conditions and new processes to facilitate remote interactions with clients and business partners increase costs. The risk of fraudulent claims increases when economic conditions deteriorate. All insurers face investment losses as a result of stock market declines, bond defaults, and spread increases; while lower interest rates weigh heavily on life insurers with return guarantees. Equity exposures are material, but a substantial share of market-value changes is directly passed on to policyholders through investment-linked products. As the duration of the liabilities is generally longer than the assets, reinvestment risk has increased. Bond downgrades to non-investment grade would have substantial impact due to the requirement for capitalization of higher risk exposures. Finally, insurers are generally more liquid than their liabilities require, but some may face liquidity pressures if product cancellations and surrenders increase sharply while new business and renewals decline.

Life insurance

Beneficiaries on life insurance policies with a death coverage will submit claims on those policies, while annuity providers might experience reduced payouts given higher mortality rates. Excess mortality is covered by reinsurance to a large degree, mostly with reinsurers outside the United States.¹ One global reinsurer has indicated that its exposure to COVID-19 life and health insurance claims, even under a very severe 1-in-200 years scenario, is similar in scope to a medium-sized natural catastrophe. Mortality increases might appear to be an immediate financial gain for annuity providers, but many of these products have guarantees that effectively reduced any perceived benefit for the insurer. Lower investment returns are a significant negative for life insurers, both in terms of reinvestment risks and the difficulty to earn a guaranteed rate of return.

Health insurance

Health insurers face higher costs and claims as policyholders may require testing, more medical care, and hospitalizations. An increase in unemployment will affect the level of uninsured health expenses. Under the Affordable Care Act (ACA), consumers who lose their coverage or become eligible for subsidies due to loss of income are able to enroll in coverage on the ACA Exchange and most state-based Exchanges have created special enrollment periods to facilitate coverage. COVID-19 testing, hospitalizations, and premium grace periods have impacted insurer costs and incomes. At the same time, delays in other, non-emergency care have significantly reduced insurer spending in the first part of 2020, and many are looking at, and some have announced, premium holidays.

The Families First Act and the CARES Act, complementing the ACA, require insurers to waive all cost-sharing, including deductibles, for medical services provided to people with any type of private health coverage related to medically necessary COVID-19 testing and associated visits. In addition, any preventive services, which include any future vaccine, must be covered by the principle of no cost-sharing. The new Act also enables states to provide free coverage for coronavirus testing for uninsured residents. However, the Act does not impose any federal requirement to waive cost-sharing for COVID-19 related medical treatments, and thus individuals may be subjected to significant out-of-pocket costs.

Box 3. COVID-19 Impact on the Insurance Industry (concluded)

Property & casualty (P&C) insurance

Most business interruption clauses included in commercial property insurance policies are only triggered in case of physical damage to the property of the policyholder due to a covered peril. There are differing views on whether the contamination of a property by a virus would be considered physical damage. Policies that more generally provide coverage for business interruption due to physical damage or loss of use may be more likely to be determined to provide coverage of pandemic-related business interruption losses. Many commercial policies apply exclusions that could apply to a viral contamination such as COVID-19. For example, the standard Insurance Services Office commercial property policy used in the United States applies an exclusion for “loss or damage caused by or resulting from any virus, bacterium, or other microorganism that induces or is capable of inducing physical distress, illness, or disease.” Yet it is unclear how many commercial policies do have such a clear inclusion or exclusion.

Major legal and regulatory risks may emerge. For example, in New Jersey, a legislative proposal has been put forward to require that all commercial property policies providing coverage for business interruption or loss of use of property also provide coverage for interruption resulting from COVID-19. As proposed, insurers that incur claims as a result of this legislation could seek reimbursement from the Commissioner of Banking and Insurance, who would then recover those costs from all insurers writing business in New Jersey. While this legislation is on hold at the time of this report’s finalization, similar legislation has been introduced in Ohio and Massachusetts. At the federal level, a group of members of the House of Representatives has requested insurers to consider retroactively covering financial losses from COVID-19 under business-interruption coverage provided in commercial policies, suggesting that containment measures should be considered as civil authority orders that trigger coverage. The NAIC has written to Congress noting that such a measure would result in substantial solvency risks for P&C insurers and significantly undermine the ability of insurers to pay other types of claims.²

Travel insurance is affected through coverage of medical treatments and trip cancellation. The overall industry exposure to trip cancellation claims is not significant relative to other lines of business. Some insurers have changed the terms of travel insurance policies or stopped selling new travel insurance policies. For existing policies, medical treatment during travel would be covered in most cases, unless a travel advisory was in place. Insurance coverage for trip cancellation will usually only reimburse expenses after all attempts for refunds have been exhausted and only when there are no official advisories against travel at the time of booking.

Claims can arise from liability insurance, including workers compensation. Employees may claim compensation for lost wages and medical expenses if they believe they were infected at workplace, which could invoke coverage under workers compensation insurance. They could also make claims for distress, bodily injury, discrimination, or financial losses due to isolation that could potentially be covered by employment practices liability insurance. For businesses whose premises are accessible to the public or to their customers, claims could be made in case of infections provided a proof of negligence regarding the spread of the virus is obtained.

Motor insurance is contributing to an overall resilience of the P&C sector. Individual traffic has declined as a result of public health measures and lower economic activity results in reduced commercial road use. In the longer term, however, it is likely that renewals will reset, and underwritten volumes will shrink.

¹ The market for life reinsurance is highly concentrated both globally and in the United States, with the largest five reinsurers having a market share of about 90 percent in the United States—of these five companies, four are part of European groups, and one is a domestic group. See Munich Re, 2018 Life Reinsurance Survey Results.

² See https://content.naic.org/article/statement_naic_statement_congressional_action_relating_covid_19.htm.

a flat surrender charge.²⁸ About one-third of the life insurers would be able to meet the outflow simply by selling parts of their (highly liquid) U.S. Treasury bonds. Up to six companies would ultimately also have to liquidate corporate bonds, which might be subject to temporarily restricted liquidity, allowing large-scale sales only at a discount. The total amount of U.S. Treasury bond sales in the four scenarios ranges from US\$23–33 billion, while for U.S. GSEs and corporate bonds the ranges are US\$13–15 billion and from US\$4–11 billion, respectively.

44. With continued low interest rates, net investment spreads in the life sector are expected to decline further (Figure 21 panel 1). Average credited rates would decline, as new business would be issued with lower contractually guaranteed interest rates. Projecting investment yields assumes that the recent downward trend will flatten out in the future, when fixed-income instruments with higher coupons would have already expired. With about 7 percent of bond investments to be rolled over every year, the net portfolio yield still declines, likely at a slightly higher pace than the guaranteed interest rate. By 2021, the net investment spread could therefore drop below 1 percent, adding further pressure on life insurers' profitability.

45. If the largest banking counterparty defaults, the vast majority of insurers would experience a limited capital impact (Figure 21 panel 2). The median life company would lose 1.2 percent of its capital, and half of the sector's firms range between 0.8 percent and 1.8 percent. In the P&C and health sector, concentration towards the largest banking counterparty is even lower, but outliers exist, in particular when an insurer holds a participation in a large bank.

46. Large, diversified P&C insurers are relatively resilient to natural disasters, even of a larger scale, but smaller and more concentrated P&C companies would be severely affected by major hurricanes (Figures 21, panels 3 and 4). A single event, expected to occur every 50 years, reduces capital of large firms by 8.1 percent—including reinsurance recoverables, the reduction is only 3.9 percent. For hurricanes with an occurrence expected every 500 years, capital (after reinsurance) declines by 8.6 percent, and drops below the regulatory minimum for 18 out of 538 insurers. Smaller local insurers rely more on reinsurance for less severe hurricanes than larger firms, mitigating the impact significantly. However, excessive costs seem to prevent small firms from buying the same level of reinsurance coverage for more remote events. In a 1-in-500 years event, their aggregated capital declines by 164 percent—14 companies would record a capital shortfall. The impact on policyholders is however mitigated through various protection schemes.

47. Carbon-intensive assets in a narrow sense do not represent a major asset class. Narrowly focusing on oil, gas, and mining companies, the exposure amounts to 3.5 percent of all corporate bond holdings and 1.6 percent of the equity portfolio. Together, the identified investments account for 1.1 percent of the sample's total balance sheet assets. Notwithstanding these small direct-exposure amounts, transition risks could also arise for other exposures, e.g., transport or heavy industries, which were not included in this analysis. Similar to other countries, mortgage loan or MBS collateral in areas becoming more frequently hit by windstorms, floods, or wildfires could be

²⁸ The upward interest rate shock is one of possible triggers for increased lapses. Similarly, higher lapse rates might be observed in a recession when household income and wealth declines as it happened in 2009.

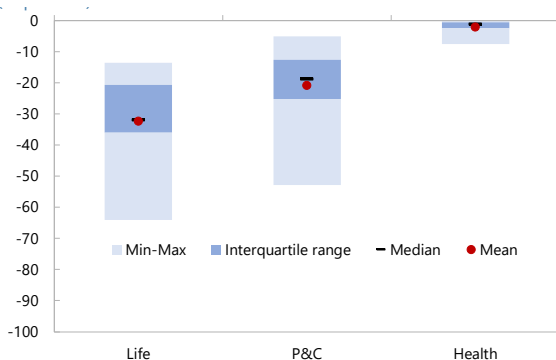
repriced by investors, acknowledging underlying long-term physical risks. The same might apply to debt issued by municipalities and utility providers in affected regions.

Figure 20. United States: Insurance Stress Test Results

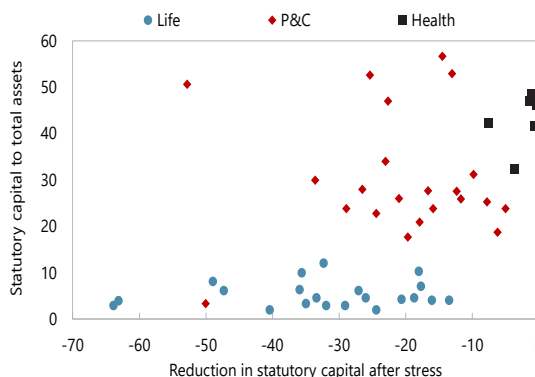
Statutory capital of the median life company declines by 32 percent, and by 19 percent for the median non-life insurer.

Health insurers are barely affected by market shocks, while results in the other sectors are very heterogenous.

Reduction in Statutory Capital (In percent)

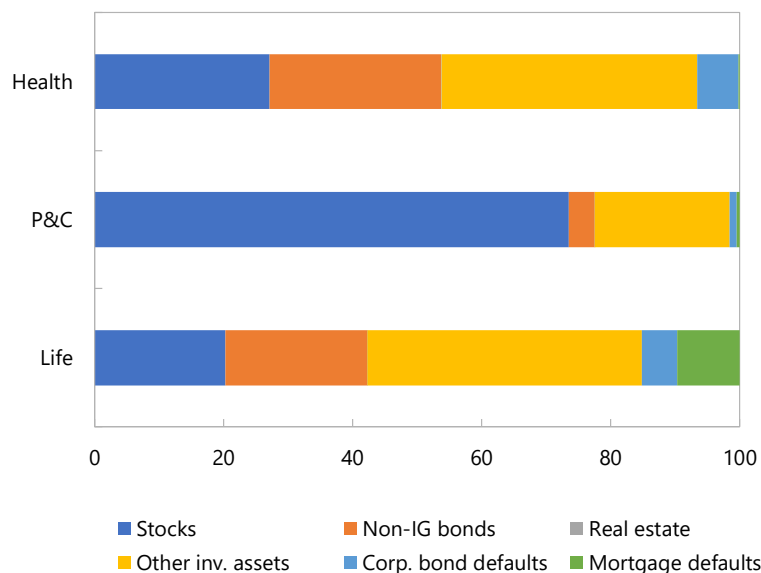


Reduction in Statutory Capital (In percent)



In the life sector, the shock to other investment assets (Schedule BA) contributes most to the overall reduction in capital, while in the non-life sector, lower stock prices are more relevant (though aggregates are driven by very few larger companies while many non-life companies hold only few stocks).

Aggregated Contribution of Individual Shocks (In percent)

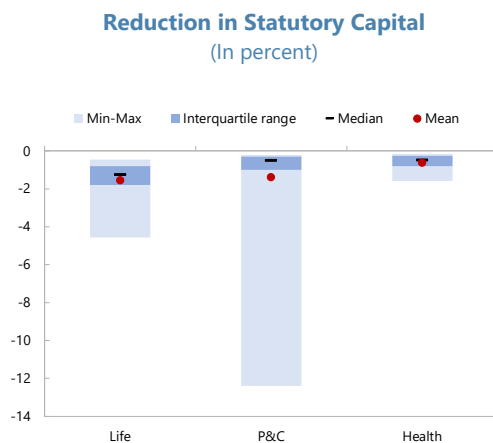
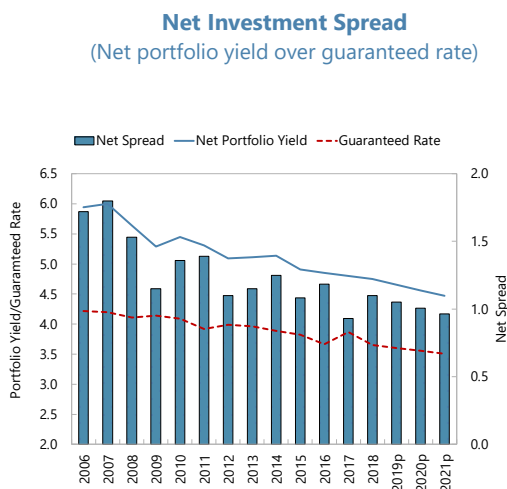


Source: IMF staff calculations based on NAIC data.

Figure 21. United States: Insurance—Sensitivity Analyses

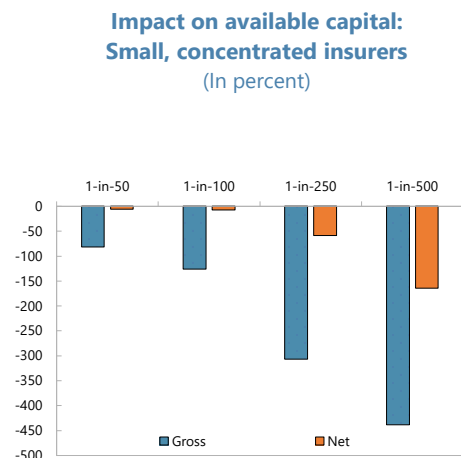
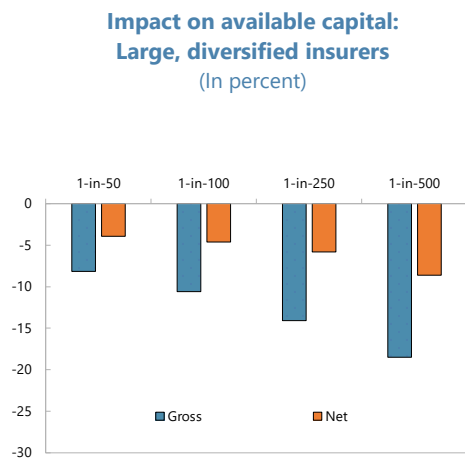
(a) Net investment spreads have been rather steadily declining since 2007 and will, assuming persistent low rates, continue to weigh on profitability.

(b) For the vast majority of insurers, the default of the largest banking counterparty has only a minor direct impact on capital, but outliers exist.



(c) Claims stemming from a 1-in-500 years hurricane would reduce capital of large and diversified insurers by 9 percent (net, after reinsurance)...

...while (d) for small and concentrated insurers, the same event would trigger claims equating 164 percent of statutory capital.



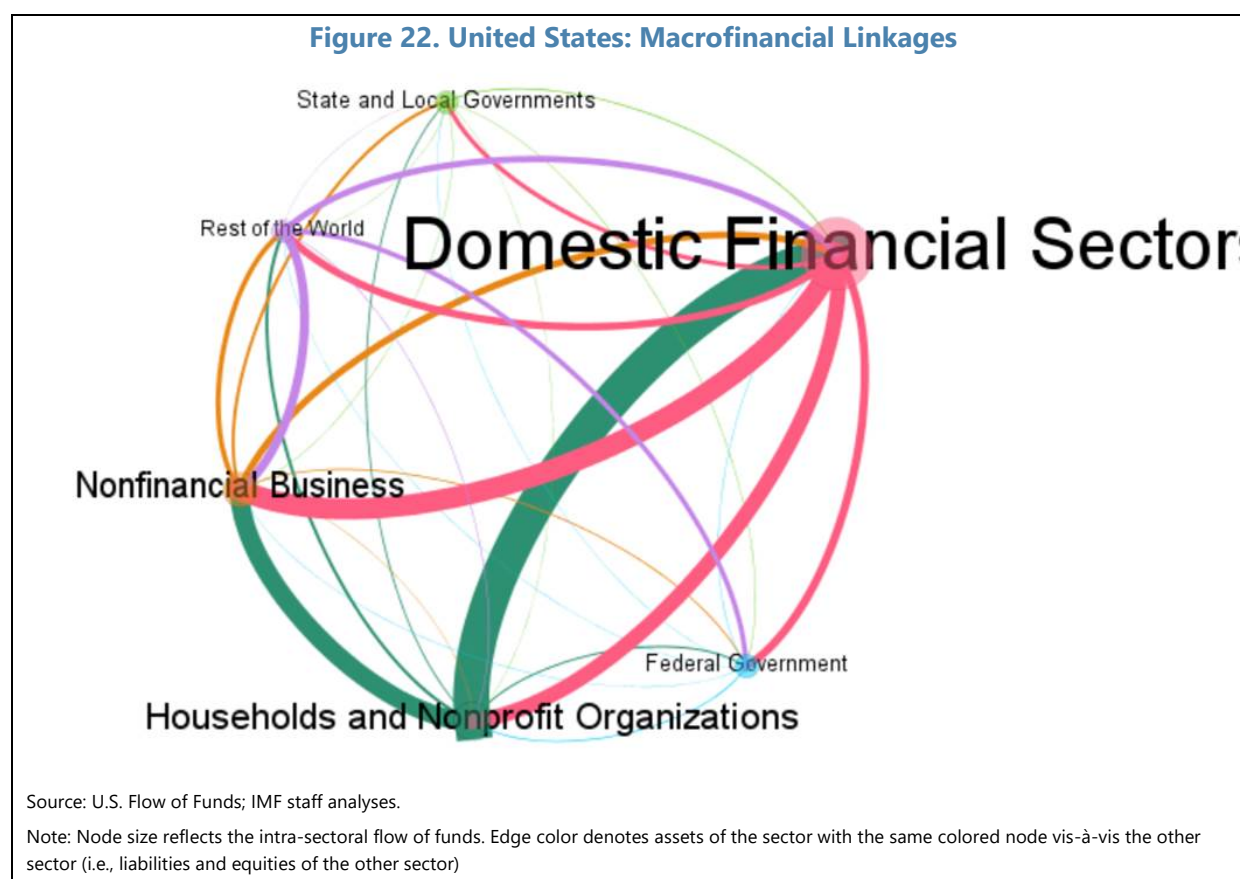
Source: IMF staff calculations based on NAIC data.

C. What Are the Financial Stability Implications of Interconnectedness?

Domestic Interconnectedness

48. The high degree of interconnectedness implies a considerable potential for shocks to reverberate through the financial system. Both banks and nonbanks have sizeable direct exposures to households and corporates (Figure 22). Nonbanks intermediate twice as much credit to

the real economy than depository institutions. Intra-financial system interconnectedness is also significant with linkages between banks and nonbanks, amounting to over 30 percent of their assets. In addition, these sectors are indirectly interconnected through common exposures to asset classes such as corporate bonds, equities, agency, and Treasury securities markets.²⁹ Common exposure to asset classes could amplify risk transmission. Moreover, the banking sector has off-balance sheet exposures similar in size to the overall balance sheet. Unused commitments such as credit lines amount to about 40 percent of the aggregate balance sheet of the bank sample. In case of severe corporate stress, these may be drawn down, exacerbating other simultaneous pressures.³⁰

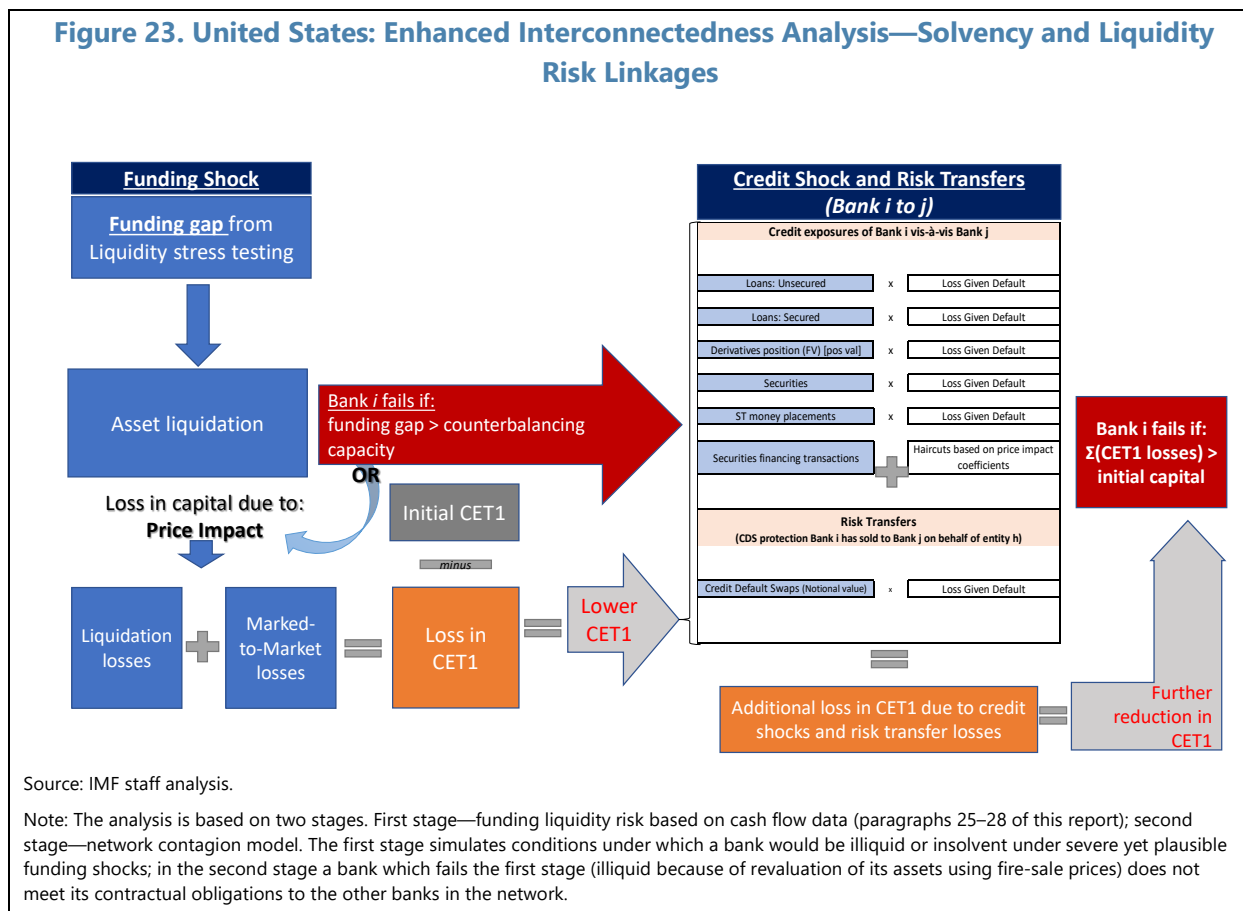


49. Direct funding and credit contagion among G-SIBs is small, however, and a failure of one G-SIB would not lead to direct default of another one. The interconnectedness modelling exercise performed by the FRB staff using IMF scenarios and models assessed the propagation of idiosyncratic and systemic shocks through the network of U.S. G-SIBs, linking solvency and liquidity risks (Figure 23). The analysis considered unsecured, secured (repos/reverse repos, swaps, etc.), and contingent (derivatives, CDS contracts) exposures among the six largest G-SIBs. While the closure of

²⁹ For example, banks, insurers, pension funds, money market and mutual funds hold about US\$4–7 trillion in debt securities each.

³⁰ Revolver drawdowns reported in 8-k filings between March to mid-April 2020 surpassed US\$200 billion.

non-Treasury repo markets coupled with severe scenario parameters would lead to one G-SIB becoming illiquid over 30-day horizon, even in this extreme case the asset fire-sale impact on remaining banks in the network is rather limited: the decline in CET1 would be 25 bps, depending on asset liquidation strategies banks would choose (Figure 24).³¹



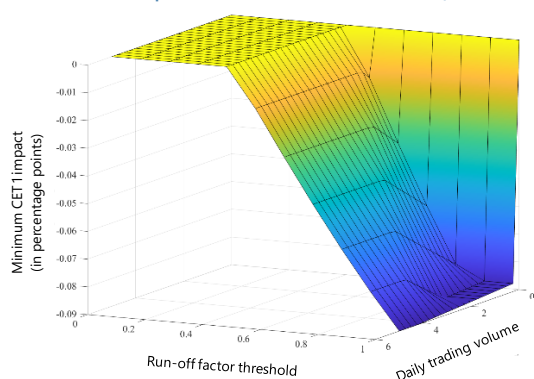
50. Complementary analysis of a corporate sector shock shows that it would reverberate through the financial system with non-negligible impact, particularly for nonbanks. The shock was calibrated based on the FSAP corporate stress tests, and the linkages were analyzed using balance sheet data. Although significant, potential losses appear to be manageable for the banking system, in large part owing to banks’ limited direct exposure to the corporate sector. For the short-term market sentiment shock lasting for one month, liquidation losses for mutual funds amount to about US\$0.9 billion (about 1 percent of the original value of the total assets sold). For banks, the resulting mark-to-market losses are close to US\$10.8 billion (roughly equivalent to 0.06 percent of assets). This would reduce banks CET1 ratio by about 0.1 percentage points. In the case of insurance

³¹ The test used two strategies: waterfall when banks liquidate most liquid assets first, and slicing when banks liquidate proportional amount of each type of security.

Figure 24. Liquidity and Asset Sales Scenario Propagation in the U.S. G-SIBs Network

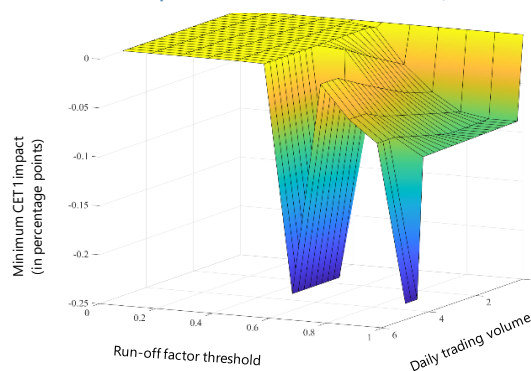
The impact of asset sales on CET1 would be 9 basis points (bps) for affected banks if they use proportional liquidation approach to sales (slicing)...

Minimum CET1 Impact: Liquidation and Network Effects
(Liquidation strategy for funding shocks = slicing; stress regime = stress ;
repo threshold = 1 times estimated threshold)



...the network contagion and fire-sales impact would be higher under waterfall liquidation strategy (i.e., liquidate most liquid assets first), albeit no bank would be insolvent and final impact would be 25 bps of CET1 loss.

Minimum CET1 Impact: Liquidation and Network Effects
(Liquidation strategy for funding shocks = waterfall; stress regime = stress ;
repo threshold = 1 times estimated threshold)



Sources: IMF calculations performed by the FRB in March 2020 based on FRB supervisory data.

companies, these may roughly translate into losses at about 1 percent of insurance sector total assets. In case of a systemic credit risk-related stress (which leads to an increase of default rates of leveraged corporates of up to 6 percent), banks would face US\$230 billion losses on commercial and industrial loans and CLO holdings (assuming that banks would be providing at least part of their US\$760 billion committed lines to corporates). Ten non-GSIBs would fall below the CET1 hurdle rate of 4.5 percent. Insurance sector will be hit by about US\$300 billion in losses, at the same time they do not have to mark these to market given the existing regulatory treatment.

Cross-Border Interconnectedness

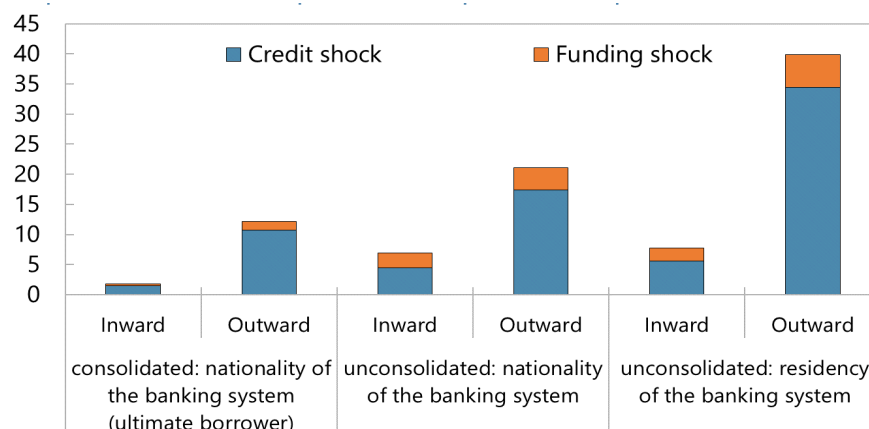
51. Although U.S. banks hold nearly a quarter of their claims against foreign borrowers, they are a larger source of outward spillovers than the rest of the world is for inward spillovers to them.³² Under the very conservative but illustrative assumption that all claims are unsecured and the loss-given default is at 100 percent, comparable foreign shocks would result in U.S. bank losses amounting to 2–8 percent of system-wide capital, while foreign banking systems would suffer losses of 10–40 percent of capital (Figure 25).³³ Contagion from the U.S. to foreign

³² These conclusions are based on an analysis using the model in Espinosa-Vega, M. A., and Sole, J., 2010, "Cross-Border Financial Surveillance: A Network Perspective," IMF Working Paper 10/105, International Monetary Fund.

³³ The analysis covered (1) exposures capturing the role of financial intermediation by financial centers; (2) exposures in the presence of foreign subsidiaries and branches, for instance, owing to dollar funding activities by foreign banks; and (3) consolidated exposures capturing claims and liabilities of domestically incorporated banks. Under a different assumption where the loss-given default is 50 percent, the inward spillovers to the U.S. banking system is between 1–3 percent, while the contagion into other banking systems is 5–15 percent of initial regulatory capital.

banking systems is partially driven by the fact that nearly half of global cross-border claims are denominated in U.S. dollars. In systemic stress episodes with fragilities in dollar funding markets, lending in U.S. dollars by foreign banks could become a shock-propagation mechanism. A market-based spillover analysis based on equity return movements confirms that U.S. G-SIBs are the largest potential source of spillovers to large global financial sector entities, followed by the foreign G-SIBs.³⁴

Figure 25. Average Spillovers between U.S. Banking System and Foreign Banking Systems
(In percent of initial capital of spillover recipient)



Sources: BIS; IMF, IFS; IMF staff estimates.

Note: Consolidated data covers exposures between U.S.-owned banks and foreign-owned banks excluding intra-group positions. Unconsolidated nationality basis data covers exposures between U.S.-owned banks and foreign-owned banks including intra-group positions. Unconsolidated residency basis data covers exposures between U.S.-domiciled banks and foreign-domiciled banks including intra-group positions.

D. Funding Market Fragility: Are there Systemic Liquidity Concerns?

52. While usually highly liquid, indicators of money market resilience showed signs of decline from 2017, with shocks causing sharp spikes in rates in September 2019 and March 2020. Financial institutions mainly use the very large and generally resilient repo market rather than other money market segments, such as the much smaller Fed funds market, for liquidity management and funding (Figure 26, top-left panel). The Fed’s balance sheet normalization during 2015–19 reduced the supply of Fed reserves (Figure 26, top-right panel) and started to more obviously impact money markets from early 2017.³⁵ The level and volatility of short-term interest rates drifted up relative to the Fed’s target range and become more sensitive to changes in reserve

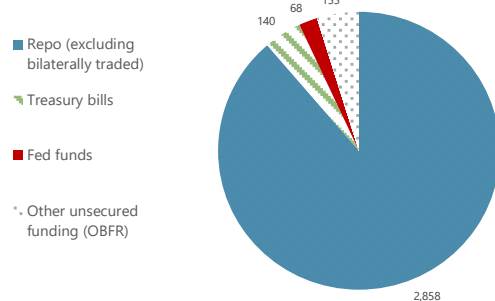
³⁴ The analysis is based on Diebold, F.X. and Yilmaz, K., 2014, "On the Network Topology of Variance Decompositions: Measuring the Connectedness of Financial Firms," *Journal of Econometrics*, 182, pp. 119–134.

³⁵ The FRB announced plans to implement monetary policy with an ample supply of reserves, without conducting regular OMOs. See <https://www.federalreserve.gov/monetarypolicy/policy-normalization.htm>. From mid-2017, the FRB began tapering its reinvestments in maturing securities and, in March 2019, it announced that the reduction in the balance sheet would be completed in September 2019.

Figure 26. United States: Systemic Liquidity Developments

Repo markets are the center of money market activity...

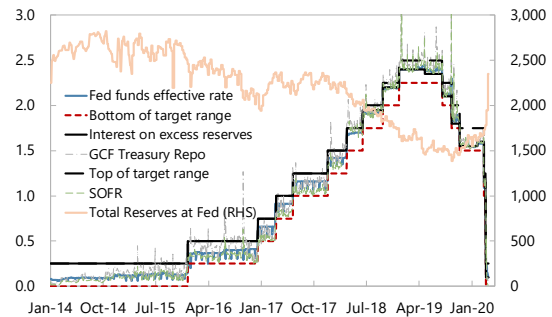
Traded volumes in key money market segments (2019 daily average, USD billions)



Sources: Federal Reserve Bank of New York, SIFMA

...markets tightened as the Fed balance sheet reduced.

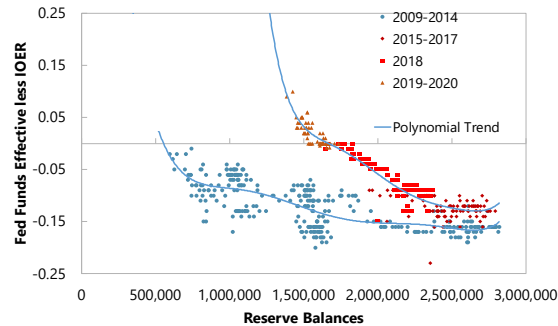
SOFR, GCF Repo, Fed Funds Rates (Percent, USD billions)



Sources: Federal Reserve Bank of New York, DTCC

The liquidity demand curve has steepened.

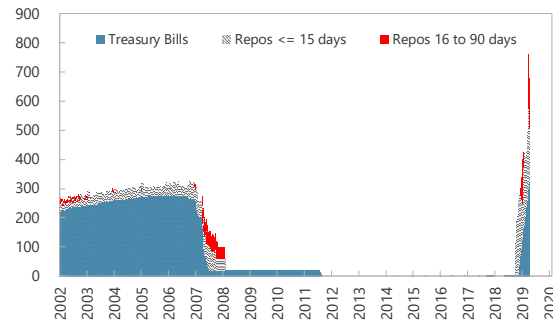
Fed Funds Effective less IOER vs. Reserve Balances (Percent, USD millions)



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

The Fed's response to extreme volatility was forceful...

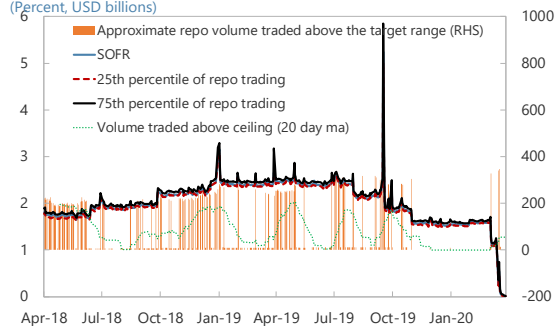
Federal Reserve treasury bill holdings and repos outstanding (USD billions)



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

...and extremely effective in quelling pressures.

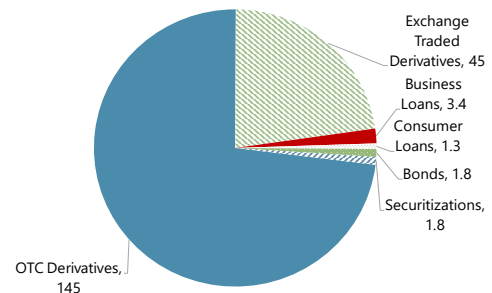
5. Distribution of intraday repo market trading versus approximate volumes traded above the Federal funds target range (Percent, USD billions)



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

Market reliance on LIBOR is very high.

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



Sources: ARRC Second Report, 2018

supply (Figure 26, middle-right panel). Interest rates spiked sharply in September 2019, and even more significant disruption occurred in March 2020 as the COVID-19 crisis unfolded.

53. Since late 2019, the Fed shifted to actively managing reserves, scaling up liquidity provision which effectively quelled market pressures. The Fed shifted quickly from passive to active liquidity management and boosted reserves from September 2019 (Figure 26, top-right panel), while regular Open Market Operations (OMOs) resumed after a long hiatus (Figure 26, middle-right panel). Major disruption following the COVID-19 outbreak prompted a broad and far-reaching Fed response that eventually settled markets.³⁶

54. The period of decreased reserve availability exposed structural money market rigidities. Quantitative easing and associated ample reserves underpinned money market liquidity post-GFC with banks opting to comply with tighter liquidity regulation through higher levels of reserves, while also substantially upgrading liquidity risk management frameworks. Banks have become more conservative and reluctant to rely on the Fed's liquidity backstops in their liquidity planning and are working harder to optimize balance sheets to boost returns. These desirable changes came hand in hand with increased cost of intermediation, reduced incentives for banks to take advantage of arbitrage opportunities and decreased bank flexibility when shocks hit markets. Market resilience has thus declined. Separating individual contributions to this complex nexus of factors is difficult, but available estimates suggest that a steady state G-SIB demand for reserves is now significant.³⁷

55. The Fed could help rebuild market resilience by adjusting its ample reserves operational framework and improving access to liquidity backstops once the crisis abates:

- *Regular OMOs should continue and the operating target should be adjusted to help provide greater liquidity certainty.* This could help reduce the demand for reserves and flatten the slope of the demand curve while still retaining ample reserves. Adjusting the operating target to encompass repo rates would help reduce uncertainty on the FRB's reaction function when pressures build. The ample reserves framework supports the resiliency of the money markets and should be retained.
- *Banking regulators should encourage banks to explicitly allow for use of the Discount Window in their short-term liquidity planning to monetize U.S. Treasury securities.* Banks could be given guidance to incorporate Discount Window use for monetizing U.S. Treasury securities holdings

³⁶ Crisis Preparedness and Management, Section C below, provides more detail on the COVID-19 response.

³⁷ For example, see Bush et al. (2019) <https://libertystreeteconomics.newyorkfed.org/2019/02/stressed-outflows-and-the-supply-of-central-bank-reserves.html>, which estimated Day 1 stressed liquidity outflows of the U.S. G-SIBs to be in the order of US\$587–934 billion—much of which would need to be covered by cash holdings given the challenges of liquidating a large volume of other HQLA within one day.

in their liquidity planning.³⁸ This approach is consistent with international standards³⁹ and that taken by other major central banks (e.g., the Bank of England⁴⁰ and the Bank of Canada). It would encourage G-SIBs to include in their liquidity plans access to the Fed's liquidity facilities for meeting regulatory requirements for intra-day liquidity needs or during resolution, thereby reducing incentives for cash hoarding and increasing incentives for large banks to make liquidity available to the wider nonbank market.

- *Adjusting the price of primary credit or implementing a standing repo facility could help reduce Discount Window stigma and boost market resilience.* Continuing to offer Primary Credit at a price closer to normal market rates than prior to March 2020 may help reduce Discount Window stigma. Alternatively, a standing repo facility, similar to the Primary Dealer Credit Facility, but perhaps limited to Treasury securities, could be considered if there is ongoing reluctance to access Primary Credit. There are, however, a number of significant design challenges with such a facility, with difficult trade-offs in terms of counterparty access and pricing versus stigma and moral hazard risks to negotiate.

56. The authorities should work with market participants to mitigate the risks stemming from concentration of repo settlement (Box 4). The concentration of repo settlements with Bank of New York Mellon (BNYM) is a vulnerability. Both the cleared and tri-party repo market depends on the BNYM to settle transactions as does the Fed when it conducts repo OMOs.

57. Reliance of banks on funding from Federal Home Loan Banks (FHLBs) increases interconnectedness. FHLBs play an important intermediation and funding role in the money markets as funding from FHLBs remains relatively generously treated in the LCR.⁴¹ Treating funding from FHLBs similarly to that from other unsecured borrowers in the Fed funds market would help reduce concentration risks on FHLBs and enhance the resilience of markets in situations where FHLBs themselves run into liquidity problems.

58. The Alternative Reference Rates Committee (ARRC) and the authorities have made excellent progress in transitioning away from LIBOR but more needs to be done. The U.S. authorities have been heavily engaged with the ARRC in promoting the transition away from LIBOR by end-2021.⁴² Most of the nominal LIBOR-related exposures are in the derivatives markets where

³⁸ Vice Chair Quarles, in a personal February 2020 speech discussed this type of policy option—see <https://www.federalreserve.gov/newsevents/speech/quarles20200206a.htm>.

³⁹ 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 options.

⁴⁰ See <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/consultation-paper/2019/cp2719.pdf>.

⁴¹ The treatment of FHLBs in the LCR rule has been assessed by the Basel Committee in 2017 as part of the Regulatory Consistency Assessment Programme. See <https://www.bis.org/bcbs/publ/d409.htm>.

⁴² The ARRC is private sector-led, convened by the Federal Reserve Board and Federal Reserve Bank of New York (FRBNY), with the SEC and CFTC among the public-sector ex-officio members. For information on the ARRC and its work program see <https://www.newyorkfed.org/arrc>.

Box 4. United States: Bank of New York Mellon (BNYM)—A Uniquely Important Financial Institution

The BNYM plays a unique role in the government securities clearing, global collateral management and tri-party repo market. As a G-SIB with global operations, it has a diversified portfolio of fee-generating investment services and investment management businesses, total assets of US\$381 billion, US\$1.9 trillion under management, and US\$37.1 trillion of client assets under custody at end-2019. The withdrawal of JP Morgan Chase for government securities settlement (GSS) in 2016 left BNYM as the sole provider of GSS and tri-party repo services. The BNYM acts as a custodian, settles repos and government securities, and takes care of back-office functions. The FRBNY is reliant on the BNYM for the conduct of OMO repos. The BNYM plays a key settlement role for FICC-sponsored repo transactions and is a major sponsor itself.

The FRB has crafted a hybrid approach to the supervision of BNYM. Co-location of the critical infrastructure role in one group with an entity that also provides commercial banking services raises specific issues from both a supervisory and resolution planning standpoint. The BNYM's U.S. government securities settlement and tri-party repo services are comparable in importance to the FMIs that have been designated as systemically important by the FSOC.¹ As one of eight U.S.-based G-SIBs, the BNYM is subject to heightened capital and liquidity requirements, dedicated on-site supervision, and recovery and resolution planning requirements to ensure the continuity of critical services. In addition, it is subject to some components of the PFMI, notably for governance and operational reliability.

Given its sole provider status in a high volume and high value market, ensuring continuity of operations is a key focus of the bank's planning and of its supervisor's concerns. The BNYM has invested heavily in IT infrastructure in recent years to build in resilience and redundancy, as well as a geographic dispersion of its activities across several sites of concurrent operations. Regular testing and various outage contingencies are part of the setup. The FRB conducts logistical planning in a range of contingencies with the objective of keeping the functions going in the event of disruptions of service or failure. While separability is required for BNYM's GSS operations (which are part of a separate legal entity with own governance structure), actual separation could prove very protracted and challenging. The BNYM would also be eligible for guarantees and liquidity support under the Dodd-Frank Wall Street Reform and Consumer Protection Act (DFA) Title II in resolution. There is, however, no alternative to the BNYM in the event it ceases operations or exits the market, and it would be left to the FRBNY to manage the GSS system. In other major jurisdictions, either the central bank or privately operated central securities depositories play this role.

The authorities should work with market participants to establish backups to preserve GSS and repo market functioning in the unlikely event that the BNYM runs into problems. While the current approach provides for a thorough set of prudential safeguards to reduce the likelihood of such an event materializing, the FRB is encouraged to enhance its comfort by conducting a full assessment of the PFMI to further identify specific clearing and settlement risks, for example, with regard to the potential risk of unwinding, delivery-versus-payment mechanisms, and access criteria. 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.

¹ See speech by J.H. Powell, "The Evolving Structure of the U.S. Treasury Market: Second Annual Conference of the Federal Reserve Bank of New York," October 24, 2016, <https://www.federalreserve.gov/newsevents/speech/powell20161024.htm>.

significant progress has occurred and where new markets that reference the Secured Overnight Financing Rate (SOFR) are developing fast. Less progress is evident in the smaller but still material corporate securities and loan markets accessed by a wide variety of users where some more significant changes in the structure of instruments are required. Market participants need to continue work on transition as quickly as possible. The authorities should remain focused on ensuring regulated firms manage and disclose LIBOR-related risks effectively, and increasingly set harder targets with deadlines for when firms start transitioning from doing business based on LIBOR to SOFR or other reference rate-based products.

FINANCIAL SECTOR OVERSIGHT

59. The supervisory and regulatory framework is sound overall, but remaining gaps relative to international standards need to be addressed. The U.S. framework was found to have a high degree of compliance with international standards in the 2015 FSAP, however, a number of the recommendations remain outstanding (Appendix VII).⁴³ In addition to full adherence to international standards, the FSAP considers that additional strengthening in some areas may be warranted given the system structure and evolution of new risks.

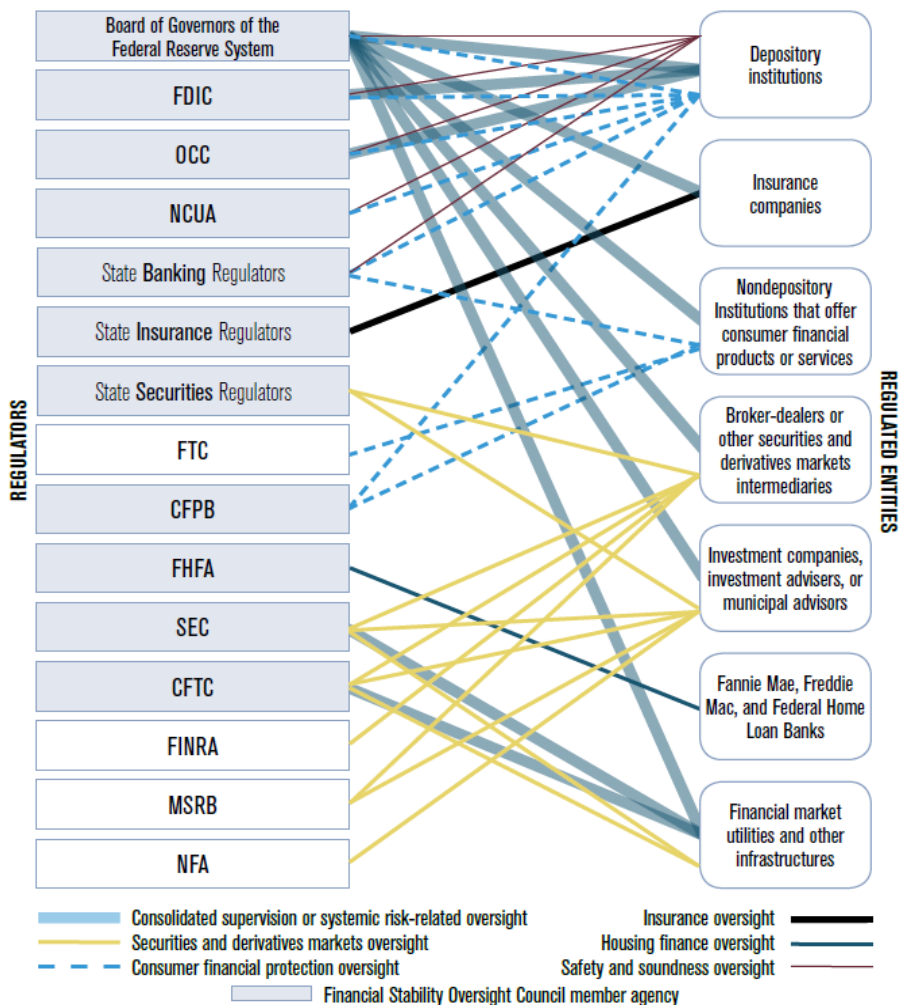
A. What Are the Regulatory Challenges in a Changing Financial System?

60. The U.S. regulatory and supervisory architecture is complex, putting a premium on coordination and cooperation across agencies (Figure 27). In banking, the Federal Financial Institutions Examination Council (FFIEC) provides an effective coordinating mechanism with joint issuance of Notices of Proposed Rulemaking by banking agencies enhancing consistency in approach and messaging. Across the securities and derivatives markets, there is no formal coordination mechanism between the CFTC and the SEC, although Memoranda of Understanding (MOUs) are in place for data sharing and there is frequent informal coordination. The FSOC provides an effective mechanism for coordination across all financial sector agencies.

61. The rapidly changing financial landscape poses additional challenges. Technological and financial innovation is lowering barriers to entry and allowing firms that may sit outside of the regulatory perimeter to provide financial services: (i) financial innovations have resulted in mortgage activity migrating out of banks; (ii) virtual assets (VAs) and virtual asset service providers (VASPs) offer services, which may be very similar to those of traditional securities intermediaries or other financial institutions (issuance, operation of a trading platform, custody) but without being subject to the same standards and obligations; and (iii) providers of critical payment services either fall outside direct supervision or are only partially supervised through third-party service provider regimes whereby risks by the third parties are expected to be managed by the banks.

⁴³ The 2015 FSAP produced Detailed Assessment Reports on banking, insurance, and securities, as well as a pilot review of the compliance with the Key Attributes for Effective Resolution with respect to the banking and insurance sectors. Given that the main standards and their assessment methodologies have not changed, this FSAP covered financial sector oversight in a targeted manner focusing on macrofinancially relevant themes.

Figure 27. United States: Complex Regulatory Architecture



Source: A Financial System that Creates Economic Opportunities: Banks and Credit Unions, Report to President Donald J. Trump by the United States Treasury, June 2017, page 29 at <https://www.treasury.gov/press-center/press-releases/Documents/A%20Financial%20System.pdf>.

Note: The figure depicts the primary regulators in the U.S. financial regulatory structure and their primary oversight responsibilities. A list of acronyms is available on page iv. There are additional agencies involved in regulating the financial markets and there may be other possible regulatory connections than those depicted. See Government Accountability Office Report on Financial Regulation: Complex and Fragmented Structure Could Be Streamlined to Improve Effectiveness, GAO-16-175, February 2016, at: <https://www.gao.gov/assets/680/675400.pdf>.

62. National charters and FSOC designation may be avenues for ensuring the regulatory perimeter is appropriately defined. The OCC proposed in 2016 a special purpose national bank charter, which could attract firms like marketplace lenders or payment companies because the national charter could reduce compliance costs by consolidating supervision under one primary national regulatory structure. The FSOC has the power to designate activities and entities as systemically important and recommend heightened prudential standards as it deems appropriate. It also is tasked with identifying gaps in the regulatory framework; however, its ability to act is limited where there is no primary regulator.

B. Are Systemic Risks Adequately Identified and Can They be Mitigated?

Institutional Arrangements for Systemic Risk Oversight

63. The FSOC provides the framework for systemic risk oversight, and a forum for the U.S. regulators to collectively identify risks and encourage individual agencies to respond. It was established in 2010 with three primary purposes: to identify risks to U.S. financial stability; to promote market discipline by eliminating expectations that the government will shield shareholders and counterparties from losses; and to respond to emerging threats to financial stability. It provides a systematic approach for the effective identification of vulnerabilities working primarily through enhancing coordination of the work of the 15 member agencies, of which 10 are voting members.

64. While buy-in to the process is strong, many member agencies do not have a clearly defined financial stability objective. Continuing full operational independence of member agencies is critical to discharging their mandates but creates challenges for the operation of the FSOC. Supplementing FSOC members' mandates and mission statements with a more explicit financial stability mandate would help address these challenges without undermining the FSOC authority, increase the focus on financial stability issues, and incentivize actions to address systemic financial stability risks. Such objective in the mandate would largely relate to issues within an agency's sphere that could potentially spill over to the wider financial sector.

65. Financial stability communication centers on the FSOC Annual Report with reports from other agencies adding breadth to the discussion.⁴⁴ The FSOC's report largely covers structural vulnerabilities with many carried over from previous years reflecting the long-lived nature of financial stability risks (e.g., in 2019, cybersecurity risk and CCP risk management). The Office of Financial Research (OFR) continues to publish its high-quality annual report, and the FRB issued the first of its semi-annual Financial Stability Reports (FSR) in November 2018. The FSR covers mainly cyclical issues (asset valuations, borrowing by businesses and households, financial sector leverage, and funding) and complements well the work of the FSOC, while also contributing to the determination of the scenarios used in its stress tests and helping inform the setting of the countercyclical capital buffer (CCyB).

66. Strengthening FSOC communication to better link actions with identified vulnerabilities would improve effectiveness. Regulatory changes made by member agencies are listed in the Annual Report but are not linked back to identified vulnerabilities, and in many cases are unrelated to any listed vulnerability. Consideration could be given to releasing more detailed minutes of FSOC meetings (for the meetings that are not open to the public) recognizing 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. To improve traceability, and with it

⁴⁴ For example: FDIC Risk Review—<https://www.fdic.gov/bank/analytical/risk-review/index.html>, and the OCC's Semiannual Risk Perspective—<https://www.occ.treas.gov/publications-and-resources/publications/semiannual-risk-perspective/index-semiannual-risk-perspective.html>.

transparency, specific actions being considered by member agencies to mitigate identified potential systemic risks should be identified, where possible. Subsequently, actions taken should be linked back to identified vulnerabilities.

67. The OFR has undergone a significant restructuring. The OFR's mandate is to support the FSOC through data collection, research, and measuring and monitoring risks. It plays a vital role in connecting the dots across the system and undertaking analyses of systemic issues. Staffing had fallen significantly since 2017 although there is stated aim now to rebuild staff levels.

68. Addressing remaining data gaps is key to enhancing the assessment of interconnections, vulnerabilities, and systemic risks. Progress has been made in addressing some of the data gaps and inter-agency data-sharing shortcomings identified in previous FSAPs. This includes the completion of the pilot on data collections on bilateral repurchase agreements and securities lending activity as well as adoption of SEC rules to provide regulators with conditional access to security-based swap data held by SEC-registered repositories. However, important data gaps remain. Data gathering on bilateral repos, tri-party repos, securities lending, and asset management is at early stages. The Trade Reporting and Compliance Engine (TRACE) pilot for data reporting on Treasury securities should be a permanent feature of the system. Finally, to build a clear view of interconnections, data on interbank exposures should be expanded from the six U.S. G-SIBs to a fuller sample of banks and a better picture is needed of the holdings of CLOs, institutions' direct and indirect exposures to leveraged and private loans, and the various channels that connect nonbanks with the rest of the system.

The Toolkit

69. Tools to address potential systemic risks are distributed across FSOC members, who are collectively accountable for identifying and responding to threats to financial stability.⁴⁵ 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 its authority to issue recommendations for new or heightened regulatory standards to financial regulators; designate nonbank financial companies for consolidated supervision and enhanced prudential standards; and designate financial market utilities as well as systemic payment, clearing, and settlement systems as systemically important, subjecting them to enhanced standards. The United States, however, stands out among its peers as not having any borrower-based tools in the housing sector.⁴⁶

70. Tools to deal with structural vulnerabilities in the banking system are generally sufficient, while coverage of the CCyB should be extended to improve effectiveness. Tools to enhance the structural resilience of the banking system include the G-SIB capital surcharge as well

⁴⁵ IMF Macprudential Policy Survey: <https://www.elibrary-areaer.imf.org/Macroprudential/Pages/Reports.aspx>.

⁴⁶ Specific market structure in the United States makes international comparisons difficult. Of the US\$11 trillion in residential mortgages, only US\$3.6 trillion (33 percent) is held by banks, representing 20 percent of banking sector assets. Over one-half of the mortgages are originated by nonbank mortgage companies (see Box 2).

as enhanced capital and liquidity standards for large non-GSIBs, and the recently introduced Stress Capital Buffer, which also potentially has a cyclical element. The CCyB is applicable to Category I–III banks and has not been activated since introduction in 2010. The FRB’s implementation framework recognizes that while 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 useful input into the setting of the CCyB, no fixed set of indicators can adequately capture all the financial sector vulnerabilities.⁴⁷ In this context, it will also consider whether 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 about 70 percent of banking sector assets to 80 percent.

71. In late 2019, the FSOC adopted final interpretive guidance describing the activities-based approach to identify and address potential risks to U.S. financial stability. As part of the activities-based approach, the FSOC will examine a diverse range of financial products, activities, or practices that could pose potential risks to financial stability. The FSOC intends to allow relevant financial regulatory agencies, which generally possess greater information and expertise with respect to company, product, and market risks, to address potential risks. If the FSOC believes that these actions are inadequate to address an identified risk, it can publicly issue recommendations to agencies under the DFA s120. In cases where a regulator would not be expected to conduct a cost-benefit analysis, the FSOC itself will—prior to making a final recommendation under s120—conduct such an analysis. Finally, if the FSOC’s engagement with regulators under the activities-based approach does not adequately address a potential threat identified, it may evaluate nonbank financial companies for an entity-specific determination under DFA s113. The FSOC will perform a cost-benefit analysis prior to making any such determination.

72. Effective implementation of the activities-based approach will be challenging. To foster confidence, the FSOC should communicate as much detail as possible about the process. Potential challenges to effective implementation include the following:

- While the requirement of a cost-benefit analysis is appropriate, in practice it may be very difficult to conduct with precision given that a probability of a risk being realized must be assigned; and
- The entity designation process must be timely, meaning that on the occasion where it is deemed necessary to designate an entity, such designation must occur within a timeframe that mitigates the financial stability risks. In this regard, there must be due recognition given to speed with which financial risks can build up in complex financial institutions.

73. The FSOC should encourage its members to prioritize the development of tools to address risks and vulnerabilities in the nonbank sector. The most pressing case is to develop

⁴⁷ Federal Register 09/16/2016: Regulatory Capital Rules: The Federal Reserve Board’s Framework for Implementing the U.S. Basel III Countercyclical Capital Buffer.

tools to address the systemic risks arising from very high leverage in nonfinancial corporates (as highlighted in the vulnerabilities analysis). Further, the following measures should be considered:

- **Tools to address the build-up of risks in housing financing will be needed.** As the Treasury and FHFA are examining options for ending the GSEs conservatorship, the CFPB is deliberating changes to the qualified mortgages (QM) definition.⁴⁸ This provides an opportunity to assess the interaction of the GSE capital regime and other potential liquidity sources for the housing market, mortgage underwriting and insurance standards, and lending restrictions aimed at ensuring borrowers' ability to repay their mortgage loan. Consideration should be given to how best to integrate and calibrate a full range of macroprudential tools (e.g., debt service ratio and other borrower-based standards, or CCyB-type capital requirements) to improve financial system resilience.
- **Changes should be considered to mitigate liquidity risks in fund management.** The SEC should consider requiring mutual funds to perform liquidity stress tests as part of their liquidity risk management program. Mandatory liquidity buffers for mutual funds exposed to liquidity risk should also be considered.
- **Analysis of insurance sector risks should be expanded and deepened.** While the NAIC's framework for monitoring individual asset-side risks is quite advanced, scenario-based solvency and liquidity stress testing would add value. State supervisors and the NAIC should continue to closely monitor reinvestment risks and search-for-yield behavior in a low interest rate environment, together with insurers' risk management capabilities when investing in higher risk assets. They should also analyze exposures of primary insurers to natural disasters and reinsurance capacity, including catastrophe or guarantee funds in the analysis for relevant states.

C. How Safe are Financial Market Infrastructures?

74. Given the global systemic importance of some of the U.S. FMIs, it is imperative that their regulation and supervision are effective. Eight firms designated by the FSOC as systemically important Financial Market Utilities (FMUs) are regulated, supervised, and overseen by the FRB, SEC, or CFTC (depending on their activities). The DFA authorized the FRB to promote uniform standards for the management of risks by systemically important FMUs. The increased global reliance on central counterparties (CCPs), following mandatory clearing requirements, underlines the crucial role of regulatory oversight and internal risk governance to ensure their resilience and adequate risk management.

⁴⁸ The DFA (s1411 and s1412) requires that, for residential mortgages, creditors must make a determination that the consumer has a reasonable ability to repay the loan. Congress established a presumption of compliance for "QMs," which are mortgages that meet criteria as defined in CFPB rules. The category of General QM Loans prohibits negative amortization, interest-only payments, terms greater than 30 years and balloon payments. The total points and fees paid for origination must not exceed a certain percentage of the loan amount and the consumer's ratio of debt service to income cannot exceed 43 percent. A separate category of QM Loans that are eligible to be purchased or guaranteed by either GSE has the aforementioned requirements, except the debt-to-income limit.

75. While regulation and supervision have strengthened since 2015, further improvements to CFTC supervision are needed. Important milestones since the last FSAP are the adoption of SEC rules for CCPs and Central Securities Depositories, and the CFTC stress tests for CCPs. The regulation, supervision, and oversight of systemically important U.S. FMIs are generally adequate and effective, but the CFTC's rule approval process and its resources need strengthening. CFTC staffing increased since the 2015 FSAP, but the increase has not kept up with additional responsibilities, which likely hampers the CFTC's effectiveness. The FRB (and, under delegated authority, the individual Federal Reserve Banks), the CFTC, and the SEC actively cooperate—a prerequisite for effective supervision in the U.S. regulatory landscape—but supervisory crisis management arrangements for FMIs could be strengthened.

76. Authorities have implemented the relevant international standards, the Principles for Financial Market Infrastructures (PFMI),⁴⁹ through dedicated regulations; but consistency of outcomes could be further enhanced. FMIs appeared so far sufficiently robust to manage surges in volumes and volatility in financial markets during the crisis. The analysis of the credit and liquidity risk management frameworks of four selected CCPs shows that they are broadly sound.⁵⁰ However, in analyzing the outcomes of certain risk management measures, the mission found that in some cases the outcome of the implementation of PFMI risk management standards by the CCPs was uneven, specifically regarding the independence of the risk management function, the conservativeness of the Margin Period of Risk (MPOR), and the implementation of intra-day margining rules. It is recommended that the FRB, CFTC, and SEC collaborate to analyze these differences and adopt an appropriately consistent, conservative implementation of the PFMI where financial stability or market efficiency could be negatively impacted. More comprehensive supervisory stress tests for CCPs may contribute to this objective by helping authorities to understand where risks could materialize during a stress event.

77. A review of the regulatory and supervisory framework for the payments ecosystem may be warranted to comprehensively address relevant risks. As in other countries, new players are entering the payments space offering innovative services. The current regulatory framework forms a complex pattern and as a result, money transmitters are subject to diverging sets of rules and multiple and overlapping examinations depending on the location and nature of their activities. Banks are expected to manage all risks raised by third-party relationships, including those related to payments. Risks posed by other providers of potentially critical payment services (e.g., card payment schemes, electronic wallet providers, payment gateways, aggregators, or platform providers), such as operational risks, either fall outside direct supervision or are supervised only partially through third-party service provider regimes. The current regulatory framework may not be future-proof so as to ensure risk sensitivity, comprehensiveness, and consistency of requirements for the possible emergence of new payment service providers, irrespective of their status as bank, money

⁴⁹ The PFMI were issued by the CPMI (then CPSS) and IOSCO in 2012 and are the internationally agreed standards for FMIs, including CCPs, <https://www.bis.org/cpmi/publ/d101.htm>.

⁵⁰ The analysis focused on CCPs critical for the respective markets they serve in the United States: ICE Clear Credit for credit default swaps; the Options Clearing Corporation for U.S. equity and index options; the Chicago Mercantile Exchange for futures and commodity derivatives (CME Base) and interest rate swaps (CME IRS); and the FICC for U.S. government securities.

transmitter, or nonbank. The FSOC has recognized the need to evaluate potential risks to payment system integrity and operational risk, among other, as well as appropriate approaches to reduce regulatory fragmentation, while supporting innovation.

D. Is Oversight of Markets Commensurate with the Changing Financial Intermediation?

78. The SEC and CFTC took prompt action to address disruption to securities and derivatives markets arising from the COVID-19 pandemic through the issuance of orders, no-action relief, and guidance.⁵¹ The SEC's actions included an order designed to facilitate open-end funds' (other than MMFs) borrowing from an affiliated person and using inter-fund lending arrangements in the face of severe redemption pressures, thereby preventing fire sales of assets. The CFTC issued no-action letters providing temporary, targeted relief to futures commission merchants, introducing brokers, swap dealers, retail foreign exchange dealers, floor brokers, and other market participants covering, inter alia, regulations requiring recording of oral communications related to voice trading and other telephonic communications, as well as audit trail and related requirements. In addition, circuit breakers that triggered temporary trading halts on several occasions in March 2020 promoted orderly trading during the periods of most extreme volatility.⁵²

79. The size, complexity, and importance of U.S. capital markets call for continued reform in oversight. Measures taken since the 2015 FSAP include an increase in the coverage of examination of investment advisers, mutual fund liquidity management reforms, and changes to reduce the potential for—and impact of—disruption in equity trading. There is, however, a continued need for the SEC and CFTC to have more budgetary independence, and autonomy over their resource allocation, with appropriate accountability for the deployment of the sums raised through their industry fees. Other priorities include deepening of joint work on topics of common interest (e.g., leveraged loans). New registrants should be subject to increased scrutiny and the National Futures Association's (NFA's) reliance on self-certifications should be reduced.

80. There is scope to strengthen the regulation and supervision of the fund management sector. The SEC has introduced important reforms since the 2015 FSAP but areas for improvement remain, including in the coverage of investment adviser inspections, rules on funds' use of derivatives, and an assessment of the impact and effectiveness of the mutual fund liquidity management reforms aimed at reducing liquidity vulnerabilities. The CFTC has not implemented the still relevant recommendations of the 2015 FSAP, which include requirements for commodity pool

⁵¹ The analysis set out in this section focuses on the medium-term challenges and policy priorities for regulation and supervision of securities markets in the United States and does not cover the COVID-19 outbreak or the related policy response, which has since become the overarching near-term priority. The FSAP recommendations are meant to be considered once the impact of the pandemic on the economy and the securities sector becomes clearer.

⁵² The current framework for Market-Wide Circuit Breaker (MWCB) was introduced as a multi-year pilot and takes the form of temporary rules.

operators to implement internal controls and risk management, and addressing the way investors are to be treated if they are adversely affected by pricing errors in a commodity pool. With respect to MMFs, the reforms introduced in 2010 and 2014 are now fully implemented and represent important additional safeguards. However, with about 87 percent of MMF assets having a stable NAV, close monitoring by SEC is essential, including stress testing and contingency planning for a stress situation where the NAV of one or more of these funds falls below US\$1.00.⁵³

81. Welcome progress has been made on equity market structure and the regulation of trading; however, more remains to be done. The United States and other jurisdictions have made progress in implementing internationally agreed reforms to OTC derivatives (“swaps” and “security-based swaps”) markets. In addition to changes in market structure, including an increased proportion of trading concentrated in closing auctions, these markets are faced with threats of wider significance such as to technological and cybersecurity-related resilience. It is important to finalize arrangements for market-wide circuit-breakers (MWCB) for trading in all equities and options markets,⁵⁴ implement the new capital rules for broker-dealers, and deliver the long-planned Consolidated Audit Trail. The SEC should also focus on off-exchange trading given that over a third of equity trading is executed outside exchanges, including 20 percent that takes place outside national securities exchanges or regulated alternative trading systems, and there is the potential for this proportion to grow. The SEC should also carry out a strategic review of its supervision and oversight of exchanges to ensure that there is sufficient focus on material areas of risk.

82. The CFTC and SEC should closely collaborate to complete implementation of the post-crisis reforms to OTC derivatives markets and make targeted adjustments to current arrangements. While data suggest that changes have been successful in incentivizing central clearing, the authorities need to finalize a regime for security-based swaps and to address barriers to increased trading on swap execution facilities and the resultant liquidity fragmentation.

83. Service providers conducting activities involving VAs that constitute securities are subject to AML/CFT regulation and supervision by the SEC. To the extent that a VA is considered an investment contract, and therefore a security under the Howey test, or another type of security, the SEC has regulatory and enforcement authority over the safekeeping and administration of the VA or the provision of financial services relating to the offer, sale, or issuance of the VA. In addition, enforcement action has been taken in circumstances involving alleged violations of the federal securities laws where a VA is a security. However, a notable gap in the current framework relates to the spot market for VAs that are commodities that are not securities. While the CFTC has exclusive jurisdiction over derivatives on commodities that are not securities, it has only general anti-fraud

⁵³ The majority of MMFs with a stable NAV are government MMFs.

⁵⁴ In this regard, the United States faces particular challenges compared to other jurisdictions due to the complexity of coordination across all relevant trading venues, which arises from the mandatory routing of orders in National Market System stocks through the National Market System (the national system for trading equities).

and anti-manipulation powers in relation to the spot market for the underlying commodity itself.⁵⁵ As a result, no federal agency is directly overseeing the spot market for Bitcoin⁵⁶—by far the largest VA by market capitalization. Market participants are also closely monitoring regulatory enforcement action as a means of better understanding the agencies' approach to perimeter issues (Box 5).

E. Have Bank Regulatory Standards Been Weakened?

84. The FSAP's targeted review of the key aspects of the banking regulatory framework focused on the recent tailoring of regulatory requirements and stress tests. The 2015 assessment of compliance with the Basel Core Principles for Effective Banking Supervision (BCPs) found a high degree of compliance. The mission leveraged that assessment by reviewing the main supervisory and regulatory developments since 2015 and assessing the progress achieved in addressing recommendations to ensure the completion of key elements of Basel III. The FSAP team has not covered in detail the impact of COVID-19 outbreak on banks and has not discussed with authorities the related policy response. The FSAP recommendations are meant to be considered once the impact of the pandemic on the economy and the banking sector becomes clearer.

85. The U.S. should implement remaining aspects of the BCPs, some of which persist from the previous assessment and require further attention. The authorities should finalize heightened standards on governance for large and complex bank holding companies, enhance the related-party framework, introduce rules on concentration risk management, and include more quantitative standards on interest rate risk in the banking book. Remaining weaknesses in relation to beneficial ownership identification and verification also need to be addressed. Finally, the authorities should also review the regulatory framework (aiming to streamline and simplify requirements) and consider rewriting certain prudential guidance as regulation.

The overall stringency of prudential regulation has been reduced while medium-term financial stability risks are rising. The scope of application of the recent tailoring reforms is wide ranging, and all the recent adjustments have been made in the same direction, i.e., to lessen requirements (Appendix VIII). Regulatory changes will reduce the number of banks that must comply with the full set of Basel standards and will no longer require non-internationally active banks to comply with the full set of the Basel standard (Appendix IX). Furthermore, fewer banks are subject to annual supervisory stress tests and recent changes to the CCAR program, which appears to be the binding capital constraint for most banks, as well as the implementation of the Stress Capital Buffer will likely result in meaningfully lower capital requirements for several large banks, and possibly also for the G-SIBs in the current stage of the economic cycle.

⁵⁵ Unless the transaction is done on a leveraged, margin, or financed basis.

⁵⁶ With the exception of FinCEN for AML/CFT purposes.

Box 5. Regulation and Oversight of Virtual Assets (VAs)

The VA sector in the United States is currently small as a proportion of the overall financial system but has grown rapidly in recent years.¹ VAs can fall into a range of categories depending on their specific features including securities, commodities, derivatives and currencies. The universe of virtual asset service providers (VASPs), meanwhile, spans small start-ups that are providing financial services for the first time through to major financial institutions.² Key activities that carried out by VASPs include issuance (typically through initial coin offerings (ICOs)), transfer of VAs from one party to another, exchange between different VAs and with fiat currency, custody, and operation of trading platforms.

There is no bespoke U.S. regulatory framework for VAs and VASPs. Depending on the features of a particular VA, and the nature and geographical reach of the activity being performed in relation to it, regulatory oversight may lie with the SEC, the CFTC, Financial Crimes Enforcement Network (FinCEN), or one of the state regulators. This leads to fragmentation, both in relation to the rules that apply and the agency that applies them. Individual agencies have taken steps to clarify in which circumstances a VA falls under its oversight. In April 2019, SEC staff issued a “Framework for “Investment Contract” Analysis of Digital Assets;” however, this does not have the status of a formal rule or agency guidance. Entities considering whether their VA activities would constitute a violation of the federal requirements can seek clarification from SEC or CFTC staff, as applicable (for example, by requesting a “no-action letter”). Market participants are also closely monitoring regulatory enforcement action and speeches by individual Commissioners as a means of better understanding the agencies’ approach to perimeter issues.

One notable gap in the current framework relates to the spot market for VAs that are commodities and not securities. While the CFTC has exclusive jurisdiction over derivatives on commodities, it has only general anti-fraud and anti-manipulation authority in relation to the spot market for the underlying commodity itself (unless a transaction is done on a leveraged, margin, or financed basis), meaning that it can only act after the fact. As a result, no federal agency is directly overseeing the spot market for Bitcoin,³ which is by far the largest VA by market capitalization. This gap raises questions on the risks of derivatives on VAs that are commodities and creates general customer protection risks.

VAs may be marketed to investors as an entirely new asset class while in fact sharing key characteristics of securities, commodities, or even certain types of investment fund. The appearance of innovation creates a situation in which less sophisticated investors may be misled and subject to fraud. Both the SEC and CFTC have made substantial efforts to inform investors about VAs and the risks inherent to them. A notable initiative undertaken by the SEC was the so-called Howeycoin, in which investors were presented with marketing material for an apparent ICO promising high returns on investment. Any attempt by an investor to buy the coins led them to the SEC’s dedicated investor education website, which explained that Howeycoins were fake and that investors should be wary of such scams. The initiative triggered widespread coverage in local and national media. More generally, both agencies have set up dedicated internal units to work on VAs and VASPs (as part of the broader fintech sector) and brought in staff with specialist expertise.

Risks to financial stability from VAs appear low at present given the small size of the sector. However, there is currently a lack of reliable, comprehensive data on VAs, rendering a definitive assessment of the potential systemic relevance of the sector more challenging. Agencies have generally not put in place specific reporting requirements for VA-related activity and rely instead on individual engagement with regulated entities and input from third-party data providers. The FRB, for example, conducts a bi-annual survey of the banks it supervises to determine the exposures they have to VAs. The lack of dedicated reporting may be explained in part by VASPs operating in non-compliance with registration and reporting requirements, but may also be due to issues of categorization and fragmentation, given that there are so many different types of VA and determining the responsible regulatory agency may not be straightforward. Under the current regulatory architecture, it is more feasible to expect individual agencies to introduce their own reporting requirements. Also, the spot market for commodities that are not securities currently is not overseen by the SEC or CFTC.

Box 5. Regulation and Oversight of Virtual Assets (VAs) (concluded)

The complexity of the framework underlines the importance of cooperation between agencies both at the federal and state levels. The SROs, FINRA and NFA, have a key role to play in ensuring consistent application of the framework. It will also be important for the Conference of State Banking Supervisors to continue its efforts to ensure consistency of approaches across the state banking regulators, including finalization and adoption of the model law for money services businesses.

AML/CFT

The U.S. framework is largely compliant with the new AML/CFT standard relating to VAs and VASPs. The United States was one of the first countries to address the ML/TF risks related to VAs prior to the 2018 issuance of the new FATF standard. In February 2020, the FATF concluded that, overall, the authorities had a good understanding of the risks associated with VA activities and that the regulatory framework captured the majority of VA activities as most VASPs in the U.S. fall within one of the categories of financial institutions under the purview of FinCEN, the SEC, or the CFTC. The U.S. also has had several successful enforcement actions targeting the illicit use financial institutions to understand and mitigate the risk associated with VAs were not explicit and the threshold for mandatory customer due diligence of VAs.

Further efforts are nevertheless needed to continue the momentum. While acknowledging the comprehensiveness of the U.S. framework, the FATF noted minor deficiencies (requirements for (CDD) measures for occasional transactions involving VAs was too high) and questioned whether AML/CFT oversight over VASPs was fully in line with the risk profile of the industry. The impact of these shortcomings in practice appears, however, to be very low given the robustness of the existing AML/CFT framework. The authorities continue to study the virtual landscape and consider ways to improve the regulatory framework. In this context, the United States should address remaining minor deficiencies by (i) lowering the threshold for CDD measures for occasional transactions to US\$1,000 or lower; and (ii) explicitly requiring financial institutions to identify, understand, and address risks related to VAs.

¹ A VA as defined by the Financial Action Task Force (FATF) is a digital representation of value that can be digitally traded, or transferred, and can be used for payment or investment purposes.

² VASP as defined by the FATF is any natural or legal person who as a business conducts one or more of the following activities or operations for or on behalf of another natural or legal person: (i) exchange between virtual assets and fiat currencies; (ii) exchange between one or more forms of virtual assets; (iii) transfer of virtual assets; (iv) safekeeping and/or administration of virtual assets or instruments enabling control over virtual assets; and (v) participation in and provision of financial services related to an issuer's offer and/or sale of a virtual asset.

³ With the exception of FinCEN for AML/CFT purposes.

87. Authorities are encouraged to maintain the overall stringency of prudential requirements for non-internationally active banks. The U.S. authorities have maintained the broad compliance with Basel III of the regulation applicable to banks that are considered internationally active (i.e., the eight U.S. G-SIBs in Category I and one bank in Category II). The other banks, including large banks classified in Categories III and IV, are no longer required to comply with the full set of Basel capital and liquidity standards. As required under the BCPs, non-internationally active banks should be required to comply with capital requirements that are broadly consistent with the Basel capital framework and appropriate large exposure limits. Authorities should consider moving capital standards for non-internationally active banks closer to those required for internationally active banks. Authorities may also want to consider extending the full LCR requirements to all non-internationally active banks in Categories III and IV. In addition, considering the increase in financial stability risks, it is important to continue thoroughly scrutinizing banks'

ability to absorb shocks, including by maintaining the frequency of stress tests for Category IV banks.

88. A number of measures to address the impact of the COVID-19 pandemic on the banking sector have been taken swiftly and effectively by the U.S. authorities. They aim to support the provision of credit to the real economy while mitigating potentially negative impacts to financial stability and maintaining banks' operational resilience. The FBAs have encouraged banks to work constructively and prudently with borrowers affected by COVID-19 crisis and issued statements supporting banks that choose to use their capital and liquidity buffers to lend to households and corporates. The FRB has also allowed bank holding companies subject to the supplementary leverage ratio (SLR) to exclude Treasuries and deposits held at Federal Reserve Banks from the SLR calculation. Additionally, supervisory priorities have been adjusted to minimize burden on banks, scale back non-essential activities and focus on monitoring efforts. Lastly, accounting and prudential changes to minimize the immediate impact of forthcoming loan losses on the regulatory capital have been introduced in law and regulation. Most of these measures are temporary and include a phase-out period. Going forward, it will be important to ensure compliance with international standards where exceptions have been temporarily introduced.

89. The U.S. regulatory capital stress test program is rigorous and comprehensive. The FBAs are encouraged to continue exploring second-round effects, possibly by integrating capital and liquidity stress tests. They may also wish to consider leveraging the stress test framework to probe the prudential implications of longer-term structural issues in the banking industry. Removing the CCAR qualitative objection places added pressure on bank supervision.

90. Maintaining high-quality bank supervision remains essential. The FBAs have been very successful in fulfilling their mandate and enhancing the resilience of the banking sector. However, to effectively face new challenges arising from regulatory changes, rapid technological transformation of financial services, renewed industry pressure against supervisory actions and vulnerabilities that continue to build in a maturing credit cycle, it is key to maintain the intensity of supervisory scrutiny and being agile in responding to new threats to financial stability. As supervisory stress tests have become less frequent and capital and liquidity requirements less stringent for some non-GSIBs, supervision needs to remain intrusive and continue enhancing its effectiveness to ensure that banks remain appropriately governed and incentivized to manage their risks to remain financially resilient.

F. Has Insurance Regulation and Supervision Been Strengthened to Address the Rising Risks?

91. State insurance regulators took numerous actions in response to the COVID-19 crisis, including facilitating late payment of premiums by policyholders while maintaining coverage and banning health insurers from imposing cost sharing for COVID-19 tests. State insurance regulators also heightened the monitoring of insurers. The recommendations are meant to be considered once

the impact of the pandemic on the insurance sector becomes clearer and when extraordinary measures can be eased.

92. The targeted review of the state-based insurance regulation and supervision found that supervisory independence remains to be addressed. Supervisory independence—perceived or actual—is likely to be undermined by the appointment of insurance commissioners and their senior staff by state governors in several states or the direct election of the commissioners in others. There are also concerns about state governments’ control of supervisors’ budgets and constraints on staff remuneration. Reforms of the appointment and dismissal of commissioners are recommended as well as a more flexible remuneration to attract and retain sufficiently qualified staff. All cost recovery assessments should be passed to the insurance regulators for their budgetary independence. Financial stability should be included as a core objective of all state insurance regulators’ mandates.

93. Reserving and asset valuation for life insurance should be strengthened expeditiously. Principles-Based Reserving (PBR) was made mandatory only for new life insurance business from January 2020, leading to a very slow evolution of reserving which it will be impossible to match with the asset valuation methodology. All reserves should be moved to a consistent PBR basis after a five-year transition period, the asset valuation approach should be adjusted to ensure consistency between assets and liabilities with risk-based capital (RBC) recalibrated accordingly.

94. Further steps are needed to strengthen risk-based supervision and implement a group capital requirement. Off-site analysis and examinations should be better integrated to enhance regulators understanding of firms’ risk culture, governance, and the quality of risk management. More frequent, focused, and thematic examinations should replace the current five-year examination cycles. Both the FRB and the NAIC are developing aggregation approaches to group capital, which contrasts with the more usual consolidated approaches implemented in other jurisdictions. These two U.S. aggregation approaches may diverge in certain technical areas while aiming for comparable outcomes over time. The U.S. authorities should develop the GAAP Plus version of the Insurance Capital Standard (at least for Internationally Active Insurance Groups) with a view to implementation in parallel with their own aggregation approaches.⁵⁷

95. Regulatory responses to the increasing risk and severity of natural catastrophes need to be strategically focused on the medium to long term; ensuring that risks are appropriately priced to increase resilience through incentivizing mitigation:

- The regulatory response in California to exceptional losses from wildfires in 2017–18 has focused on protecting policyholders from significantly increased rates while ensuring continuity in the availability of insurance in the short term. The authorities and industry need to collaborate and develop a medium- to long-term plan incorporating risk-based pricing to incentivize insurers to remain in the market, while allowing time for development of standard mitigation measures, and

⁵⁷ In November 2019, the IAIS agreed to consider the comparability of the Aggregation Method and the IAIS ICS reference method. The outcome of this assessment is not available at the time of the report finalization.

for policyholders to adjust to higher premiums as necessary. Long-term solutions require policies among multiple agencies to reduce the risks loss from wildfires.

- After hurricane-related crises (1990s and 2000s), the Florida homeowners insurance market eventually stabilized, and the state settled on a system of regulation that appears to be working and may provide some lessons for other states that are facing increasing catastrophe losses.
- There are likely to be significant protection gaps⁵⁸ arising from flood risks that need to be first assessed, and then addressed. While addressing the protection gap is difficult, the authorities are urged to consider a range of possible solutions to closing the gap in the medium to long term.

96. The NAIC and state insurance regulators need to quickly finalize post-crisis reforms to requirements for PMIs. The binding financial requirements for PMIs are PMIERS imposed by the GSEs rather than minimum capital requirements of state regulators.⁵⁹ The NAIC and state regulators are working on a risk-based capital requirement that includes a countercyclical factor to capture risks from rising house prices compared to incomes. This should be quickly finalized including regulatory intervention levels.

G. How is Cybersecurity Risk Being Incorporated in Financial Oversight?

97. Cybersecurity risk preparedness is a top concern for both the financial sector intermediaries and their supervisors. Cybersecurity recommendations featured prominently in the 2017–19 FSOC annual reports, and FSOC members are increasingly focusing on the cyber resilience of the institutions that they supervise. These issues carry even more relevance in the environment imposed by COVID-19 mitigation measures. Key components of the U.S. financial sector are considered critical infrastructure, and its cybersecurity is a matter of national security. A National Infrastructure Protection Plan (NIPP) sets out the general framework for strengthening the resilience of the critical infrastructure.⁶⁰ The Treasury is designated as the financial sector-specific agency responsible for a sector-specific protection plan, which—together with the NIPP—provides a mechanism for coordination between the public and the private sector. Most relevant response and recovery plans are at the individual institutions' level.

98. Regular security testing is an established practice. Banking regulators generally do not mandate but rather include the use of security tests in their broader guidance. In addition, industry-wide tabletop cybersecurity exercises with the participation of systemic financial institutions and FMI, industry associations and government stakeholders are conducted regularly, coordinated by the Treasury. A key result of the sectoral exercises was the establishment of a last resort

⁵⁸ The protection gap is the difference between total asset losses in a possible catastrophic event and the possible insured asset losses.

⁵⁹ For the discussion of PMIERS see paragraph 18.

⁶⁰ See <https://www.cisa.gov/national-infrastructure-protection-plan>.

standardized and highly secure financial data restoration facility that makes it possible to restore bank account information after catastrophic failures of participants' critical systems.

99. FBAs run risk-based, mature, policy-driven, and highly formalized cybersecurity supervisory processes. Notwithstanding the complex institutional structure, cybersecurity expectations and supervisory practices have a strong common base. Banking regulators all use the FFIEC principles, standards, and tools as the foundation of their cybersecurity supervisory activities. Cybersecurity regulation and guidance are sufficiently principles-based to facilitate risk-based supervision well-integrated into the overall supervisory cycle, and to maintain relevance despite the changing threat landscape. The Cybersecurity Information Sharing Act provides sound legal basis for information sharing, and established fora and protocols are part of a national framework. Public-private partnerships are key enablers of voluntary information sharing between the industry and government agencies.

100. The CFTC and SEC have mainstreamed consideration of cybersecurity, business continuity, and other aspects of technological resilience into both regulation and supervision. This has included sharing of key findings from examinations for the benefit of other registrants, enabling a wider dissemination of lessons learned and good practices. Both agencies have regulatory requirements that take industry best practices into consideration, which allows them to remain relevant as tools, technologies, and the associated standards evolve.

101. The FBA's supervisory remit over third parties that provide core information technology services to their regulated firms is well established. To further enhance third-party service provider information security, in its 2019 Annual Report the FSOC recommended Congress pass legislation providing this authority to additional agencies, including the National Credit Union Administration.

H. Is the Financial Integrity Framework Effective?

102. Financial integrity has been strengthened since the last FSAP in relation to beneficial ownership (BO) identification and verification for some covered financial institutions⁶¹ customers; addressing high risk sectors and misuse of legal entities remain priorities.⁶² In 2016, the U.S. AML/CFT framework was assessed as very effective⁶³ in most areas, but fundamentally

⁶¹ Banks, brokers, or dealers in securities, mutual funds, and future commission merchants and introducing brokers in commodities.

⁶² Beneficial ownership means the natural person(s) who ultimately owns or controls a customer and/or the natural person on whose behalf a transaction is being conducted. It also includes those persons who exercise ultimate effective control over a legal person or arrangement. Reference to "ultimately owns or controls" and "ultimate effective control" refer to situations in which ownership/control is exercised through a chain of ownership or by means of control other than direct control.

⁶³ Under the common AML/CFT assessment methodology, a High level of Effectiveness (HE) is the highest rating a country can achieve. A Substantial level of Effectiveness (SE) is the second top rating—it entails that the country has reached a specific outcome to a large extent and that moderate improvements are needed. The other two ratings are a Moderate (ME) and Low (LE) levels of Effectiveness, in which major and fundamental improvements are needed, respectively. The U.S. ratings were four HE, four SE, two ME, and one LE, one of the better results from the latest round of assessments.

weak for mitigating risks of misuse of legal persons.⁶⁴ There were also major weaknesses in AML/CFT obligations for investment advisers, lawyers, accountants, and company service providers, and for identifying and verifying BO for covered FIs' customers and politically exposed persons. The authorities recognize that these weaknesses facilitate the misuse of legal persons and increase ML risks for high-end real estate.⁶⁵ They have imposed a new BO rule which requires all covered FIs, including smaller institutions, to collect and verify BO information for companies and some trusts that are customers, although minor deficiencies remain.⁶⁶ It is too early to tell if this materially improves timely access to BO information about all entities. The other major weaknesses remain unaddressed. The United States should rapidly fix those weaknesses, including by requiring BO information to be collected upon company formation rather than when companies enter into customer relationships with covered FIs. U.S. compliance with new FATF requirements on virtual asset service providers is discussed in Box 5.

CRISIS PREPAREDNESS AND MANAGEMENT

A. Bank Resolution and Deposit Insurance

103. Recovery and Resolution Planning (RRP) for and by the largest and most complex bank holding companies (BHCs) under the DFA is the centerpiece of orderly resolution. After a decade of resolution planning, the development of the U.S. resolution regime is more advanced than in other major jurisdictions and has improved firms' capabilities to recover from financial distress and to be resolved in an orderly way under court-governed bankruptcy procedures. The initial requirement to submit annual comprehensive resolution plans under DFA Title I has had far-reaching effects. Firms have reconfigured their financial, legal, and operational structures, underpinned by strengthened governance arrangements; they increasingly assess business decisions through a "resolution lens," ensuring that acquisitions and new activities do not adversely affect resolvability. BHCs' Title I resolution planning has helped the FBAs to better prepare for administrative resolution under the DFA Title II orderly liquidation authority (OLA).

104. Deposit insurance by the Federal Deposit Insurance Corporation (FDIC) is an effective tool to limit the damage caused by the failure of insured depository institutions (IDIs). For failed IDIs, the FDIC's preferred resolution method is a purchase and assumption (P&A) transaction, which is a time-tested and cost-effective resolution method. Supported by effective recordkeeping by IDIs for timely deposit insurance determination, P&A transactions have provided access to insured—and often also uninsured—deposits typically within one business day. This was also the

⁶⁴ The assessment was conducted jointly by the Financial Action Task Force (FATF) and the Asia/Pacific Group on Money Laundering (APG, the FATF-style regional body for the Asia/Pacific) as the United States is a member of both.

⁶⁵ See: <https://home.treasury.gov/system/files/136/National-Strategy-to-Counter-Illicit-Financev2.pdf>.

⁶⁶ The FATF upgraded the U.S. technical compliance with customer due diligence requirements from partially to largely compliant, see: <http://www.fatf-gafi.org/media/fatf/documents/reports/fur/Follow-Up-Report-United-States-March-2020.pdf>.

case during the GFC. Since 2012, to support its preparedness, the FDIC requires large IDIs to submit annual resolution plans under the Federal Deposit Insurance Act (FDI Act).

105. Requirements for financial companies' DFA Title I resolution plans have been reduced since the previous FSAP. The Economic Growth, Regulatory Relief, and Consumer Protection Act of 2018 (EGRRCPA) increased the thresholds established under the DFA for mandatory Title I plans from US\$50 billion to US\$250 billion, while giving the FRB discretion—which it has exercised—to apply the requirement to BHCs with assets between US\$100 billion and US\$250 billion. Under rule changes in 2019 by the FRB and the FDIC, the 74 financial companies subject to DFA Title I resolution plans—including the eight U.S. G-SIBs and several large regional U.S. BHCs and FBOs—follow longer two- or three-year cycles (depending on their size and complexity), alternating full and targeted plans, or even less extensive reduced plans.⁶⁷ BHCs with assets under US\$100 billion are not required to submit resolution plans.

106. Recovery plan requirements have also been reduced. Dovetailing these changes, in 2019, the OCC increased the threshold for its recovery planning guidelines from US\$50 billion to US\$250 billion, reducing the number of national banks to which the guidelines apply from 25 to 8. The FRB's recovery planning requirements continue to apply to only the eight U.S. G-SIBs (including the BHC parents of four banks subject to OCC guidelines). For other financial institutions, regular supervision includes overseeing aspects of recovery capabilities; for example, through contingency planning and capital management requirements, without additional or enhanced requirements.

107. Exercising their discretion actively, the FBAs should continue to keep a wider array of firms focused on improving critical capabilities for resiliency, recoverability, and resolvability. The FBAs retain discretion to prescribe more comprehensive and frequent RRP, and to apply these to BHCs with assets above US\$100 billion. The FDIC should continue to review these firms' resolvability at least annually and promptly discuss the plans and resolvability assessments in crisis management groups (CMGs). All BHCs and IDIs that are subject to resolution plan requirements should also be subject to recovery plan requirements; other firms should adopt credible, enhanced contingency funding plans—emulating recovery plans—subject to the FBAs' critical supervisory assessment. Any increase of the threshold (from the current US\$50 billion) for IDI resolution plans should be very limited. Ensuring the credibility of recovery plans—as is now being done for resolution plans—and the complementarity between recovery and resolution plans is an important priority.

108. Loss-absorbing capacity (LAC) additional to regular capital requirements should be considered for some non-GSIB U.S. financial companies. So far, the U.S. authorities have focused on G-SIBs' LAC. However, the simultaneous failure of smaller or less complex companies could also impact financial stability. This risk could be mitigated, and resolvability improved, by requiring some non-GSIB financial companies—prioritizing those that are subject to resolution planning or have a large regional presence—to hold LAC additional to regular capital requirements, in the form of

⁶⁷ Firms are still required to report material changes as they occur, and the FBAs can request that firms focus on specific topics, as needed, allowing targeted reviews of core elements of resolvability.

subordinated debt or otherwise. This is consistent with the Key Attributes, and it is the practice in other major jurisdictions such as the European Union and the United Kingdom.

109. Further refinements relating to cross-border resolution also deserve attention, as the 2015 FSAP pointed out. OLA powers do not cover FBOs' U.S. branches. While judicial recognition of a foreign resolution action may be possible under the doctrine of comity, a specific statutory mechanism to recognize and support foreign resolution actions does not exist. The depositor preference rule discriminates based on the jurisdiction where deposits are payable.

B. CCP Recovery and Resolution Planning

110. Important progress has been achieved in recent years on recovery planning for CCPs; resolution for CCPs is still work in progress. Since the 2015 FSAP, CCPs have developed recovery plans as required by new and dedicated requirements, with guidance from primary regulators. The FDIC is developing resolution strategies for select CCPs in cooperation with relevant domestic and foreign supervisors, for example—but not only—through so-called CCP CMGs for the CME and ICC. Coordination of the FDIC with domestic regulators is a good and necessary development and should continue, for example, to broaden resolution planning to other CCPs than the ones currently selected; to further develop a policy approach on the interaction between recovery and resolution; and to participate in CCP supervisory stress tests.

C. Liquidity Backstops

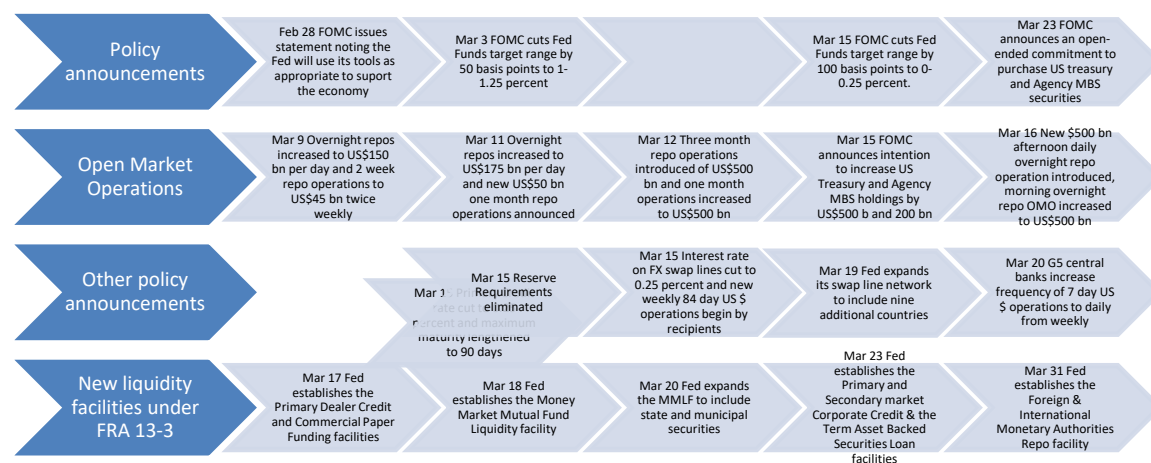
111. The Fed rolled out a comprehensive set of liquidity support measures from March 2020 to combat widespread market dysfunction and to enhance monetary policy transmission. The sequence of measures combined significant monetary policy easing, outright long-term asset purchases, expansion of standard repo OMOs, enhancement of the Primary Credit Facility, elimination of reserve requirements, globally coordinated U.S. dollar liquidity provision through an expanded FX swap line network and introduction of a panoply of crisis liquidity support measures using section 13-3 of the FRA (Figure 28).⁶⁸ The initial policy response targeted extreme dysfunction in money and securities markets and included coordinated global central bank action to help stabilize FX swap markets. Many of the support measures were a reactivation of GFC-era liquidity facilities with the support of the Treasury to help manage the elevated risks.

112. The FRB's actions were effective in bringing markets under control. Much of the impact in March was an announcement effect as few of the newly announced facilities were immediately operational, implying high credibility of the FRB's timely measures. Money market volatility came down relatively quickly, and repo and Fed funds rates moved back within the Fed funds target

⁶⁸ The authorities also implemented complementary regulatory changes which reduced bank balance sheet constraints—for example, adjustments to the Liquidity Coverage Ratio Rule published on May 6, 2020 that require banking organizations to neutralize the effect under the LCR rule of participating in some Fed emergency programs; <https://www.federalregister.gov/documents/2020/05/06/2020-09716/liquidity-coverage-ratio-rule-treatment-of-certain-emergency-facilities>.

range. Commercial paper and other securities markets took longer to respond reflecting the significant uncertainty about corporate credit quality and the underlying business environment.

Figure 28. United States: Measures in Response to COVID-19 Crisis as of end-March 2020



Source: IMF staff analysis.

Note: The figure includes actions taken up to end March 2020. In April 2020, the Federal Reserve introduced new facilities 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.

Depository Institutions

113. The Fed has a broad and scalable toolkit to backstop liquidity pressures at depository institutions. The Discount Window covers all depository institutions in a variety of circumstances and has wide collateral eligibility. The Discount Window has two main parts: the Primary Credit Facility, which provides collateralized liquidity to well-capitalized depository institutions on a no-questions-asked basis; and the Secondary Credit Facility, which provides liquidity to less well-capitalized depository institutions to assist them quickly returning to the market for funding as well as facilitating an orderly resolution, if required. Significant collateral is pre-positioned at the Fed. The term auction facility is fully developed and provides a scalable tool to provide term funding.

114. Stigma is a longstanding challenge to the effectiveness of the Discount Window. Large banks are usually unwilling to use the Discount Window, which partially reflects perceptions that even the Primary Credit Facility is not merely for helping meet normal day-to-day needs and its use is indicative of more serious problems. Stigma is less evident in banking systems where standing facilities are more frequently used in business-as-usual situations. Encouraging banks to incorporate Discount Window use in their liquidity planning and making Discount Window credit available at a cost closer to normal bank funding rates might improve its effectiveness.

Nonbanks

115. The DFA narrowed the FRB’s powers to lend to systemically important nonbanks, leaving an important gap in the toolkit. The DFA restricted the FRB’s powers in that lending to nonbanks under section 13(3) of the Federal Reserve Act is now only possible in exigent circumstances as part of a broad-based program available to at least five nonbanks approved by the Treasury Secretary.⁶⁹ Bilateral liquidity support to individual systemically important nonbanks (for example, of the nature of the GFC lending to American International Group and Bear Stearns) is no longer feasible. Restoring such powers is desirable.

Central Counterparties

116. The DFA provided the FRB with the power to provide liquidity support under Title VIII of the DFA to FSOC-designated FMUs. This is desirable given the prominent role these firms play in the management of liquidity and risk in the financial markets. The DFA appropriately sets a high bar for lending to FMUs, which puts appropriate pressure on FMUs and their regulators to ensure that robust liquidity management processes and buffers are in place that reduce the need for official sector support.

117. Early warning processes are well established but preparedness for liquidity support to CCPs could be improved. Regulators 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 will be adequate in stressed market conditions, very extreme circumstances could still conceivably challenge the stressed liquidity plans. The FRB should enhance arrangements to provide liquidity support in a very extreme and likely fast-moving situation.

Market-Wide Liquidity Support

118. Preparedness to provide liquidity support to key securities markets and to quickly implement broad-based liquidity support programs to nonbanks could be further upgraded. The U.S. financial system depends heavily on securities markets for funding and risk management. The Fed deployed programs to support key securities markets in both the GFC and the recent COVID-19 crisis period, which emphasizes the importance of these tools. Preparedness would be enhanced if the FRB developed a more formal framework and associated operational modalities, to determine where and how to quickly provide support to key securities markets.

Foreign Exchange Liquidity Support

119. The capacity for the FRB to provide liquidity support in foreign currencies deserves further attention. The system of standing central bank FX swap lines provides a potentially useful

⁶⁹ See <https://www.federalreserve.gov/aboutthefed/section13.htm>.

source to finance FX liquidity provision. It is recommended that the FRB develops its FX liquidity support protocols to both banks and CCPs.

D. Collective Crisis Preparedness and Management

120. The FSOC should more actively facilitate and engage in preparedness for a banking sector crisis. So far, the FSOC has focused less on how interagency cooperation would function in contingencies where risk reduction has not succeeded. The FSOC should devote greater attention to ensuring that the FBAs and the Treasury have comprehensive and complementary organization-wide crisis preparedness plans. The FSOC should also prepare the modalities for crisis cooperation, particularly where crisis responses require far more than individual agencies' regular planning. This applies to, for example, national financial crisis communications, and in the rare possibility of a DFA Title II resolution without prior Title I planning. The FBAs should also prepare mitigating actions for a case in which several (larger) institutions will need to simultaneously activate their recovery or contingency funding plans. Considering the increased role of the Treasury Secretary in activating important crisis response tools (some of them still untested), it is critical to decisive crisis action that the modalities for the interactions between the Treasury and the FBAs be operationalized, documented, and regularly reviewed and tested. The FSOC should prioritize this work.

121. Building on the extensive preparation for the resolution of individual large banks, the authorities should consider how a future systemic financial crisis extending beyond the banking sector would best be handled. It is widely acknowledged that the ingenuity and shared vision of the several agencies and of the Treasury during the GFC facilitated what was sufficiently decisive action at most of the key decision points. A next crisis might have its origin and important parts of its transmission in new types of failure and in new types of financial or nonfinancial firms. Needed action might, sooner or later, involve agencies other than the FBAs. Although the FRB would surely still play a leading part, it might have to interact with unfamiliar counterparts and with its freedom of action constrained.

122. The FSOC's crisis preparedness work must cover the entire financial system and include all its member agencies. The FSOC has a broad membership and its mandate covers both the identification of financial stability risks and the response to emerging financial stability threats; it is primarily a forum for coordination between operationally autonomous agencies and has limited decision-making powers. This design puts a premium on advance collective crisis preparation to ensure decisive and coordinated responses from the entire FSOC community. The FSOC should devote greater attention to preparing the modalities for crisis coordination that could be activated at the time of a next financial crisis. Such modalities would not substitute for the member agencies' statutory responsibilities, which they should continue to exercise autonomously. Similar to the preparedness for a banking sector crisis as discussed above, the FSOC should ensure that all member agencies and U.S. Treasury have comprehensive and complementary organization-wide crisis preparedness plans to support the FSOC mandate, ensuring collective and decisive responses to contingencies.

Table 2. United States: Selected Economic Indicators, 2018–25
(In percentage change from previous period, unless otherwise indicated)

	2018	2019	Projections					
			2020	2021	2022	2023	2024	2025
National production and income								
Real GDP	3	2	-7	4	3	2	2	2
Real GDP (q4/q4)	3	2	-7	5	3	2	2	2
Net exports 1/	0	0	0	0	0	0	0	0
Total domestic demand	3	2	-6	4	3	2	2	2
Final domestic demand	3	2	-6	4	3	2	2	2
Private final consumption	3	3	-8	5	4	2	2	2
Public consumption expenditure	2	2	2	2	1	1	1	1
Gross fixed domestic investment	4	2	-5	1	3	3	3	3
Private fixed investment	5	1	-7	1	4	3	3	3
Public fixed investment	2	4	3	3	2	2	2	1
Change in private inventories 1/	0	0	-1	0	0	0	0	0
Nominal GDP	5	4	-5	6	5	4	4	4
Personal saving rate (% of disposable income)	8	8	16	11	8	8	8	8
Private investment rate (% of GDP)	18	17	17	16	16	17	17	17
Unemployment and potential output								
Unemployment rate	4	4	9	8	6	5	4	4
Labor force participation rate	63	63	62	62	63	62	62	62
Potential GDP	2	2	-1	1	2	2	2	2
Output gap (% of potential GDP)	0	1	-5	-2	-1	0	0	0
Inflation								
CPI inflation (q4/q4)	2	2	1	2	2	2	2	2
Core CPI Inflation (q4/q4)	2	2	1	2	2	2	2	2
PCE Inflation (q4/q4)	2	1	1	2	2	2	2	2
GDP deflator	2	2	1	2	2	2	2	2
Government finances								
Federal balance (% of GDP) 2/	-4	-5	-18	-10	-5	-5	-5	-5
Federal debt held by the public (% of GDP)	77	79	100	107	107	107	107	108
General government budget balance (% of GDP) 2/	-6	-6	-23	-12	-7	-7	-6	-6
General government gross debt (% of GDP)	107	109	138	142	143	144	145	147
Interest rates (percent; period average)								
Merchandise trade balance (billions of dollars)	-880	-864	-796	-824	-861	-893	-919	-947
Merchandise trade balance (billions of dollars)	-880	-864	-796	-824	-861	-893	-919	-947
Merchandise trade balance (billions of dollars)	-880	-864	-796	-824	-861	-893	-919	-947
Balance of payments								
Current account balance (billions of dollars)	-450	-480	-436	-447	-478	-496	-500	-510
Merchandise trade balance (billions of dollars)	-880	-864	-796	-824	-861	-893	-919	-947
Current account balance (% of GDP)	-2.2	-2.2	-2.2	-2.1	-2.1	-2.1	-2.0	-2.0
Merchandise trade balance (% of GDP)	-4.3	-4.0	-3.9	-3.8	-3.8	-3.8	-3.7	-3.7
Export volume (NIPA basis, goods)	4.3	0.2	-11.2	6.3	5.5	4.6	2.9	2.3
Import volume (NIPA basis, goods)	5.0	0.3	-9.2	6.9	4.6	3.7	2.4	2.1
Net international investment position (% of GDP)								
	-47.0	-51.6	-61.2	-59.8	-58.8	-58.5	-58.3	-58.2
Saving and investment (% of GDP)								
Gross national saving	18.4	18.1	17.9	17.4	17.4	17.6	17.8	18.0
General government	-3.3	-3.8	-15.1	-9.1	-4.9	-4.0	-3.9	-3.9
Private	21.8	21.9	32.9	26.5	22.3	21.5	21.7	21.9
Personal	5.9	6.1	13.1	8.7	6.4	5.9	5.9	5.9
Business	15.9	15.8	19.8	17.7	15.9	15.7	15.9	16.0
Gross domestic investment	21.0	20.9	20.7	20.1	20.1	20.2	20.4	20.6
Private	17.6	17.5	16.9	16.4	16.4	16.6	16.7	16.9
Fixed investment	17.4	17.2	17.1	16.6	16.6	16.8	17.0	17.1
Inventories	0.3	0.3	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2
Public	3.3	3.4	3.8	3.7	3.7	3.7	3.7	3.7

Sources: BEA; BLS; FRB; Haver Analytics; and IMF staff estimates.

1/ Contribution to real GDP growth, percentage points.

2/ Includes staff's adjustments for one-off items, including costs of financial sector support.

Table 3. United States: Core Financial Soundness Indicators for Deposit Takers, 2011–19
(In percent unless stated otherwise, end-of-period)

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Regulatory capital to risk-weighted assets	14.7	14.5	14.4	14.4	14.1	14.2	14.5	14.8	14.7
Regulatory tier 1 capital to risk-weighted assets	12.6	12.7	12.8	13.1	13.1	13.2	13.5	13.8	13.8
Non-performing loans net of provisions to capital	17.6	15.7	11.7	8.8	7.2	6.6	5.7	4.7	4.3
Non-performing loans to total gross loans	3.8	3.3	2.5	1.9	1.5	1.3	1.1	0.9	0.9
Sectoral distribution of total loans: residents	95.6	95.5	95.2	95.6	95.8	96.1	96.0	96.3	96.3
Sectoral distribution of total loans: deposit-takers	6.0	6.0	5.0	4.1	3.6	3.8	3.9	5.5	4.8
Sectoral distribution of total loans: other financial corporations	3.8	4.4	5.2	6.2	6.7	6.7	6.9	7.3	7.7
Sectoral distribution of total loans: general government	0.9	1.1	1.2	1.3	1.4	1.5	1.6	1.5	1.4
Sectoral distribution of total loans: nonfinancial corporations	31.8	32.1	33.3	34.2	35.0	35.5	35.4	35.3	35.5
Sectoral distribution of total loans: other domestic sectors	53.1	51.9	50.5	49.8	49.1	48.5	48.2	46.7	46.8
Sectoral distribution of total loans: nonresidents	4.4	4.5	4.8	4.4	4.2	3.9	4.0	3.7	3.7
Return on assets	0.3	0.3	0.4	0.3	0.4	0.4	0.3	0.4	0.4
Return on equity	2.3	2.7	3.3	2.8	3.0	3.2	2.9	3.4	3.5
Interest margin to gross income	65.2	60.8	63.5	63.7	63.4	65.1	67.0	68.3	66.2
Non-interest expenses to gross income	64.5	63.6	61.7	64.7	60.7	59.6	61.6	58.4	57.3
Liquid assets to total assets (liquid asset ratio)	12.7	13.4	14.5	14.5	13.2	12.8	13.2	12.7	11.7
Liquid assets to short term liabilities	66.1	74.1	88.3	90.0	91.2	98.2	97.7	89.3	80.6

Source: IMF, Financial Soundness Indicators and IMF staff calculations.

Appendix I. FSAP Risk Assessment Matrix

Nature of Risk	Overall Level of Concern	
	Medium-term Likelihood of Realization	Expected Impact if Risk Materializes
Prolonged COVID-19 outbreak	High	High
	Longer containment and uncertainties about the intensity and the duration of the COVID-19 outbreak reduce supply, as well as domestic and external demand. Deteriorating economic fundamentals and the associated decline in risk appetite would result in a second wave of financial tightening, and in debt service and refinancing difficulties for corporates and households.	A sharp recession would have a negative impact on both the U.S. and the global economy. Rising unemployment and bankruptcies would impact banks' NPLs and increase credit risks, translating into financial institutions' losses and forcing them to cut credit, with further adverse implications for growth.
Sharp rise in risk premia	High	High
	An abrupt deterioration in market sentiment (e.g., prompted by policy surprises, pandemic, trade or geopolitical tensions) could trigger risk-off events such as recognition of underpriced risk. Financial asset prices could fall sharply, and credit spreads widen given the bulk of securities in the lowest investment-grade rating.	Liquidity could dry up in some funding and securities markets (e.g., leveraged loan market) reducing intermediation impacting banks and NBFIs. Higher risk premia cause higher debt service and refinancing risks; stress on leveraged corporates, and to a lesser extent households, disruptive corrections to stretched asset valuations—all depressing growth.
Cyber-attacks	Low	High
	Cyber-attack on the interconnected financial system reliant on a broadening array of interconnected platforms could trigger systemic financial instability or widely disrupt socio-economic activities.	Shock to critical infrastructure causes delay, denial, disruption, breakdown or loss of services, affecting many institutions that rely on the attacked hub. This could also lead to a loss of confidence in the functioning of the financial system.
Distress of a major CCP or other financial infrastructure	Low	High
	Regulation and oversight of systemically important U.S. FMIs are generally adequate and effective. However, outcomes of the implementation of the relevant internationally agreed risk management requirements by CCPs are uneven in certain areas in select CCPs, which may potentially exacerbate financial stability risks.	The high interconnectedness and concentrated nature of major FMIs, interdependencies with the largest banks and quasi-monopolies for clearing specific asset classes could trigger a systemic event both domestically and globally.
Inadequate preparations for LIBOR transition	Medium	Medium
	While progress has been made in moving to a new benchmark, there are still significant risks that public and private entities may not be ready for the transition by the end of 2021.	With more than US\$200 trillion of LIBOR-based contracts, problems in transitioning to a new benchmark could cause very significant disruption in financial markets.
<p>Note: The Risk Assessment Matrix shows events that could materially alter the baseline path (the scenario most likely to materialize in the view of IMF staff). It reflects views of the FSAP team on the sources of financial stability risks surrounding the baseline, relative likelihood of their realization sometime in the next three years, and the overall level of concern.</p>		

Appendix II. Banking Sector Stress Testing Matrix

A. Banking Sector: Solvency Test			
Domain		Framework	
		TD by FRB	TD by FSAP Team
1. Institutional perimeter	Institutions included	18 BHCs classified as large and complex were assessed during the 2019 DFAST/CCAR exercise (8 G-SIBs, 4 other domestic BHCs, 6 IHCs) based on conservative scenarios.	34 largest BHCs/IHCs. The criteria used to determine the institutional perimeter include: (1) FRB stress test sample of banks used in the 2018 DFAST/CCAR exercise; (2) firms' balance sheet size at or above US\$100 billion (including one bank which assets are close to US\$100 billion).
	Market share	About 65 percent of total banking sector assets in the United States.	About 78 percent of total banking sector assets in the United States.
	Data	Effective date: December 2018. Data: Mostly based on confidential FR Y-14A/M/Q reports and publicly available FR Y-9C report Scope of consolidation: Consolidated group basis.	Effective date: March 2020. Data: Based on publicly available FR Y-9C report accessed via S&P Market Intelligence platform, and supplemented by other data sources including Bloomberg, Dealogic, Haver Analytics, Moody's KMV, International Financial Statistics (IFS), IMF Global Assumptions (GAS), and IMF WEO. Scope of consolidation: Consolidated group basis.
	Stress testing process	The path of any additional macroeconomic or financial variable is derived in a way which is consistent with the scenario using FRB own models.	The FSAP team conducted its own TD stress test using <i>June 2020 WEO Update</i> forecast paths (baseline) and forecast paths generated by IMF's Global Macrofinancial Model (adverse) for all material geographies of included banks. The path of any additional macroeconomic or financial variable required by the IMF models is derived in a way which is consistent with the scenario (e.g., real estate prices, credit growth, equity prices, corporate bond yields, term spreads, etc.).

A. Banking Sector: Solvency Test

Domain		Framework	
		TD by FRB	TD by FSAP Team
2. Channels of risk propagation	Methodology	<p>FRB uses its own satellite models for: credit risk projections, bank interest rates and net interest margins, market risk, and banks' fee & commission income.</p> <p>FRB projects PPNR components using supervisory models that take the FRB's scenarios and firm-provided data as inputs. The FRB projects the paths of these variables as a function of aggregate macroeconomic variables included in the CCAR scenarios. FRB calculates projected pre-tax net income by combining projections of revenue, expenses, loan-loss provisions, and other losses.</p>	<p>FSAP team projected pre-tax net income at bank level by combining projections of PPNR components and loan loss provisions derived based on forecasted charge-offs and recoveries (57 separate specifications).</p> <p>The model's core set of regressions are used to forecast financial ratios related to pre-provision net revenue (PPNR), returns on AFS securities, and provisions conditional on macroeconomic conditions, lagged value of the ratio, and firm-level controls.</p> <p>FSAP team forecasted 26 PPNR-related ratios separately (8 interest income ratios, 7 interest expense ratios, 8 non-interest income ratios, and 3 non-interest expense ratios). The macroeconomic variables for these specifications are chosen based on the economic intuition rather than merely relying on the statistical significance. Bank-level controls such as various loan shares also enter the PPNR specifications to account for heterogeneity such as various business models these BHCs have.</p> <p>FSAP team forecasted charge-offs and recoveries ratios separately for 15 ratios (30 ratios in total) at industry-level as presented in the schematic below. The autoregressive nature of the specifications implies that the projected ratios will converge to their long-run steady state value.</p> <p>Solvency-funding cost interaction: bank-specific funding costs (interest expenses) conditional on stressed capital position.</p>
		3. Tail shocks	Scenario analysis

A. Banking Sector: Solvency Test			
Domain		Framework	
		TD by FRB	TD by FSAP Team
			severely adverse scenario in terms of severity (less than 1 percent probability of occurrence).
	Sensitivity analysis	<ul style="list-style-type: none"> Default of the largest counterparties 	<ul style="list-style-type: none"> Fintech impact on income and IT expenses. Market shock on corporate loans, including CLOs/LLs. Decreased reliance on FHLB funding.
4. Risks and buffers	Positions/risk factors assessed	<p>Credit risk Estimated according to the FRBs stress testing framework. Framework is based upon accounting classification of assets. CLOs and securitization exposures are included. Off-balance sheet exposures using baseline and stressed Credit Conversion Factors (CCFs) are included.</p> <p><u>Traded risks</u> Mark-to-market valuation of securities (from shocks to interest rates and credit spreads). For banks with large trading books, trading book exposures are shocked through a set of Global Market Shocks (GMS) with losses recognized in the first quarter of the planning period. In addition, DFAST applies a largest counterparty default shock (LCPD) to the trading firms and two other firms with substantial process and/or custodial operations. Both GMS and LCPD are add-ons to the macroeconomic scenarios. All sovereign issuers relevant for banks are included. Market stress from shocks to risk-free interest rates, exchange rates, credit spreads, commodities, and equity prices.</p> <p><u>Profit loss recognition.</u> Losses/gains are recognized in the same quarter that a shock hit.</p>	<p><u>Credit risks:</u> Estimated based on 15 charge-off and recoveries specifications for: first lien and junior lien residential mortgages, home equity lines of credit (HELOC), construction loans, multifamily and non-residential commercial mortgages, credit cards, other consumer loans, commercial and industrial (C&I) loans, loans to foreign governments, loans to depository institutions, agriculture loans, other residential real estate loans, and all other loans.</p> <p><u>Traded risks:</u> Realized gains on AFS securities is estimated separately following the original CLASS model. Realized AFS gains and losses reflect a combination of asset price shocks, credit events, behavioral decisions about asset sales, and accounting judgment.</p> <p>Due to lack of access to detailed risk information such as mark-to-market losses at loan-level, this model may be more effective in forecasting variables for diversified firms.</p> <p>Market stress from shocks to risk-free interest rates, credit spreads, and equity prices are also incorporated into the framework through the FSAP macro scenario.</p>

A. Banking Sector: Solvency Test		
Domain	Framework	
	TD by FRB	TD by FSAP Team
	<p><u>Evolution of RWAs.</u> RWAs for credit risk evolve according to STA approach as well as balance sheet growth requirements embedded into scenario. Net trading income from equity positions, debt instruments, and trading derivatives. Interest income declines by the amount of lost income from defaulted loans. Interest income from non-defaulting loans is estimated according to satellite models. Interest expenses increase due to rising funding costs linked to the macroeconomic scenario with empirically estimated pass-through, and add-on funding stress from a market event with no pass-through to lending rates. Net fee and commission income and other income evolve with macroeconomic conditions and banks' balance sheets. No change in business models (no rebalancing of portfolio). Balance sheets growth over the stress horizon. Starting in DFAST 2020, projections are based on the assumption that firms' balance sheets remain unchanged throughout the projection period. Also, in March 2020, the FRB amended its stress testing requirements to assume that a firm maintains a constant level of assets over the projection horizon and to assume that a firm will not pay any common dividends or make any issuance of common or preferred stock.</p> <p><u>Tax Rate</u> The effective corporate income tax rate.</p> <p><u>Regulatory impact</u> Stress tests results are compared against regulatory minima of CET1 and leverage ratios. G-SIB buffer is included into 4.5 percent CET1 minima and can be depleted. No conversion of additional Tier 1 capital</p>	<p><u>Profit loss recognition.</u> Losses/gains are recognized in the same quarter that a shock hit.</p> <p><u>Balance sheet and RWA projections</u> Growth path of assets over the stress testing horizon is used to forecast the balance sheet variables and RWAs. The FSAP team first uses a simple approach of using the long-run historical asset growth, supplemented by additional approaches for robustness. The latter include: (1) assuming a zero growth in balance sheet in the stress testing horizon; (2) forecasting balance sheet growth to reflect dynamics of the nominal GDP path in the scenario.</p> <p><u>Tax rate:</u> Assumed at 21 percent in the forecasting horizon</p> <p><u>Regulatory impact</u> Stress test results will be compared against a hurdle rate of 4.5. In addition to the hurdle rate, these BHCs are also subjected to a capital conservation buffer (CCB also includes the G-SIBs surcharge in the case of G-SIBs).</p>

A. Banking Sector: Solvency Test			
Domain		Framework	
		TD by FRB	TD by FSAP Team
		is assumed during the stress horizon. If banks' capital ratio falls below regulatory minimum during the stress test horizon, banks are not able to return funds to shareholders (dividend payments as well as share buybacks).	
	Behavioral adjustments	<u>Dynamic Balance Sheet:</u> In line with 2019 FRB methodology. <u>Dividend Policy:</u> Payout ratio set by 2019 FRB methodology.	<u>Dynamic Balance Sheet:</u> Balance sheet size is assumed to grow at historical industry growth rate <u>Dividend Policy:</u> Payout ratio projected based on a partial adjustment model with a payout rate of 45 percent for a portion of the net income. The specification is as follows: $(0.9 * (\text{previous period's dividends}) + (1 - 0.9) * (0.45 * \text{net income}))$.
5. Regulatory and market-based standards and parameters	Calibration of risk parameters	<u>Parameter definition</u> Net charge off ratios for credit risk (accounting definition)	<u>Parameter definition</u> Accounting portfolios.
	Regulatory standards	Capital definition according to national implementation of Basel principles, including CET1, Tier 1, leverage ratio and total CAR. Capital components that are no longer eligible for additional Tier 1 and Tier 2 capital components follow Basel III transitional path.	
6. Reporting format for results	Output presentation	Bank-by-bank: <ul style="list-style-type: none"> • Minimum CET1, Tier 1, CAR, and leverage ratio • Composition of P&L • Capital ratios • Profitability metrics: ROE; ROA; NII. 	Contribution of key drivers to aggregate CET1 capital ratios Number of banks and share of total assets below hurdle rates. Capital shortfall in terms of nominal GDP. System-wide and by groups of banks: <ul style="list-style-type: none"> • CET1, Tier 1, CAR, and leverage ratio • Distribution of capital ratios (box plots) • Profitability metrics: ROE; ROA; NII

B. Banking Sector: Liquidity Test			
Domain		Framework	
		TD by FSAP Team	
1. Institutional Perimeter	Institutions included	33 banks on the consolidated basis	

	Market share	Over 80 percent of total banking sector assets
	Output presentation	Public data: LCR disclosure templates containing cash flow data for 30 days period. Consolidated basis. Banks grouped by business model Baseline date: December 31, 2019
B. Banking Sector: Liquidity Test		
Domain		Framework
		TD by FSAP Team
2. Channels of risk propagation	Methodology	Cash flow-based analysis using contractual LCR cash flow data aggregated for all currencies with assumptions about combined interaction of funding and market liquidity and different degrees of central bank support. Integrated Solvency-Liquidity-Network contagion framework with sequential recalculation of key solvency, liquidity and risk parameters to incorporate feedback loops due to asset fire-sales.
	Feedback loops and links with solvency analysis	Solvency-Funding cost loop (price effect). Higher funding costs for those banks which experience significant decline in solvency ratios. CCP loop. Stress in collateral market (e.g., MBS, corporate securities downgrade etc.) leads to additional flows of collateral.
3. Sensitivity analysis	Perimeter and type of analysis	LCR distribution and volatility across banks
4. Tail Shocks	Size of the shock	Baseline: business as usual (as reported by banks under normal market conditions). Behavioral assumptions: all maturing liabilities are rolled-over. Collateral freeze scenario (e.g., due to cyber-risk related event at CCP)
		1 day, 5 days and 1-month intermediate/severe market stress scenario: higher run-off rates on unsecured wholesale funding, and undrawn committed credit/liquidity lines on top of the mild stress scenario;
5. Regulatory and Market-Based Standards and Parameters	Regulatory standards	Threshold for cash flow-based analysis: net cumulative funding gap falls below 0.
6. Reporting Format for Results	Output presentation	Number of banks with negative net cumulative funding gaps; Aggregate negative cumulated counterbalancing capacity.

Appendix III. Interconnectedness Stress Testing Matrix

A. Banking Sector Domestic Interconnectedness: Exposure Based		
1. Institutional Perimeter	Institutions included	<ul style="list-style-type: none"> • Six domestic G-SIBs.
	Market share	<ul style="list-style-type: none"> • About 50 percent of the banking sector.
	Data and baseline date	<ul style="list-style-type: none"> • Confidential bilateral exposure data collected by the FRB for the BIS G-SIB hub and confidential liquidity data from FR 2052a. Given the confidentiality of the data used for this exercise, FRB staff implemented the analysis for the FSAP team. Data cutoff as of end-December 2019.
2. Channels of Risk Propagation	Methodology	<ul style="list-style-type: none"> • First stage (Liquidity Shock) <ul style="list-style-type: none"> ○ Calibration of net outflows shock and comparison to the counter-balancing capacity. ○ Liquidity channel-related contagion to the other entities occur due to the price impact of asset sales. ○ Loss in capital due to liquidity channel-related losses (liquidation losses plus marked-to-market losses). These capital levels are carried forward to the second stage as the starting capital levels. • Second stage (Credit Shock and Risk Transfers) <ul style="list-style-type: none"> ○ Based on a modified version of Espinosa-Vega and Sole (2010) with 7 exposure categories separately.
3. Tail shocks	Size of the shock	<ul style="list-style-type: none"> • Redemption shocks/run-off factors in the first stage are scenario-based, calibrated based on historical evidence. • Loss given default rates (LGDs) in the second stage vary by exposure category.
4. Reporting Format for Results	Output presentation	<ul style="list-style-type: none"> • Capital shortfall in percent of initial capital before stage 1 in the network (<u>without</u> identifying individual banks by name); • Capital shortfall, system wide (with max values).
B. Banking Sector Cross-Border Interconnectedness: Exposure Based		
1. Institutional Perimeter	Institutions included	<ul style="list-style-type: none"> • 22 large banking systems (both nationality/consolidated and locational residency basis).
	Market share	<ul style="list-style-type: none"> • Includes exposures of internationally active banks in these banking systems.
	Data and baseline date	<ul style="list-style-type: none"> • Based on publicly available and confidential BIS consolidated and locational data. Data cutoff end-September 2019.

2. Channels of Risk Propagation	Methodology	<ul style="list-style-type: none"> Balance-sheet based; network contagion based on Espinosa-Vega and Sole (2010).
3. Tail shocks	Size of the shock	<ul style="list-style-type: none"> Pure contagion: default of banking systems, 50–100 percent loss given default, 50 percent funding roll-over ratio.
4. Reporting Format for Results	Output presentation	<ul style="list-style-type: none"> Capital shortfall, system wide on consolidated basis (i.e., based on nationality); Capital shortfall, system wide on residency basis.
C. Domestic and Cross-Border Interconnectedness: Market Based		
1. Institutional Perimeter	Institutions included	<ul style="list-style-type: none"> 120 depository institutions and 87 other financial entities in 23 countries. Out of the 207 total entities, 47 are U.S. entities.
	Market share	<ul style="list-style-type: none"> All listed financial sector entities with consolidated assets above US\$100 billion.
	Data and baseline date	<ul style="list-style-type: none"> Equity prices from Thompson Reuters DataStream (daily). Data cutoff as of end-December 2019.
2. Channels of Risk Propagation	Methodology	<ul style="list-style-type: none"> Market-based model: Diebold and Yilmaz's (2014) generalized forecast error variance decomposition approach. The analysis is conducted using either daily or weekly data. For daily data, following standard practice, two-day average is used to accommodate time differences across markets.
3. Tail shocks	Size of the shock	<ul style="list-style-type: none"> Size of the correlation coefficient. We further refined it by incorporating the asset size of these entities (i.e., asset-weighted coefficients).
4. Reporting Format for Results	Output presentation	<ul style="list-style-type: none"> Heatmap of average co-movement between banks/nonbanks in the US/Rest of the world. Network maps with co-movement between entities.

Appendix IV. Mutual Fund Stress Testing Matrix

Mutual Fund Sector: Liquidity Risk		
1. Institutional perimeter	Institutions included	<ul style="list-style-type: none"> All fixed income and mixed mutual funds covered by Morningstar (2,733 funds with total net assets of US\$6,319 billion).
	Market share	<ul style="list-style-type: none"> Around 100 % of the fixed income and mixed fund sector.
	Data	<ul style="list-style-type: none"> Commercial data (Morningstar).
	Reference date	<ul style="list-style-type: none"> December 31, 2019.
2. Channels of risk propagation	Methodology	<ul style="list-style-type: none"> Calibration of redemption shock and comparison to level of highly liquid assets. Price impact due to asset sales. Second-round effects based on flow-performance relationship.
	Time horizon	<ul style="list-style-type: none"> Instantaneous shock.
3. Tail shocks	Scenario analysis	<ul style="list-style-type: none"> Adverse scenario: same as the banking sector scenario but converted to monthly frequency. Pure redemption shock: outflows based on historical distribution: 3% expected shortfall (average of 3% worst net flows).
4. Risks and buffers	Risks/factors assessed	<ul style="list-style-type: none"> Market risk: interest rates, share prices, credit spreads. Liquidity risk: severe redemption shock.
	Buffers	<ul style="list-style-type: none"> Level of highly liquid assets.
	Behavioral adjustments	<ul style="list-style-type: none"> Choice of liquidation strategy used: slicing (prorated), waterfall (most liquid assets first), and mixed approach (cash then slicing). Liquidity Management Tools are not taken into account.
5. Regulatory standards and parameters	Regulatory/accounting standards	<ul style="list-style-type: none"> N/A
6. Reporting format for results	Output presentation	<ul style="list-style-type: none"> Number of funds with a redemption coverage ratio below one (ratio of highly liquid assets to redemptions). Price impact of asset sales. Redemptions due to second-round effects.
Mutual Fund Sector: Vulnerability analysis and contagion		
1. Institutional perimeter	Institutions included	<ul style="list-style-type: none"> All fixed income and mixed mutual funds covered by Morningstar (2,733 funds with total net assets of US\$6,319 billion) and fixed-income ETFs.
	Market share	<ul style="list-style-type: none"> Around 100% of the fixed income and mixed fund sector.
	Data	<ul style="list-style-type: none"> Commercial data (Morningstar).
	Reference date	<ul style="list-style-type: none"> December 31, 2019.
2. Channels of risk propagation	Methodology	<ul style="list-style-type: none"> CoVaR applied to fund flows and returns by fund category to identify most vulnerable funds and most contagious. Diebold-Yilmaz methodology applied to funds to identify most vulnerable funds and most contagious. Tail-dependence using copula.
	Time horizon	<ul style="list-style-type: none"> Monthly data.
3. Tail shocks	Scenario analysis	<ul style="list-style-type: none"> For Copula approach: expected net flows conditional on a fund category facing net flows worse than the 3% expected shortfall.
5. Regulatory standards and parameters	Regulatory/accounting standards	<ul style="list-style-type: none"> N/A
6. Reporting format for results	Output presentation	<ul style="list-style-type: none"> Representation of interconnectedness among funds by fund category. Identification of fund categories most vulnerable to distress from other categories.

Insurance Sector: Solvency Risk		
1. Institutional perimeter	Institutions included	<ul style="list-style-type: none"> • Macrofinancial scenario: 21 life insurance groups, 22 non-life insurance groups, 7 health insurance groups. • Low-for long: Life insurance sector. • Mass lapse event: 21 life insurance groups. • Natural disaster: 538 non-life insurers (solo), 44 small, regionally concentrated non-life insurers (solo). • Banking counterparty default: 21 life insurance groups, 22 non-life insurance groups, 7 health insurance groups.
	Market share	<ul style="list-style-type: none"> • Macrofinancial scenario (based on gross written premiums): <ul style="list-style-type: none"> • Life: 70 percent. • Non-life: 70 percent. • Health: 45 percent.
	Data	<ul style="list-style-type: none"> • Regulatory reporting.
	Reference date	<ul style="list-style-type: none"> • December 31, 2018.
2. Channels of risk propagation	Methodology	<ul style="list-style-type: none"> • Investment assets: other-than-temporary impairments on securities after price shocks, increase in the default rate for corporate bonds and loan exposures. • Insurance liabilities: unaffected by change in interest rates as discount rates are based on historic cost accounting. • Sensitivity analysis: effect on statutory capital.
	Time horizon	<ul style="list-style-type: none"> • Instantaneous shock.
3. Tail shocks	Scenario analysis	<ul style="list-style-type: none"> • Adverse macrofinancial scenario: Equity prices -40.4 percent (unaffiliated) and -20.0 percent (affiliated); property held for sale -23.2 percent; impairment on fixed-income instruments between 3.0 percent (NAIC rating category 3) and 15.0 percent (NAIC rating category 6); corporate bond yield increase between 2.8 percentage points (NAIC rating category 3) and 7.0 percentage points (NAIC rating category 6); impairment on mortgages 2.0 percent (first lien) and 10.0 percent (other mortgages).
	Sensitivity analysis	<ul style="list-style-type: none"> • Low-for-long interest rate projections. • Mass lapse event, triggered by a +2.0 percentage points interest rate hike for U.S. Treasury bonds. • Natural disaster: 1-in-50, 1-in-100, 1-in-250, and 1-in-500 years hurricane. • Default of the largest banking counterparty.
4. Risks and buffers	Risks/factors assessed	<ul style="list-style-type: none"> • Market risks: interest rates, share prices, property prices, credit spreads. • Asset-liability risks. • Credit risks, incl. counterparty risks. • Natural catastrophe risks. • Summation of risks, no diversification effects.
	Buffers	<ul style="list-style-type: none"> • None.
	Behavioral adjustments	<ul style="list-style-type: none"> • None.
5. Regulatory standards and parameters	Regulatory/ accounting standards	<ul style="list-style-type: none"> • U.S. Risk-Based Capital (RBC). • U.S. GAAP.
6. Reporting format for results	Output presentation	<ul style="list-style-type: none"> • Macrofinancial scenario: Impact on statutory capital and contribution of individual shocks; dispersion measures. • Low-for-long: Projection of net investment spread (investment return minus guaranteed interest rate). • Mass lapse event: Cash outflow, waterfall of assets which need to be liquidated; dispersion measures. • Natural disaster: Impact on statutory capital and RBC coverage ratio, number of companies with an RBC shortfall; dispersion measures. • Banking counterparty default: Impact on statutory capital; dispersion measures.

Appendix VI. Grouping of Banks in the Stress Test

Banks in the stress test are grouped into four different categories depending on business model and size of the balance sheet, namely: G-SIBs (excluding four G-SIBs, which are grouped as Trading Banks given their focus on trading-related activities, investment banking, and asset management services); trading banks; foreign-owned banks; and large domestically oriented banks (Non-GSIBs).

Name	Stress Testing Category	Assets (2020: Q1); in th. USD
JPMorgan Chase & Co.	G-SIB	3,139,431,000
Bank of America Corporation	G-SIB	2,619,954,000
Citigroup Inc.	G-SIB	2,219,770,000
Wells Fargo & Company	G-SIB	1,981,349,000
Goldman Sachs Group, Inc.	Trading bank	1,089,759,000
Morgan Stanley	Trading bank	947,795,000
U.S. Bancorp	Non-GSIB	542,909,000
Truist Financial	Non-GSIB	506,229,000
Bank of New York Mellon Corporation	Trading bank	468,155,000
TD Group US Holdings LLC	Foreign	447,268,871
PNC Financial Services Group, Inc.	Non-GSIB	445,567,546
Capital One Financial Corporation	Non-GSIB	396,878,031
State Street Corporation	Trading bank	362,528,000
HSBC North America Holdings Inc.	Foreign	297,535,664
BMO Financial Corp.	Foreign	187,756,342
American Express Company	Non-GSIB	186,054,000
Fifth Third Bancorp	Non-GSIB	185,391,070
BNP Paribas USA, Inc.	Foreign	183,085,293
Ally Financial Inc.	Non-GSIB	182,527,000
Barclays US LLC	Foreign	179,955,000
Citizens Financial Group, Inc.	Non-GSIB	176,981,456
MUFG Americas Holdings Corporation	Foreign	165,696,005
UBS Americas Holding LLC	Foreign	163,248,851
Northern Trust Corporation	Trading bank	161,709,179
KeyCorp	Non-GSIB	157,003,466
Santander Holdings USA, Inc.	Foreign	152,144,560
RBC US Group Holdings LLC	Foreign	137,944,290
Regions Financial Corporation	Non-GSIB	133,638,000
Credit Suisse Holdings (USA), Inc.	Foreign	131,778,058
M&T Bank Corporation	Non-GSIB	124,577,833
DB USA Corporation	Foreign	117,159,000
Huntington Bancshares Incorporated	Non-GSIB	113,897,248
Discover Financial Services	Non-GSIB	112,656,646
BBVA Compass Bancshares, Inc.	Foreign	94,325,559

Source: IMF staff; and S&P Market Intelligence

Appendix VII. Implementation of 2015 FSAP Recommendations

FSAP Recommendation	Developments	Status
Macroprudential framework and policy		
Provide an explicit financial stability mandate to all FSOC member agencies	Several agencies continue to have no explicit legal mandate to support financial stability. As discussed in the 2015 FSAP, this can complicate their input to the Financial Stability Oversight Council (FSOC), and potentially undermines the response to the committee's recommendations and macroprudential coordination. While not all FSOC agencies within their existing authorities have an explicit legal mandate to support financial stability, they all continue to make progress toward financial reforms. Some FSOC agencies, however (including the U.S. federal banking agencies), have, as their responsibilities, key roles in maintaining financial stability.	Not implemented.
Include in FSOC Annual Report specific follow-up actions for each material threat identified	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.	Partially implemented.
Publish the current U.S. macroprudential toolkit and prioritize further development	<p>The macroprudential toolkit remains to be centrally published, and a prioritization to be made.</p> <p>The FSAP recommended further development and implementation of time-varying macroprudential tools, like the countercyclical capital buffer (CCyB). The OCC, FDIC, and Federal Reserve (FRB), have the authority under their respective regulations to determine whether or not to activate the CCyB (and to determine the appropriate level) for the banking organizations subject to the respective jurisdictions. Staff from the three agencies meet on a regular basis to discuss their views on CCyB implementation and have generally agreed to coordinate as appropriate.</p> <p>In September 2016, the FRB approved a final policy statement detailing the framework for setting the CCyB. The policy statement provides background on the range of financial-system vulnerabilities and other factors the FRB may take into account as it evaluates settings for the buffer, including but not limited to, leverage in the nonfinancial and financial sectors, maturity and liquidity transformation in the financial sector, and asset valuation pressures. Due to the constantly evolving nature of economic and financial risks, the FRB is likely to adapt the range of indicators and models over time. The FRB has re-assessed the level of the CCyB annually since adopting the policy statement and has begun issuing a semiannual report on financial stability conditions. Most recently, in March 2019, the FRB affirmed the amount of the CCyB at 0 percent.</p>	Partially implemented.

	<p>The NAIC Financial Stability (EX) Task Force is working to enhance the macroprudential toolkit of state insurance regulators. The Macro Prudential Initiative (MPI) addresses four focus areas: developing a liquidity stress testing framework for material life insurance groups, including enhancing disclosures to better assess products with higher liquidity risk potential; capital stress testing to be addressed as part of the NAIC group capital calculation; reviewing existing recovery and resolution processes, and disclosures to identify any enhancement needs; and determining if there are material gaps in existing counterparty exposure disclosures.</p>	
<p>Expedite heightened prudential standards for designated nonbank systemically important financial institutions (SIFIs)</p>	<p>In 2015, the FRB adopted a comprehensive set of enhanced prudential standards (EPS) for General Electric Capital Corporation, Inc. (GECC), which was designated by the FSOC in July 2013 for Federal Reserve supervision. The EPS included capital and liquidity requirements, capital planning and stress testing requirements, risk management requirements, and restrictions on intercompany transactions between GECC and its parent. The FSOC rescinded the designations of GECC in June 2016; AIG in September 2017; and Prudential Financial, Inc. in October 2018. In March 2016, a federal district court rescinded FSOC's designation of MetLife, Inc. As a result, there are currently no companies designated by the FSOC for Federal Reserve supervision and enhanced prudential standards.</p> <p>On June 3, 2016, the FRB approved an advance notice of proposed rulemaking (ANPR) inviting comment on conceptual frameworks for capital standards that could apply to systemically important insurance companies and to insurance companies that own a bank or thrift. The standards would differ for each population of insurance firms supervised by the FRB. In parallel, the FRB approved a notice of proposed rulemaking to apply EPS for the systemically important insurance companies as designated by the FSOC. In line with the Dodd-Frank Act (DFA), these proposed standards would apply consistent liquidity, corporate governance, and risk management standards to the firms and require the firms to employ both a chief risk officer and chief actuary.</p>	<p>Partially implemented.</p>
<p>Improve data collection, and address impediments to inter-agency data sharing</p>	<p>The Office of Financial Research (OFR) <i>Interagency Data Inventory</i> (IDI), which catalogues the data that FSOC member agencies purchase or collect from the industry or derive from other data, had its annual update in March 2017. FSOC member agencies use the inventory for identifying data gaps and for improving research and analysis but, due to specific restrictions to data sharing, the listing of data in the inventory does not necessarily signify that all FSOC member agencies have access to all data sets. In support of FSOC, OFR facilitated a review of data sharing agreements to identify areas for standardization (see OFR 2016 Financial Stability Report).</p> <p>OFR, along with the FRB, the New York Federal Reserve, and the Securities and Exchange Commission (SEC) have completed pilot data collections about bilateral repurchase agreements (repos) and securities lending activity. The OFR has made the summary of</p>	<p>Partially implemented.</p>

	<p>findings publicly available on its website.¹ Steady progress in data collection and sharing is being made, including areas previously identified as those where more work needs to be done: (i) the collection of data on securities lending, and bilateral repos is still at an early stage; and (ii) outstanding obstacles to interagency data sharing should be reduced, as recommended in the FSAP.</p> <p>Section 21(c)(7) of the Commodity Exchange Act directs swap data repositories to make swap data available to certain enumerated domestic authorities and any other entity the Commodity Futures Trading Commission (CFTC) determines to be appropriate, which may include certain types of foreign authorities. In 2011, the CFTC adopted rules implementing these statutory swap data access provisions by establishing processes by which various categories of entities could gain access to swap data held by swap data repositories. In June 2018, the CFTC amended the 2011 access requirements such that certain authorities may obtain swap data access more efficiently. The amendments removed statutorily mandated requirements that foreign and domestic regulators indemnify swap data repositories for any expenses arising from litigation relating to the information provided by the repositories. The amendments also set forth a process for the CFTC to deem other domestic and foreign regulators appropriate to receive access to swap data held by the repositories.</p> <p>In August 2016, the SEC adopted rules to provide authorities with conditional access to security-based swap data held by SEC-registered security-based swap data repositories. Authorities must agree to keep confidential the data they receive from the repository, and the rules adopted require a memorandum of understanding or other arrangement between the SEC and the data recipient addressing the confidentiality of the information made available.</p>	
Regulation and supervision		
Give primacy to safety and soundness in the supervisory objectives of Federal Banking Agencies	No material change in the legal mandates.	Not implemented.
Strengthen the banking supervisory framework and limit structures for related-party lending and concentration risk; and	In August 2018, the Federal Reserve adopted a final rule to address <i>single-counterparty credit risk</i> . The rule applies single-counterparty credit limits to bank holding companies (BHCs) and foreign banking organizations with total consolidated assets of \$250 billion or more, including any U.S. intermediate holding company (U.S. IHCs) of a foreign banking organization with \$50 billion or more in total consolidated assets, and any BHC identified as a global systemically important BHC under the Federal Reserve's capital rules.	Partially implemented.

update guidance for operational and interest rate risk	<p>In late 2015, the agencies issued guidance on commercial real estate lending, which includes, among other things, a discussion of the importance of managing concentration risk.</p> <p>No meaningful progress on related-party transactions and guidance for operational and interest rate risk.</p>	
Set up an independent insurance regulatory body with nationwide responsibilities and authority	The supervisory and regulatory architecture for insurance firms has not changed.	Not implemented.
Implement principle-based valuation standard for life insurers consistently across the states	All states are in the process of implementing principles-based reserving (PBR) for life insurance reserves with an optional three-year transition period starting on January 1, 2017 (only 37 life insurance companies took this option) before it became mandatory on January 1, 2020. PBR only applies to new business written so existing books of business will continue to use the previous valuation methodologies.	Partially implemented.
Develop and implement group supervision and group-level capital requirements for insurance companies	<p>In 2016, the FRB developed consolidated reporting requirements and consulted on enhanced prudential standards for insurance companies designated by FSOC. The FRB has consulted twice on the development of capital standards for groups with insurance activities subject to its supervision. As there are no FSOC-designated insurance groups currently, only the consultation on the Building Block Approach for capital requirements for the insurance groups that own a bank or thrift remain relevant in 2019.</p> <p>State insurance regulators are working through the NAIC to develop a group capital calculation, which would be an additional analysis tool for regulators, but not a quantitative capital requirement. The proposed group capital calculation is currently being tested by over 30 insurance groups and 15 lead states.</p> <p><u>Developments in insurance group regulation</u></p> <p>All 50 states, the District of Columbia, and Puerto Rico have adopted the updated NAIC model holding company Act enhancing state insurance regulators' group supervisory authorities and the NAIC Own Risk and Solvency Assessment (ORSA) model Act.</p> <p>Twenty-nine states have adopted updates to the NAIC model holding company Act relating to powers of a group-wide supervisor (GWS) of an IAIG. It became part of the accreditation program for all states by January 1, 2020.</p>	Partially implemented.

	Twenty-seven states have adopted the NAIC corporate governance model Act, which became an accreditation requirement on January 1, 2020.	
Provide needed resources to the SEC and CFTC and enhance their funding stability	There has been no change to the funding systems of both agencies.	Not implemented
Increase examination coverage of asset managers	The SEC has increased its examination coverage of registered investment advisers, reaching a level of 17 percent in fiscal year 2018. However, further improvements are warranted.	Partially implemented
Introduce explicit requirements on risk management and internal controls for asset managers and commodity pool operators	New SEC rules took effect in 2018 requiring open-end funds to have liquidity risk management programs with certain mandatory elements. The CFTC has not introduced any changes to the framework for commodity pool operators.	Partially implemented.
Complete the assessment of equity market structure and address regulatory gaps	Since the 2015 FSAP, the SEC has issued several significant proposals related to equity market structure, including amendments to existing regulation to enhance operational transparency and regulatory oversight of ATs. In addition, the SEC approved the consolidated audit trail, which would enable regulators to efficiently track all trading activity in the U.S. equity and options markets. SEC staff has also organized a series of roundtables devoted to specific equity market structure topics.	Implemented.
Stress testing		
Conduct liquidity stress testing for banks and nonbanks on a regular basis; run regular network analyses; and link liquidity, solvency, and network analyses	While the Comprehensive Capital Analysis and Review (CCAR) and DFA stress tests continue to take the form of supervisory solvency stress tests in which second-round effects are not explicitly incorporated, they are implicitly captured in a few ways. First, the macro scenarios are based on very severe recessions coupled with significant declines in asset prices. In the past, such recessions have been associated with very weak banking sectors, so the macro dynamics should reflect the amplification effects from the banking system. Second, the global market shock is based on the movements of asset prices in the second half of 2008, a period that saw the default of a SIFI and the distress of several systemically important institutions. Thus, market conditions should reflect the “second round” effects of the failure of a major	Partially implemented.

	<p>financial company. Third, in implementing the default of the largest counterparty element, participating banks are instructed to compute outcomes if the counterparty whose default would cause the largest losses (under the market conditions described in the market shock) was to default. While this does not capture additional second-round effects beyond those described above, it does guarantee that the first-round effects are as large as possible.</p> <p>Federal banking agencies finalized a rule implementing the <i>Liquidity Coverage Ratio</i> (LCR) in 2014 and proposed a <i>Net Stable Funding Ratio</i> (NSFR) in 2016. Per definition, the LCR is a short-term liquidity stress test, and banks are expected to pass the underlying stress scenario on a continuous basis. The proposed NSFR would establish a quantitative metric that measures the stability of a firm’s funding profile over a one-year timeframe. However, stress testing exercises, like the DFA stress tests or the CCAR, focus on credit and market risk, not on funding and market liquidity risk.</p> <p>Authorities do not conduct, on a regular basis, liquidity stress tests on nonbanks. However, the SEC requires MMFs to conduct regular stress tests, including on their liquidity. In addition, certain of the largest broker-dealers are providing additional information regarding their liquidity risk so SEC staff can better monitor the firm’s management of that risk. The SEC also adopted rules in October 2016 requiring open-end funds to have liquidity risk management programs with certain required elements (see further below).</p> <p>While most large U.S. life insurers perform their own internal liquidity stress testing work, a consistent regulatory liquidity stress test is currently under development by the NAIC. This requirement will exist for any insurance group or legal entity with U.S. results that trigger any of six thresholds (fixed and indexed annuities, funding agreements and GICs, derivatives, securities lending, repurchase agreements, and borrowed money). Once a group triggers the liquidity stress testing requirement, the liquidity stress test itself will be based upon internal company cash flows, will utilize consistent stress tests and “what if” modifications (currently being established), and be applied at the legal entity level (including the holding company) with results reported individually and as a group. The target date for the proposed liquidity stress testing design is August 2019.</p> <p><i>Network analysis, and integration with liquidity and solvency stress tests.</i> The DFA stress tests and the CCAR do not integrate different risk classes beyond credit and market risk. The tests look at banks individually, with contagion and spillover risks entering implicitly through the macro dynamics in the current scenarios rather than explicitly being assessed in the tests. Publicly available information suggests there is no supervisory requirement to integrate in a single framework different risk factors. OFR has conducted research on network models within the context of stress testing and contagion.</p>	
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	<p>In March 2010, the U.S. federal banking agencies issued guidance titled “The Interagency Policy Statement on Funding and Liquidity Risk Management” (75 FR 13656 (March 22, 2010)) (“Liquidity Risk Policy Statement”). The Liquidity Risk Policy Statement incorporates elements of the BCBS’s Principles for Sound Liquidity Risk Management and Supervision (“Basel Liquidity Principles”) and is supplemented by other liquidity risk management principles previously issued by the U.S. federal banking agencies. The Liquidity Risk Policy Statement discusses examples for fundamental liquidity risk management practices that the U.S. federal banking agencies generally consider to be consistent with safety and soundness standards and other applicable laws and regulations, including a comprehensive management process for identifying, measuring, monitoring, and controlling liquidity risk. It also emphasizes the central role of corporate governance, cash-flow projections, stress testing, ample liquidity resources, and formal contingency funding plans as tools for effectively measuring and managing liquidity risk. In addition, in 2014, the Federal Reserve adopted Regulation YY (12 CFR part 252) to implement the enhanced prudential standards established under section 165 of the Dodd-Frank Wall Street Reform and Consumer Protection Act (“Dodd-Frank Act”) (12 U.S.C. § 5365) for BHCs, including foreign-based BHCs, with total consolidated assets of \$50 billion or more (covered companies). These enhanced prudential standards included requirements related to liquidity risk management and liquidity sufficiency. The Regulation YY liquidity requirements, which came into effect in 2015 for the relevant domestic BHCs and 2016 for the relevant foreign banking organizations, provide a regulatory framework for large banking institutions to establish and maintain robust liquidity risk management practices, perform internal stress tests for determining the adequacy of liquidity resources, and maintain a buffer of highly liquid assets to cover cash flow needs over a 30-day stress period, or the first 14 days of a 30-day stress period in the case of the collective U.S. branches and agencies of a foreign banking organization operating in the United States. As a result of statutory changes, the Board has proposed to change the threshold for Regulation YY to apply to BHCs with total assets of \$100 billion or more (in addition, in the case of foreign banking organizations, the Board has proposed to raise the threshold to \$100 billion or more in combined U.S. assets). A component of Regulation YY’s liquidity stress testing requirement is evaluated annually. For example, in one-year supervisors may review foreign banking organizations’ compliance with the requirement that they conduct stress testing with respect to their U.S. branches and agencies, and in the following year supervisors may examine compliance by BHCs. In addition, the Federal Reserve conducts an annual review of the liquidity stress testing practices, liquidity position, and liquidity risk management practices of systemically important banking organizations. Under this program, supervisors assess the adequacy of firms’ liquidity positions relative to their unique risks and test the reliability of these firms’ approaches to managing liquidity risk. The review provides a regular opportunity for supervisors to respond to evolving liquidity risks and firm practices over time. The supervisory review evaluates firms’ liquidity positions both through a range of supervisory liquidity metrics and through analysis of firms’ internal stress tests. The assessment includes an examination of the stress tests that each firm uses to make funding decisions and to</p>	
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	determine its liquidity needs and an assessment of a range of liquidity risk management practices.	
Develop and perform regular insurance stress tests on a consolidated group-level basis	State insurance regulators assess the stress tests performed by insurance companies on a consolidated group-level basis through the Own Risk and Solvency Assessment (ORSA) under the Risk Management and Own Risk Assessment Model Act, which has been adopted by all states. The group capital calculation contemplates determining if stress testing should be included in the filing of that calculation.	Partially implemented.
Develop and perform regular liquidity stress tests for the asset management industry	The SEC requires MMFs to conduct regular stress tests, including on their liquidity. The SEC also requires that an open-end fund assess, manage, and periodically review (with such review occurring no less frequently than annually) its liquidity risk, based on a range of factors. However, the SEC does not perform stress tests itself.	Not implemented.
Market-based finance and systemic liquidity		
Change redemption structures for mutual funds (MFs) to lessen incentives to run; move all money market mutual funds (MMMFs) to variable net asset value (NAV) approaches	<p>In September 2015, SEC proposed a rule for MFs and ETFs designed to enhance liquidity risk management, provide new disclosures regarding fund liquidity, and allow MFs to adopt swing pricing to pass on transaction costs to entering and exiting investors. However, to date no MF has adopted swing pricing.</p> <p><i>MMFs and variable NAV:</i> Rules issued by the SEC that have been fully implemented require floating NAVs for institutional non-government MMFs. Retail and government MMFs are permitted to continue using an amortized cost method of pricing where constant NAVs are applied. For the latter group of MMFs, the rules provide new tools—liquidity fees and redemption gates—to address potential runs.</p> <p>In its 2018 annual report, FSOC recommended that the SEC continue to monitor the impact of its reforms in light of the approximately \$1 trillion shift from non-government MMFs to government MMFs since the adoption of the reforms.</p>	Partially implemented.
Complete tri-party repo (TPR) reforms and measures to reduce run-risk, including the possible use of central clearing platforms (CCPs)	<p>The underlying infrastructure of the TPR market, a key stress point in the global financial crisis, has been improved. The amount of intra-day credit extended to collateral providers has been reduced by over 95 percent as a result of changes in practice and process made to adhere to the reform roadmap. Also, clearing banks are now limited to funding a maximum of 10 percent of a dealer's notional tri-party book through pre-committed lines and incur a capital charge from the credit extension.</p> <p>Risk of fire sales of collateral by a dealer losing access to repo or by a dealer's creditors: Although the risk of collateral fire-sales is reduced through post-crisis capital and liquidity regulations, it remains a significant risk that warrants attention.</p>	Implemented.

	<p>Intra-day counterparty risk exposure in the tri-party repurchase (repo) market contracted significantly in recent years, but the potential for fire sales of collateral by creditors of a defaulted broker-dealer remains a significant risk. Additionally, data gaps continue to limit regulators' ability to monitor the aggregate repo market and identify interdependencies among firms and market participants.</p>	
<p>Enhance disclosures and regulatory reporting of securities lending</p>	<p>In early 2016, the OFR, the FRB, and the SEC completed a <i>joint securities lending data collection pilot</i>. 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 FSOC 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 efforts to propose and adopt a rule for a permanent collection of data on securities lending relevant agencies continue to consult on these issues.</p> <p>In October 2016, the SEC adopted new reporting requirements for registered investment companies, which include information on 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.</p>	<p>Partially implemented.</p>
<p>Strengthen broker-dealer regulation, in particular liquidity and leverage regulations</p>	<p>The U.S. authorities are tackling financial leverage through regulating financial products as well as the types of market participants (of which some are not subject to direct regulation): Broker-dealer requirements, like margin rules for securities transactions, central clearing of derivatives (fostering product standardization and increasing liquidity), as well as newly introduced margin requirements for uncleared swaps constitute important examples of regulatory and supervisory efforts. In addition, certain of the largest broker-dealers are providing additional information regarding their liquidity risk so SEC staff can better monitor the firm's management of that risk.</p> <p>To reduce the financial stability risk potential of derivatives, U.S. bank swap dealers are now required to collect and post margin on (almost) all swaps that cannot be centrally cleared. The use of uncleared derivatives is thereby made less attractive, and the requirements will encourage the use of standard derivatives that go through central clearinghouses. This measure also helps ensure that a default of a major OTC derivatives market participant would not bring down the system.</p> <p>In October 2015, the FRB, Federal Deposit Insurance Corporation (FDIC), Office of the Comptroller of the Currency (OCC), Farm Credit Administration (FCA), and Federal Housing Finance Agency (FHFA) issued a final rule to establish capital and margin requirements for swap dealers, major swap participants, security-based swap dealers, and major security-based</p>	<p>Partially implemented.</p>

	<p>swap participants regulated by one of the aforementioned agencies. The final rule phased in the variation margin requirements between September 1, 2016 and March 1, 2017. The initial margin requirements began on September 1, 2016 and phase in over four years.</p> <p>In January 2016, the CFTC issued its final rule on margin requirements for uncleared swaps. The CFTC final rule on cross-border application of margin requirements was published in May 2016. Implementation of the CFTC's final regulations on margin requirements for swap entities not regulated for this purpose by a U.S. prudential regulator was initiated for initial margin on a phase-in basis starting on September 1, 2016 and was effective for variation margin as of March 1, 2017. The CFTC amended its rules in November 2018 to harmonize with the requirements for swap entities regulated by the U.S. prudential regulators. In addition, the CFTC issued comparability determinations for margin requirements for uncleared swaps for Japan (September 2016, updated March 2019), the European Union (October 2017), and Australia (March 2019).</p>	
Improve data availability across bilateral repo/tri-party repo and securities lending markets	<p>Data on the tri-party and General Collateral Financing (GCF) repo markets are published regularly. In February 2019, the 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, the 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.</p> <p>Pursuant to the FRB's supervisory authority, the Federal Reserve Bank of New York (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 the 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 GCF repo transactions that are cleared by FICC.)</p>	Partially implemented.
Liquidity backstops, crisis preparedness, and resolution		
Revamp the Primary Credit Facility as a monetary instrument	In 2016, the Federal Reserve considered the role of the Primary Credit Facility as part of an evaluation of its long-run operating framework. In particular, at the FOMC's November 2016 meeting Federal Reserve staff discussed considerations regarding potential choices of operating regimes and the issue of stigma associated with borrowing from the discount window. No changes to the Primary Credit Facility were made at that time.	Not implemented.

	Subsequently, staff of the Federal Reserve System has continued to study the role of Primary Credit. This work has included an October 2017 conference on the stigma associated with use of the discount window.	
Enable the FRB to lend to solvent nonbanks that are designated as systemically important	In November 2015, the Federal Reserve approved a <i>final rule specifying its procedures for emergency lending</i> 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.	Partially implemented.
Assign formal crisis preparedness and management coordinating role to FSOC	The FSOC has not assumed a crisis preparedness and management role. The FSOC was an informal forum for emerging issues, such as, Brexit, Hurricane Sandy, and MF Global's bankruptcy.	Not implemented.
Extend the Orderly Liquidation Authority powers to cover systemically important insurance companies and U.S. branches of foreign-owned banks	The recommendation pertained to systemic insurance firms that would have to be resolved under state bankruptcy legislation, for example, insurers without a holding company. The DFA was not changed on this point. The U.S. authorities cooperate with foreign resolution authorities in CMGs and through firm-specific COAGs and interagency MOUs, but the DFA has not been changed to extend OLA powers to cover U.S. branches of foreign-owned banks.	Not implemented.
Adopt powers to support foreign resolution measures; extend preference to overseas depositors	Foreign resolution measures continue to rely on recognition by U.S. courts under the principle of comity. The standards for such recognition are unclear regarding entities that are explicitly excluded under Chapter 15 of the U.S. Bankruptcy Code, such as FBOs' U.S. branches and agencies. The FDIC's "dual payability" rule clarified—but has yet to be confirmed in court—that foreign branch deposits are treated as deposit liabilities under the FDI Act's depositor preference rule with equal ranking as domestic uninsured deposits but not insured deposits.	Not implemented.

<p>Finalize recovery and resolution plans for SIFIs, agree cooperation agreements with overseas authorities</p>	<p>RRP under the DFA for and by the largest and most complex financial companies has progressed. The U.S. authorities concluded resolution-related cooperation frameworks and information-sharing arrangements with foreign counterparts, including by participating in firm-specific CMGs and by concluding firm-specific COAGs with CMG members. The FDIC concluded bilateral Resolution Memoranda of Understanding with its counterparts in major jurisdictions.</p> <p>State insurance regulators through their work at the NAIC are reviewing the value of aspects of resolution planning for large insurance groups under its Macro Prudential Initiative (MPI). The goal of MPI is to consider some new or improved tools to (1) better monitor and respond to the impact of external financial and economic risks on the firms state insurance regulators supervise, including financial, reputational, litigation or regulatory risks for the firm; and (2) better monitor and respond to risks emanating from or amplified by insurers that might be transmitted externally, and which may result in significant impacts to the stability of broader financial markets. Moreover, state insurance regulators are authorized, under revisions to the NAIC model holding company act, to have the power to act as a group-wide supervisor (GWS) for identified IAIGs, and these powers enable the GWS to be able to order mitigation of material risks to the insurance operations of the group, which could if necessary include the power to require the development of resolution and/or recovery plans. The revisions to the NAIC Model Holding Company Act that provide for the powers to act as a GWS of an IAIG have been adopted in 29 states and will be required to be adopted in all accredited U.S. states and jurisdictions by January 1, 2020.</p>	<p>Partially implemented.</p>
<p>Financial market infrastructures (FMIs)</p>		
<p>Identify and manage system-wide risks related to interdependencies among FMIs, banks, and markets</p>	<p>U.S. authorities continue efforts to increase the resilience and recoverability of financial market infrastructures (FMIs), with particular emphasis on central counterparties (CCPs). U.S. authorities advanced domestic efforts and continued to participate in, and contribute to, numerous international work streams.</p> <p>Since 2015, the SEC adopted risk management standards for systemically important FMIs, while all authorities issued expectations for recovery and orderly wind-down planning. Authorities are examining the viability and comprehensiveness of these FMIs' recovery and orderly wind-down plans.</p> <p>The authorities also are actively engaging in resolution planning for systemic CCPs. The FDIC and the CFTC co-host crisis management group (CMGs) meetings for two U.S. CCPs-that are considered systemically important in more than one jurisdiction: the Chicago Mercantile Exchange (CME) and Ice Clear Credit, LLC.</p>	<p>Largely Implemented.</p>

	<p>The CFTC conducted stress testing exercises of selected CCPs in 2016, 2017, and 2019. In September 2016, the CFTC issued final cybersecurity testing rules for FMIs and markets.</p> <p>In May 2018, FRB welcomed the release of the CPMI's strategy for <i>reducing the risk of wholesale payments fraud related to endpoint security</i> and reaffirmed its commitment to work collaboratively with domestic and international stakeholders to promote the safety and resilience of the wholesale payments ecosystem worldwide. FRB staff, in close collaboration with the Federal Reserve Banks, has been engaged in efforts domestically to advance the strategy in the United States and actively monitor progress.</p> <p>The U.S. authorities participated in the Study Group on Central Clearing Interdependencies (SGCCI), which was established by the Financial Stability Board (FSB), the International Organization of Securities Commissions (IOSCO), and the Basel Committee on Banking Supervision (BCBS) to identify, quantify, and analyze interdependencies between CCPs and major clearing members, and financial service providers. Results from the SGCCI's analysis were published in July 2017 and August of 2018.</p> <p>The U.S. authorities, as members of CPMI-IOSCO, participate in the drafting of reports, at both the consultation and final stage, for the CPMI-IOSCO's Framework for Supervisory Stress Testing of CCPs, CPMI-IOSCO's Resilience of Central Counterparties (CCPs): Further Guidance on the PFMI, and Recovery of FMIs. The final versions were published in July 2017 (Resilience of CCPs and Recovery of FMIs) and April 2018 (the Framework for Supervisory Stress Testing for CCPs). The CFTC co-chairs the CPMI-IOSCO Policy Standing Group. U.S. authorities also contributed to CPMI-IOSCO's report on "Guidance on cyber resilience for financial market infrastructures" published in June 2016. The U.S. authorities are participating in the FSB work streams on resolution of CCPs and the continuity of access to FMIs for members in resolution. The FDIC co-chairs the FSB work stream on CCP resolution, which published in July 2017 "Guidance on Central Counterparty Resolution and Resolution Planning."</p>	
Offer FRB accounts to designated Financial Market Infrastructures (FMIs) to reduce dependencies on commercial bank services	<p>By December 2017, requests from designated financial market infrastructures have been authorized by the Federal Reserve Banks of Chicago and New York.</p> <p>The following five U.S. FMIs have been designated as systemically important utilities and are authorized to open accounts, and have opened accounts, at the central bank: ICE Clear Credit, CME Inc., the Options Clearing Corporation, the National Securities Clearing Corporation, and the Fixed Income Clearing Corporation. The measure has been possible because these (nonbank) FMIs have been designated as systemically important financial market utilities and are therefore eligible for Federal Reserve accounts and services pursuant to section 806 of the Dodd-Frank Act.</p>	Implemented.

Housing finance		
Reinvigorate the momentum for comprehensive housing market reform	<p>The U.S. housing market has not been reformed comprehensively. No legislative or executive action has been taken to reduce substantially the footprint of the GSEs.</p> <p>As conservator, however, the Federal Housing Finance Agency (FHFA) has required market-based credit risk transfers from the GSEs to the private sector at an increasing level since 2013. Between their initiation in 2013 and June 2018, the GSEs have transferred a portion of credit risk on approximately \$2.5 trillion of unpaid principal balance (UPB) with a combined Risk in Force (RIF) of about \$81 billion. The GSEs have also jointly developed a common securitization platform. FHFA issued a final rule on the uniform mortgage-backed security in February 2019 to align GSE policies and practices that affect cash flows of To-Be-Announced (TBA) eligible mortgage-backed securities. These requirements apply to both the GSEs' current offerings and to the new Uniform Mortgage-Backed Security (UMBS). These GSE reforms have been accomplished administratively and have not reformed the entire housing finance system, which would require legislative action.</p> <p>Since 2015, the FHFA has directed the Enterprises to fund the Housing Trust Fund and Capital Magnet Funds (as required by the 2008 Housing and Economic Recovery Act) by transferring a portion of total new acquisitions to these funds, which are administered by the Department of Housing and Urban Development and Treasury Department, respectively. FHFA has the discretion to suspend the GSE allocations to the affordable housing funds, including the Housing Trust Fund, if the allocations are contributing to the GSE's financial instability.</p> <p>The Senior Preferred Stock Purchase Agreements (PSPAs) between the Treasury and each GSE continue to provide financial strength for the GSEs. They ensure the ability of the GSEs to meet their financial obligations and are structured so that they will have minimal net worth as all profits above the capital reserve amount are transferred to Treasury each quarter. The capital reserve amount had been declining by \$600 million per year and was scheduled to decline to zero by January 2018. However, on December 21, 2017, FHFA and the Department of the Treasury agreed to reinstate a \$3 billion capital reserve amount for each GSE to prevent draws on the PSPA due to fluctuations in the GSEs' income due to the normal course of business. Despite the new capital reserve, the December 2017 tax cuts caused the GSEs to draw a combined total of \$4 billion at the end of that quarter, reflecting value loss in deferred tax assets that followed the Tax Cuts and Jobs Act enactment.</p> <p>In June 2018, FHFA issued a proposed rule on GSE capital requirements. The rule would implement new risk-based capital requirements and two alternatives for a revised minimum leverage capital requirement for the GSEs. The requirements in this rule would continue to be suspended while the GSEs remain in conservatorship.</p>	Not implemented.

	<p>In September 2019, the U.S. Treasury released the Housing Reform Plan which calls for a reduced role of the government in the U.S. housing finance system. The Department of Housing and Urban Development (HUD) put forth a concomitant plan focused on streamlining the Federal Housing Administration (FHA) and the Government National Mortgage Association (GNMA) and avoiding the duplication of government support in the housing market.</p>	
<p>Note: Based on IMF staff's assessment and inputs from authorities.</p> <p>¹ For the summary of the bilateral repo data collection, see https://www.financialresearch.gov/data/repo-data-project/, for the summary of the securities lending data collection, see https://www.financialresearch.gov/data/securities-lending-data-collection-project/.</p>		

Appendix VIII. Legislative and Regulatory Changes Impacting Banks

Content of the New Requirements	Date	Proposal/ Final Rule
<p>Economic Growth Regulatory Relief Consumer Protection Act</p> <ul style="list-style-type: none"> • Raised the enhanced prudential threshold from US\$50 billion or more in assets to US\$250 billion. • Directed the U.S. FBAs to tailor supervision and regulation of large banking organizations with more than US\$100 billion in assets. • Eliminates the supervisory stress tests for BHCs with less than US\$100 billion in assets, requires periodic (rather than annual) supervisory stress test for firms in the US\$100 billion to US\$250 billion range, and removes the company-run stress tests requirements for banking organizations with less than US\$250 billion in assets. • Includes a simplified regulatory regime for community banks that meet certain risk profile criteria (ability to opt for a capital requirement based on a simple leverage ratio), requires FBAs to amend the Supplementary Leverage Ratio (SLR) rule for custodial banks to exclude from the leverage exposure measure qualifying deposits at certain central banks. • Mandates FBAs to amend the LCR rule to classify all investment-grade, liquid, and readily marketable municipal securities as level 2B liquid assets. • Introduces Volcker Rule exemptions and a less restrictive definition of high volatility commercial real estate. 	May 2018	Final
<p>Recalibration of the enhanced SLR for G-SIBs</p> <ul style="list-style-type: none"> • The proposal would replace the fixed leverage ratio buffer (2 percent) that applies uniformly to all G-SIBs holding companies with a buffer tailored to each G-SIB, set at 50 percent of the G-SIB risk-based surcharge. 	April 2018	Proposed
<p>Volcker Rule revisions</p> <ul style="list-style-type: none"> • A three-tier compliance framework is introduced. Banks with moderate and limited trading assets and liabilities are exempted from a number of requirements (such as reporting, internal control, CEO attestation). If an instrument is held for longer than 60 days, banks can presume (subject to supervisory rebuttal) that the rule will not apply to such instruments. 	August 2019	Final
<p>Tailoring rules</p> <ul style="list-style-type: none"> • Introduce four categories of regulatory standards for banks with over US\$100 billion in total consolidated assets, with standards increasing in stringency (Category I standards being the most stringent and Category IV standards the least stringent). 	October 2019	Final

<p>Simplification to the capital rules for non-advanced approaches banking organizations</p> <ul style="list-style-type: none"> • It replaces the 10 percent of CET1 capital deduction threshold for each category (deferred tax assets, mortgage services rights, investments in unconsolidated financial institutions) with 25 percent of CET1 capital threshold. • It eliminates the aggregate 15 percent of CET1 threshold for the combined impact of the three categories of deduction items. • It allows banking organizations to include minority interest up to 10 percent of the parent banking organization's CET1 capital. 	October 2019	Final
<p>Stress testing rules</p> <ul style="list-style-type: none"> • The Stress Capital Buffer would integrate the capital rule and the CCAR process and relax some assumptions. • Various changes to the perimeter and frequency of the CCAR introduced as mandated by the EGRRC Act. • Removal of the qualitative objection. 	<p>March 2020</p> <p>October 2018</p> <p>April 2019</p>	<p>Final</p> <p>Final</p> <p>Final</p>

Appendix IX. Banking Regulation and Basel Standards

		U.S. standards				
		Category I (U.S. GSIBs)	Category II (*)	Category III (*)	Category IV (*)	Other firms
Capital rules						
GSIB surcharge	From 1% to 3.5%	From 1% to 5.5%	N/A			
DSIB surcharge	Principle-based approach	N/A	No surcharge as no D-SIBs have been identified in the US			N/A
Banks operate above the minimum regulatory capital ratios (to reflect banks' risk profile and changes in economic conditions)	Pillar 2 (**)	Stressed risk-based capital requirements (**)				No Pillar 2 and no stressed risk-based capital requirements
Countercyclical capital buffer (CCyB)	From 0% to 2.5%	In line with Basel			No CCyB	
Higher leverage ratio requirements for GSIBs (eSLR in the US)	3% + leverage buffer (50% of the GSIB surcharge) Leverage buffer in the 0.5-1.75% range	3% + leverage buffer (50% of the US GSIB surcharge) Leverage buffer in the 0.5-2.75% range	N/A			
Leverage ratio (SLR in the US)	3%	N/A	3% (SLR is aligned with Basel)		No SLR	
Regulatory adjustments to CET1	- For DTAs, MSRs and investments in unconsolidated financial entities: limited recognition in capital capped at 10% of CET1 for each category - The amount of the three items that remains recognized cannot exceed 15% of CET1 - Limited recognition of minority interests	In line with Basel	In line with Basel	- Limited recognition capped at 25% of CET1 for each category - The amount of the three items that remains recognized after the application of all regulatory adjustments is not capped - All minority interests are eligible		
Impact of unrealized gains and losses	Unrealized gains and losses are included in regulatory capital	Unrealized gains and losses are included in regulatory capital	Unrealized gains and losses are included in regulatory capital	Firms have the possibility to exclude gains and losses from regulatory capital (i.e., unrealized losses are not deducted from capital). This is less conservative under stressful conditions when firms are likely to accumulate underlying losses		
Calculation of RWAs						
Floor for firms using internal model approach	72.50%	100% (***)	100% (***)	N/A		
Operational risk	Standardized approach (Business Indicators)	AMA (****)	AMA (****)	No capital charge	No capital charge	No capital charge
Market risk	Framework applies to all banks regardless of the size of the trading book	Framework applies to banks with significant market risk exposures (with aggregated trading assets and liabilities of at least US\$ 1 bn or 10% of total assets)				
CVA risk	Yes	Yes	Yes	No capital charge	No capital charge	No capital charge
Liquidity rules						
LCR	Full LCR requirements	Full LCR requirements	Full LCR requirements	Reduced LCR	No LCR	No LCR
NSFR	Full NSFR requirements	Full NSFR requirements if implemented (*****)	Full NSFR requirements if implemented (*****)	Reduced NSFR if implemented (*****)	No NSFR	No NSFR

(*) **Category II firms:** ≥ US\$700 bn in total assets or ≥ in cross-Jurisdictional activity. **Category III:** US\$250 bn total assets or US\$75 bn ≥ in nonbank assets, short-term funding, or off-balance sheet exposure. **Category IV:** Other firms with US\$100 to 250 bn in assets

(**) Comparing the Pillar 2 approach in the Basel framework and the CCAR process in the US is extremely difficult -if not impossible- given the conceptual differences. It is all about implementation.

(***) A prudent permanent capital floor on banks based on the standardized approach risk-based capital rules (100%) is implemented, but the U.S. standardized approach excludes capital charges for operational risk and for Credit Value Adjustment (CVA) risk

(****) The FBAs are considering introducing a standardized approach

(*****) The NSFR rule has not been finalized and timing is uncertain

More conservative than Basel standards Less conservative than Basel standards