2019

ANNUAL REPORT

FSOC

FINANCIAL STABILITY OVERSIGHT COUNCIL

Financial Stability Oversight Council

The Financial Stability Oversight Council (Council) was established by the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) and is charged with three primary purposes:

1. To identify risks to the financial stability of the United States that could arise from the material financial distress or failure, or ongoing activities, of large, interconnected bank holding companies or nonbank financial companies, or that could arise outside the financial services marketplace.

2. To promote market discipline, by eliminating expectations on the part of shareholders, creditors, and counterparties of such companies that the U.S. government will shield them from losses in the event of failure.

3. To respond to emerging threats to the stability of the U.S. financial system.

Pursuant to the Dodd-Frank Act, the Council consists of ten voting members and five nonvoting members and brings together the expertise of federal financial regulators, state regulators, and an insurance expert appointed by the President.

The voting members are:

- the Secretary of the Treasury, who serves as the Chairperson of the Council;
- the Chairman of the Board of Governors of the Federal Reserve System;
- the Comptroller of the Currency;
- the Director of the Consumer Financial Protection Bureau;
- the Chairman of the Securities and Exchange Commission;
- the Chairperson of the Federal Deposit Insurance Corporation;
- the Chairperson of the Commodity Futures Trading Commission;
- the Director of the Federal Housing Finance Agency;
- the Chairman of the National Credit Union Administration; and
- an independent member having insurance expertise who is appointed by the President and confirmed by the Senate for a six-year term.

The nonvoting members, who serve in an advisory capacity, are:

- the Director of the Office of Financial Research;
- the Director of the Federal Insurance Office;
- a state insurance commissioner designated by the state insurance commissioners;
- a state banking supervisor designated by the state banking supervisors; and
- a state securities commissioner (or officer performing like functions) designated by the state securities commissioners.

The state insurance commissioner, state banking supervisor, and state securities commissioner serve two-year terms.

Statutory Requirements for the Annual Report

Section 112(a)(2)(N) of the Dodd-Frank Act requires that the annual report address the following:

i. the activities of the Council;
ii. significant financial market and regulatory developments, including insurance and accounting regulations and standards, along with an assessment of those developments on the stability of the financial system;
iii. potential emerging threats to the financial stability of the United States;
iv. all determinations made under Section 113 or Title VIII, and the basis for such determinations;
v. all recommendations made under Section 119 and the result of such recommendations; and
vi. recommendations—
    I. to enhance the integrity, efficiency, competitiveness, and stability of United States financial markets;
    II. to promote market discipline; and
    III. to maintain investor confidence.

Approval of the Annual Report

This annual report was unanimously approved by the voting members of the Council on December 4, 2019.

Abbreviations for Council Member Agencies and Member Agency Offices

- Department of the Treasury (Treasury)
- Board of Governors of the Federal Reserve System (Federal Reserve)
- Office of the Comptroller of the Currency (OCC)
- Consumer Financial Protection Bureau (CFPB)
- Securities and Exchange Commission (SEC)
- Federal Deposit Insurance Corporation (FDIC)
- Commodity Futures Trading Commission (CFTC)
- Federal Housing Finance Agency (FHFA)
- National Credit Union Administration (NCUA)
- Office of Financial Research (OFR)
- Federal Insurance Office (FIO)

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The Honorable Nancy Pelosi
Speaker of the House
United States House of Representatives

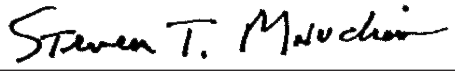
The Honorable Kevin McCarthy
Republican Leader
United States House of Representatives

The Honorable Michael R. Pence
President of the Senate
United States Senate

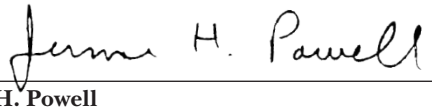
The Honorable Mitch McConnell
Majority Leader
United States Senate

The Honorable Charles E. Schumer
Democratic Leader
United States Senate

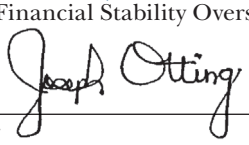
In accordance with Section 112(b)(2) of the Dodd-Frank Wall Street Reform and Consumer Protection Act, for the reasons outlined in the annual report, I believe that additional actions, as described below, should be taken to ensure financial stability and to mitigate systemic risk that would negatively affect the economy: the issues and recommendations set forth in the Council's annual report should be fully addressed; the Council should continue to build its systems and processes for monitoring and responding to emerging threats to the stability of the U.S. financial system, including those described in the Council's annual report; the Council and its member agencies should continue to implement the laws they administer, including those established by, and amended by, the Dodd-Frank Act, through efficient and effective measures; and the Council and its member agencies should exercise their respective authorities for oversight of financial firms and markets so that the private sector employs sound financial risk management practices to mitigate potential risks to the financial stability of the United States.



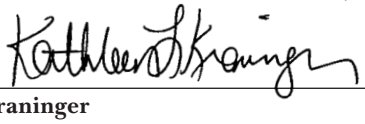
Steven T. Mnuchin
Secretary of the Treasury
Chairperson, Financial Stability Oversight Council



Jerome H. Powell
Chairman
Board of Governors of the Federal Reserve System



Joseph Otting
Comptroller of the Currency
Office of the Comptroller of the Currency

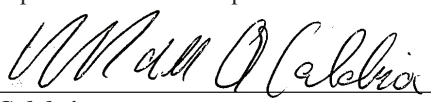


Kathleen Kraninger
Director
Consumer Financial Protection Bureau

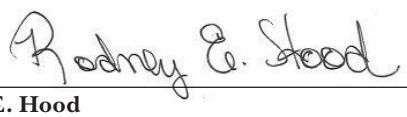
Jay Clayton
Chairman
Securities and Exchange Commission

Jelena McWilliams
Chairman
Federal Deposit Insurance Corporation

Heath P. Tarbert
Chairman
Commodity Futures Trading Commission



Mark A. Calabria
Director
Federal Housing Finance Agency



Rodney E. Hood
Chairman
National Credit Union Administration

Thomas E. Workman
Independent Member Having Insurance Expertise
Financial Stability Oversight Council

2 Executive Summary

The U.S. economy has continued to perform well since the publication of the previous report of the Council in December 2018. Economic growth remains robust, unemployment rates are at a fifty-year low, corporate and consumer delinquency and default rates are low, and financial conditions are broadly stable. Stock prices have increased over the past year. Prices for commercial and residential real estate have also increased albeit at a somewhat slower rate than in previous years. However, some uncertainty regarding future economic performance has emerged. This uncertainty prompted the Federal Reserve to shift to a more accommodative monetary policy stance over the past year.

Overall, risks to U.S. financial stability remain moderate. Much of the uncertainty in the economic outlook stems from events overseas. A slowdown in economic growth in the euro area and China may affect economic conditions in the United States though the effects on financial stability, if any, are likely to be modest. The potential for a disorderly withdrawal of the United Kingdom from the European Union (EU) remains. Such an event could impact global markets and have a further negative impact on European economic growth. Domestically, the growth in corporate borrowing remains a key area of focus for the Council. While firms are able to service their obligations in the current economic environment, high levels of debt and leverage in the corporate sector could exacerbate the effects of a sharp reversal in economic conditions.

Maintaining a resilient financial system is important. The economic well-being of Americans depends on the ability of the financial system to provide capital to businesses and individuals, to provide vehicles for savings, and to intermediate financial transactions even in the face of adverse events. Post-crisis regulatory reforms have strengthened the ability of the financial system to withstand a shock or an economic downturn. However, the financial services industry and financial regulators must continue to adapt to changing circumstances. One change in the near future is the anticipated cessation or degradation of LIBOR as a reference rate for financial contracts. Widespread failure of market participants to adequately adapt could result in a reduction in liquidity in markets for several types of financial contracts and could potentially adversely impact financial stability. The Council is closely monitoring developments in this area and remains vigilant regarding other potential emerging threats to financial stability.

The Council and member agencies use a wide range of tools to identify and address risks in the financial system. These include supervisory and company-run stress tests; supervisory review and feedback on the resolution plans of large banking organizations; on-site examinations and off-site monitoring; and economic analysis. The Council and member agencies are continuously working to improve the financial regulatory and supervisory framework.

Over the past year, Council member agencies have taken steps to enhance the efficiency of financial regulation by tailoring regulation to the risks posed by firms and activities. These actions reduce the costs of the provision of financial services as well as better utilize the resources of regulatory agencies. During the past year, the Federal Reserve adopted a new regulatory framework for large bank holding companies (BHCs), consistent with the Economic Growth, Regulatory Relief, and Consumer Protection Act (EGRRCPA), that would tailor capital, liquidity, and stress testing requirements to the risks that an institution poses to the financial system, and the Federal Reserve and the FDIC modified their resolution plan requirements for large firms. The banking agencies also adopted several changes to regulations to better align requirements for community banks with the risks of those institutions. The SEC adopted a rule that will permit exchange-traded funds that satisfy certain conditions to operate within the scope of the Investment Company Act of 1940 and come directly

to market without the cost and delay of obtaining an exemptive order.

Council member agencies continue to pursue initiatives aimed at increasing the amount and quality of information available to financial regulators to identify and analyze emerging risks in the financial system. In 2019, the OFR finalized rules and commenced the collection of data on centrally cleared repurchase agreement (repo) transactions. The CFTC took steps to improve the accuracy of data collected by swap data repositories. In addition, the SEC began to receive enhanced reporting on investment fund liquidity levels and portfolio holdings under the SEC's new reporting requirements.

Member agencies have also taken actions to reduce systemic risk in the financial system. In 2019, the banking agencies issued a proposal whereby unsecured debt instruments issued by another global systemically important banking organization would be subject to a deduction from the holder's regulatory capital. This capital treatment would provide a significant incentive for large banking organizations to reduce their crossholdings of debt and thereby reduce interconnectedness within the financial system and systemic risk. Also in 2019, several member agencies adopted and invited comment on an interim final rule intended to address concerns regarding the status of certain swaps in the event of a disorderly Brexit. Member agencies have also been actively engaged in facilitating the transition away from LIBOR; the Alternative Reference Rates Committee (ARRC) has been active in the introduction of the Secured Overnight Financing Rate (SOFR) as an alternative reference rate.

Separately, the Council notes the potential for an increasing federal government debt burden to negatively impact long-term financial stability. U.S. federal government debt held by the public was estimated to be 79 percent of GDP in 2019. The Congressional Budget Office (CBO) projects that the debt burden could increase in an accelerating manner in the coming decades. High levels of indebtedness could limit the latitude of the federal government in responding to a future financial crisis. Achieving long-term sustainability of the national budget is important to maintaining global market confidence in U.S. Treasury securities and the financial stability of the United States.

The Council remains focused on promoting market discipline to reduce the risk of future financial crises. While financial institutions may be more resilient to market disruptions due in part to increased capital and liquidity requirements since the financial crisis, market discipline reduces the likelihood of future market disruptions resulting from unwarranted risk-taking. The Council will continue to work with regulators to analyze ways to promote market discipline and reduce any lingering perceptions that some institutions are too big to fail.

Cybersecurity

The increasing reliance of financial firms on information technology increases the risk that a cybersecurity event could have severe negative consequences for the U.S. economy, potentially impacting financial stability. The Council recommends that member agencies continue to conduct cybersecurity examinations of financial institutions and financial infrastructures to ensure, among other things, robust and comprehensive cybersecurity monitoring. At the same time, the unique and complex threats posed by cyber risks require the public and private sectors to cooperate to identify, understand, and protect against these risks. The Council supports the use and development of public and private partnerships, including efforts to increase coordination of cybersecurity examinations across regulatory authorities.

Large, Complex, Interconnected Financial Institutions

Large financial institutions have become more resilient since the crisis. Bank capital levels have increased. Large BHCs engaged in the resolution planning process have made important changes to their structure and operations in order to improve resolvability. The banking and financial regulatory agencies have adopted rules intended to further increase the robustness of large BHCs and enhance financial stability. The Council recommends that agencies ensure that the largest financial institutions maintain sufficient capital and liquidity to ensure

their resiliency against economic and financial shocks. The Council also recommends that agencies continue to review recovery and resolution plans and monitor and assess the impact of rules on financial institutions and markets.

Central Counterparties

Central counterparties (CCPs) play a critical role in the financial system. Effective regulation and risk management of CCPs is essential for financial stability. Consistent with the requirements adopted by financial regulators, CCPs, including CCPs that have been designated by the Council as systemically important financial market utilities (FMUs), have made progress in improving risk management practices and providing greater transparency in their functioning. The Council recommends that relevant agencies continue to coordinate their supervision of CCPs. Member agencies should continue to evaluate whether existing rules and standards for CCPs and their clearing members are sufficiently robust to mitigate potential threats to financial stability. Agencies should also continue working with international standard-setting bodies to identify and address areas of common concern as additional derivatives clearing requirements are implemented in other jurisdictions. Supervisory agencies should continue to conduct evaluations of the performance of CCPs in stress scenarios. Agencies should continue to monitor and assess interconnections among CCPs, their clearing members, and other financial institutions. Agencies should also promote further recovery planning and development of resolution plans for systemically important FMUs.

Short-Term Wholesale Funding Markets

Since the financial crisis, considerable progress has been made in the reduction of counterparty risk exposures in repo markets; nonetheless, the potential for post-default fire sales of collateral in these markets remains a vulnerability. The Council recommends that financial regulators continue to closely monitor the repo markets, including an assessment of the increased concentration risk in the tri-party repo market. Understanding of the bilateral repo market can be improved considerably and will be aided by the OFR's data collection on centrally cleared repo transactions. Overnight repo markets experienced unexpectedly high volatility in mid-September 2019. Given the importance of these markets, the Council recommends that relevant authorities undertake a focused review of the September 2019 events in wholesale funding markets and assess the broader implications for financial stability. Separately, the Council recommends that financial regulators monitor developments concerning short-term cash management vehicles that use stable net asset values (NAVs) for any financial stability risk implications.

Investment Funds

The SEC has issued new rules, a new reporting form, and rule amendments designed to promote effective liquidity risk management across the open-end fund industry, including a limit on registered open-end investment funds' investments in illiquid assets. The Council recommends that the SEC monitor the implementation and evaluate the effectiveness of rules intended to reduce liquidity and redemption risks in investment funds. The Council also recommends that relevant agencies continue to review the available data on private funds to assess whether and how private funds may pose a risk to financial stability.

Financial Market Structure

The evolution of financial markets has been driven by technological advances and regulatory developments. While new technologies have reduced transaction costs and made financial data more widely available, the increased use of technology and the entry of new types of market participants have created new types of risks. The increased use of automated trading systems and the ability to quote and execute transactions at higher speeds increase the potential for severe market disruptions from operational events at market makers or other participants. In some markets, economies of scale associated with new technologies have led to higher concentration and greater dependency for liquidity on a small number of participants. The emergence of new trading venues has fragmented trading and required the implementation of technological solutions to connect markets. The Council recommends that regulators continue to evaluate structural changes in financial markets and consider their impact on the efficiency and stability of the

financial system. Regulators should also assess the complex linkages among markets, examine factors that could cause stress to propagate across markets, and consider potential ways to mitigate these risks.

Data Gaps and Challenges

The financial crisis revealed gaps in the data needed for effective oversight of the financial system and of internal firm risk management and reporting capabilities. Since the financial crisis, important steps have been taken, including developing and implementing new identifiers for financial data. Significant gaps remain, however, as some market participants continue to use legacy processes that rely on data that are not aligned to definitions from relevant consensus-based standards. Gaps and legacy processes inhibit data sharing. The Council recommends that regulators and market participants continue to work together to improve the coverage, quality, and accessibility of financial data, as well as improve data sharing among relevant agencies.

Alternative Reference Rates

The cessation or degradation of LIBOR has the potential to significantly disrupt trading in many important types of financial contracts. The Council commends the progress of the ARRC in identifying SOFR as an alternative reference rate and its subsequent work to facilitate a transition from LIBOR. The Council recommends that the ARRC continue its work to facilitate an orderly transition from LIBOR. The Council also recommends that market participants formulate and execute transition plans so that they are prepared for the anticipated discontinuation or degradation of LIBOR. New issuance of instruments that continue to reference LIBOR should include appropriate contract fallback language to mitigate risk that the contract's interest rate benchmark becomes unavailable. Council member agencies should work closely with market participants to identify and mitigate risks from potential dislocations during the transition process. Council member agencies should also use their supervisory authority to understand the status of regulated entities' transition from LIBOR.

Managing Vulnerabilities amid Prolonged Credit Expansion

Increased borrowing by nonfinancial businesses and continued appreciation in asset prices reflect, in part, the strong performance of the U.S. economy and expectations for continued economic growth. However, several metrics indicate that nonfinancial corporate debt and leverage are elevated relative to historical norms. Likewise, there are indications that valuations of many important asset types, including equities, corporate debt, and some types of commercial and residential real estate, are above historical levels. High levels of nonfinancial business leverage could intensify the impact of a sharp reversal in business conditions and have spillover effects to other sectors of the economy. Similarly, large declines in the value of one type of financial asset could impact other markets or cause a decline in real investment and economic activity. The Council recommends that agencies continue to monitor levels of nonfinancial business leverage, trends in asset valuations, and potential implications for the entities they regulate in order to assess and reinforce the ability of financial institutions to manage severe, simultaneous losses.

Nonbank Mortgage Origination and Servicing

The share of residential mortgages originated and serviced by nonbanks has increased significantly over the past decade. Nonbanks have a particularly important role as providers of mortgage credit and servicing to low-income and riskier borrowers. However, most nonbank mortgage companies have fewer resources to absorb adverse shocks and are more dependent on short-term funding than banks. The Council recommends that federal and state regulators continue to coordinate closely to collect data, identify risks, and strengthen oversight of nonbank companies involved in the origination and servicing of residential mortgages.

Financial Innovation

New financial products and practices can offer substantial benefits to consumers and businesses by meeting unfilled or emerging needs or by reducing costs. New products and practices may also create new risks and vulnerabilities. The Council encourages agencies to continue to monitor and analyze the effects of new financial

products and services on consumers, regulated entities, and financial markets, and evaluate their potential effects on financial stability. In particular, the Council recommends that federal and state regulators continue to examine risks to the financial system posed by new and emerging uses of digital assets and distributed ledger technologies.

Housing Finance Reform

Fannie Mae and Freddie Mac (the Enterprises) are now into their twelfth year of conservatorship. Although some progress has been made to reform the housing finance system and to end the Enterprises' conservatorships, the Enterprises' capital levels remain low, and signs of increased credit risk have begun to emerge. The Council reaffirms its view that housing finance reform is urgently needed to address the present conservatorships of the Enterprises, codify existing reforms, and implement a more durable and vibrant housing finance system.

3 Annual Report Recommendations

3.1 Cybersecurity

The increasing reliance of the financial sector on information technology across a broadening array of interconnected platforms increases the risk that a cybersecurity event will have severe consequences for financial institutions. Financial institutions are making significant investments in cybersecurity, but the risk remains that a cyber event could materially impact a single institution or the broader financial system. Sustained senior-level commitment to mitigate cybersecurity risks and their potential systemic implications is necessary at both member agencies and private firms.

Improving the cybersecurity and operational resilience of the financial sector requires continuous assessment of cyber vulnerabilities and critical connections across firms. Financial institutions often rely on each other to provide critical operations. The interdependency of the networks and technologies supporting these critical operations magnifies cyber vulnerabilities, threatening the operational risk capabilities not just at individual institutions, but also of the financial sector as a whole. Critical vendors often provide key services to many institutions and an event at such a vendor could simultaneously undermine the business continuity and disaster recovery capabilities of several financial institutions. Maintaining confidence in the security practices of critical vendors is therefore increasingly important to preserving stability and preventing contagion.

The Council recommends that member agencies continue to conduct cybersecurity examinations of financial institutions and infrastructures to, among other things, ensure robust and comprehensive cybersecurity monitoring. However, the authority to supervise third-party service providers varies across financial regulators. To further enhance third-party service provider information security, the Council recommends that Congress pass legislation that ensures that FHFA, NCUA, and other relevant agencies have adequate examination and enforcement powers to oversee third-party service providers. The Council also recommends that federal banking regulators continue to work together to coordinate third-party service provider oversight and work with the Conference of State Bank Supervisors to identify additional ways to support information sharing among state and federal regulators.

The Council encourages continued cooperation across government agencies and private firms to enhance firms' ability to mitigate the risk of a cybersecurity incident and maintain the financial sector's strong cybersecurity posture. The Council supports the ongoing work of partnerships between government agencies and private firms, including the Financial and Banking Information Infrastructure Committee (FBIIC), the Financial Services Sector Coordinating Council (FSSCC), and the Financial Services Information Sharing and Analysis Center (FS-ISAC). These partnerships focus on improving the financial sector's ability to rapidly respond to and recover from significant cybersecurity incidents, thereby reducing the potential for such incidents to threaten the stability of the financial system and the broader economy.

The Council recommends that the FBIIC continue to promote processes to strengthen response and recovery efforts, including efforts to address the systemic implications of significant cybersecurity incidents. The FBIIC should continue to work closely with the Department of Homeland Security (DHS), law enforcement, and industry partners to carry out regular cybersecurity exercises recognizing interdependencies with other sectors, such as telecommunications and energy.

The Council further recommends that agencies work to improve information sharing among private firms and government partners. Sharing timely and actionable cybersecurity information can reduce the risk that cybersecurity incidents

occur and can mitigate the impacts of those that do occur. Treasury and relevant agencies should carefully consider how to appropriately share information and, where possible, continue efforts to declassify (or downgrade classification) to the extent practicable, consistent with national security imperatives. The Council encourages efforts to enhance information sharing with the FS-ISAC and its growing community of financial sector institutions.

Financial institutions are rapidly adopting new technologies, including cloud computing and artificial intelligence. The Council supports the efforts of the FBIIC Technology Working Group, which examines the extent to which financial services firms using emerging technologies introduce new cyber vulnerabilities into the financial services critical infrastructure. The Council recommends agencies consider how such emerging technologies will be addressed in supervision and regulation.

3.2 Ongoing Structural Vulnerabilities

3.2.1 Large, Complex, Interconnected Financial Institutions

Large and complex U.S. financial institutions have become more resilient since the crisis. They have done so, in part, by raising more capital; holding higher levels of liquid assets to meet peak demands for funding withdrawals; improving loan portfolio quality for residential real estate; implementing better risk management practices; and developing plans for recovery and orderly resolution. Financial regulatory agencies have developed and implemented rules intended to further increase the robustness of these institutions and enhance financial stability **(see Section 5.1)**. The Council recommends that financial regulators ensure that the largest financial institutions maintain sufficient capital and liquidity to ensure their resiliency against economic and financial shocks **(see Section 6.2.1)**. The Council further recommends that the appropriate regulatory agencies continue to review resolution plans submitted by large financial institutions; provide feedback and guidance to such institutions; and ensure there is an effective mechanism for resolving large, complex institutions.

The Council also recommends that regulators continue to monitor and assess the impact of rules on financial institutions and financial markets—including, for example, on market liquidity and capital—and ensure that BHCs are appropriately monitored based on their size, risk, concentration of activities, and offerings of new products and activities.

3.2.2 Central Counterparties

Central counterparties can improve financial stability by reducing counterparty risk and increasing transparency. CCPs must be robust and resilient to deliver these benefits. CCPs have made progress in strengthening their risk management practices and providing greater transparency regarding their operations. This includes CCPs that have been designated by the Council as systemically important FMUs. Due to the critical role CCPs play in financial markets and their interconnectedness, effective regulation and risk management of CCPs is essential to financial stability **(see Section 6.2.2)**.

The Council recommends that the CFTC, Federal Reserve, and SEC continue to coordinate in the supervision of all CCPs designated by the Council as systemically important FMUs. Relevant agencies should continue to evaluate whether existing rules and standards for CCPs and their clearing members are sufficiently robust to mitigate potential threats to financial stability. Member agencies have recently done work on CCP default management auctions and should continue working with global counterparts and international standard-setting bodies to identify and address areas of common concern. The Council encourages engagement by Treasury, CFTC, and SEC with foreign counterparts to address the potential for inconsistent regulatory requirements or supervision to pose risks to U.S. financial stability and encourages cooperation in the oversight and regulation of FMUs across jurisdictions **(see Sections 5.2.1 and 6.2.2)**.

The Council also encourages agencies to continue to monitor and assess interconnections among CCPs, their clearing members, and other financial institutions. Agencies should consider the potential effects of distress of one or more of these entities on other stakeholders in the clearing system and on

financial stability, with an eye toward identifying measures that would enhance the resiliency of the financial system.

Finally, the Council encourages regulators to continue to focus on recovery and resolution planning for systemically important FMUs.

3.2.3 Short-Term Wholesale Funding Markets

Repurchase Agreement Markets

Repo markets play an important role in facilitating the flow of cash and securities in the U.S. financial system. In recent years, tri-party repo infrastructure reform contributed to the reduction and clarification of counterparty risk exposures that arise in repo transactions. These reforms were aimed at reducing reliance on discretionary extensions of intraday credit and fostering improvements in the liquidity and credit risk management practices of market participants. Because the possibility of fire sales of collateral by creditors of defaulted repo counterparties remains a vulnerability, the Council recommends that financial regulators continue to closely monitor the repo markets and assess the degree to which recent reforms have mitigated risk in these markets. The Council also recommends assessing the potential risks from increased concentration in the tri-party repo market, where a single private financial institution is now effectively responsible for all settlements **(see Section 6.2.3)**.

Key to mitigating vulnerabilities in the repo market is bolstering the understanding of policymakers and market participants of how these markets function, how participants interact, and how risks are changing. Although visibility into the tri-party repo market has improved since the financial crisis, understanding of the bilateral market can be improved considerably. Following the Council's recommendation in its 2016 annual report, the OFR proposed rules in 2018 for the collection of data on centrally cleared repo transactions **(see Section 5.4.1)**. These rules were finalized in February 2019. Data collection began in October 2019. The data collection will allow monitoring of potential risks to financial stability in an important segment of the repo market and will also support the calculation of one of the alternative reference rates that could replace U.S. dollar LIBOR.

Overnight repo markets experienced unexpectedly high volatility in mid-September 2019 **(see Section 4.9.2)**. Given the importance of these markets, the Council recommends that relevant authorities undertake a focused review of the September 2019 events in wholesale funding markets and assess the broader implications for financial stability.

Money Market Mutual Funds and Other Cash Management Vehicles

In July 2010, the SEC implemented money market fund (MMF) reforms designed to make MMFs more resilient by reducing interest rate, credit, and liquidity risk in their portfolios. SEC reforms adopted in July 2014 were also designed to make MMFs less susceptible to heavy redemptions in times of stress (or more able to manage and mitigate potential contagion from redemptions). The 2014 reforms required the use of floating NAVs by institutional prime and tax-exempt MMFs to price their shares, while retaining stable NAVs for retail funds and funds consisting primarily of U.S. government issued holdings.

Other types of cash management vehicles, such as bank-sponsored short-term investment funds, local government investment pools, and private liquidity funds, continue to use stable NAVs. These cash management vehicles are not regulated by the SEC and are not subject to the SEC reforms, but are subject to similar interest rate, liquidity, and credit risks. As such, these types of cash management vehicles can also be susceptible to destabilizing redemptions during times of market stress. The adoption of new strategies by sponsors of cash management vehicles in response to regulatory or market developments could also introduce new risks and vulnerabilities. The Council recommends that financial regulators monitor developments concerning short-term cash management vehicles that use stable NAVs for any financial stability risk implications.

3.2.4 Investment Funds

The Council supports initiatives by the SEC and other agencies to address risks in investment funds.

Recent areas of Council focus include liquidity and redemption risks at investment funds and risks that arise from the use of leverage by certain fund types.

In 2016, the SEC adopted rules that require funds to maintain a minimum level of highly liquid investments, place limits on illiquid investments, and require disclosures by mutual funds and exchange-traded funds (ETFs) of their liquidity risk management practices **(see Section 6.2.4)**. The Council recommends that the SEC monitor the implementation and evaluate the effectiveness of rules intended to reduce liquidity and redemption risk in investment funds.

The Council also supports data collection and analytical work by member agencies aimed at the identification of potential emerging risks. The SEC initiated several data collection efforts and has established additional reporting requirements for investment funds during the past three years. As a result, there is now significantly more data available to regulators to monitor and analyze developments concerning fund liquidity, leverage, and risk-taking.

With respect to private funds, the Council recommends that relevant agencies continue to review the available data to assess whether and how private funds may pose a risk to financial stability.

3.2.5 Financial Market Structure

Financial market structures, driven by rapid technological change and regulatory developments, have continued to evolve. Certain new and emerging characteristics of financial markets—including, among other things, the increasingly significant role of non-traditional market participants, concentration of liquidity providers, fragmentation of execution venues, importance and availability of data, and interdependencies among various segments of the financial markets—pose both benefits and threats. Financial regulators are evaluating how changes in market structure are impacting market performance and liquidity and, more broadly, the stability of the financial system. Market participants should also regularly assess how these developments affect the risk profile of their institutions. The Council recommends that financial regulators continue to monitor and evaluate ongoing changes that might have adverse effects on markets, including on market integrity and liquidity. As markets are global in nature, there should be active collaboration among regulators across jurisdictions to ensure coordination of efforts.

The Council encourages member agencies to continue to evaluate the use of coordinated tools such as trading halts across interdependent markets in periods of overall market stress, operational failure, or other incidents that might pose threats to financial stability, while being mindful of the potential costs and other tradeoffs associated with such tools. Additionally, Council member agencies should work collaboratively to monitor and analyze developments concerning market liquidity.

3.2.6 Data Gaps and Challenges

High-quality financial data is an essential input into the financial regulatory process. The Council and member agencies rely on data collected from market participants to monitor developments in the financial system, identify potential risks to financial stability, and prioritize and execute supervisory and examination work. The Council encourages member agencies to collaborate and expand their data resources and analytical capabilities to assess interconnectedness and concentration risks in their respective areas of responsibility.

The establishment of uniform standards for reporting and collection enhances the usefulness of market data and reduces the reporting burdens on market participants. The absence of broadly shared standards on financial transaction and entity data can lead to unnecessary costs and inefficiencies, such as duplicate reporting, and may impede the ability to aggregate data for risk-management and reporting purposes. The Council recommends that regulators and market participants continue to partner to improve the scope, quality, and accessibility of financial data, as well as data sharing among relevant agencies. These partnership efforts include developing and implementing new identifiers such as the Unique Transaction Identifier (UTI), Unique Product Identifier (UPI), and Critical Data Elements (CDEs); developing and linking data inventories; and implementing industry

standards, protocols, and security for secure data sharing.

Broader adoption of the Legal Entity Identifier (LEI) by financial market participants continues to be a Council priority. The LEI enables unique and transparent identification of legal entities participating in financial transactions. Universal Loan Identifiers (ULIs) will make it possible to track loan records through a loan's life cycle. The Council recommends that member agencies update their regulatory mortgage data collections to include LEI and ULI fields. The Council also recommends that member agencies support adoption and use of standards in mortgage data, including consistent terms, definitions, and data quality controls, which will make transfers of loans or servicing rights less disruptive to borrowers and investors.

Important initiatives are underway at member agencies that will improve the functioning of financial markets. Among these is the collection of repo transaction data, which is used to create SOFR benchmark rates for use by market participants. The Council recommends that member agencies continue to work to harmonize domestic and global derivatives data for aggregation and reporting, and ensure that appropriate authorities have access to trade repository data needed to fulfill their mandates **(see Section 5.4.2)**.

The Council supports efforts by pension regulators and accounting standards boards to improve the quality, timeliness, and depth of disclosures of pension financial statements.

3.3 Alternative Reference Rates

As further discussed in **Section 6.3**, the cessation of LIBOR without adequate preparation could cause significant disruptions across financial markets and to borrowers given the widespread use of LIBOR in a variety of financial instruments.

The UK Financial Conduct Authority (FCA) has stated publicly that it has voluntary agreements with LIBOR panel banks to continue submissions through year-end 2021 and that the FCA expects some banks to stop submissions around that time. If a bank leaves the LIBOR submission panel, the FCA must assess whether LIBOR continues to be representative of the underlying market. The FCA could deem LIBOR "unrepresentative," at which time EU-regulated financial institutions would no longer be able to rely on the rate for new transactions. Additionally, if enough banks leave the LIBOR panel, LIBOR may cease to be published. Even if LIBOR continues for some period with diminished submissions, its performance may become increasingly unpredictable and unstable.

The Council recommends that market participants formulate and execute transition plans so that they are fully prepared for the anticipated discontinuation or degradation of LIBOR. Because of the uncertainty around the exact timing of the cessation of LIBOR, including the potential of LIBOR to be deemed non-representative by the FCA under EU regulations, market participants should formulate and execute plans to transition prior to year-end 2021 taking into account their business requirements and other considerations. Market participants must understand the exposure of their firm to LIBOR in every business and function, assess the impact of LIBOR's cessation or degradation on existing contracts, and remediate risks from existing contracts that do not have robust fallback provisions to transition the contract to an alternate rate. Market participants should evaluate whether any new agreements contain sufficiently robust fallback provisions, such as those endorsed by the ARRC, to mitigate risk that the contract's interest rate benchmark becomes unavailable.

The Council commends the efforts of the ARRC and recommends that the ARRC continue its work to facilitate an orderly transition to alternative reference rates. Council member agencies should determine whether further guidance or regulatory relief is required to encourage market participants to address legacy LIBOR portfolios. Council member agencies should also use their supervisory authority to understand the status of regulated entities' transition from LIBOR, including their legacy LIBOR exposure and plans to address that exposure.

3.4 Managing Vulnerabilities amid Prolonged Credit Expansion

Nonfinancial business borrowing has increased significantly since the crisis and leverage is elevated relative to historical norms **(see Section 4.3 and Box A)**. Prices for residential and some types of commercial real estate have increased significantly since the crisis **(see Section 4.5)**. By several measures, valuations of corporate equities are also near the high end of their historical range **(see Section 4.7)**.

Currently, default rates among corporate borrowers are relatively low, companies are reporting strong levels of interest coverage and liquidity, and equity volatility has generally remained subdued. However, these conditions could change as a result of macroeconomic or sectoral shocks to the economy. A decline in one market may be transmitted to other markets and may have spillover effects on real investment and economic activity. The impact of a correction on financial stability depends on the severity of market losses, speed of contagion, whether participants are sufficiently capitalized and liquid, and participants' risk management practices. It is important that financial regulators, financial intermediaries, and investors assess and reinforce their ability to manage risks in stress conditions. Such an analysis should consider the ability to absorb risk and the incentives of the major types of investors and intermediaries active in a market **(see Box A)**.

The Council recommends that agencies continue to monitor levels of nonfinancial business leverage, trends in asset valuations, and potential implications for the entities they regulate, in order to assess and reinforce the ability of the financial sector to manage severe, simultaneous losses. Regulators and market participants should continue to monitor and analyze the exposures, loss-absorbing capacity, and incentives of different types of holders. This includes the direct and indirect exposures of holders of U.S. nonfinancial corporate credit, the effects of potential liquidity risks in certain mutual funds, the effects of easing loan covenant and documentation requirements, and the potential effects of mark-to-market losses and credit rating downgrades, among other considerations. Regulators and market participants should also continue to assess ways in which leveraged nonfinancial corporate borrowers and elevated asset prices may amplify stresses in the broader market in the event of a rapid repricing of risk or a slowdown in economic activity.

3.5 Nonbank Mortgage Origination and Servicing

Nonbanks have increased their share of residential mortgage originations and servicing over the last decade. Nonbank mortgage companies play an important part in the extension of credit to certain key market segments, such as borrowers requiring Federal Housing Administration (FHA) insurance; in providing additional liquidity in the market for servicing rights; and in providing greater competition in the market for mortgage servicing. Though their business models vary, many of the largest nonbank mortgage companies are subject to similar fragilities and could transmit risk to the financial system should they experience financial stress **(see Box B)**.

The Council recommends that federal and state regulators continue to coordinate closely to collect data, identify risks, and strengthen oversight of nonbank companies involved in the origination and servicing of residential mortgages. Regulators and market participants have taken steps to address the potential risks stemming from nonbanks, including additional sharing of data and strengthening prudential requirements. The Council encourages regulators to take additional steps to address the potential risks of nonbank mortgage companies.

3.6 Financial Innovation

Financial innovation can benefit firms, households, and financial institutions by reducing the cost of financial services, increasing the convenience of payments, and potentially increasing the availability of credit. Financial innovation has been especially important in the post-crisis period, particularly in the realm of technology-enabled products and services **(see Sections 4.14 and 6.6)**.

Financial innovation can also create new risks. The Council encourages financial regulators to continue to be vigilant in identifying new products and services; in evaluating how innovation is used and can be misused; and in monitoring how innovation affects investors and consumers, regulated entities, and financial markets. The Council encourages relevant authorities to evaluate the potential effects of new financial products and services on financial stability, including operational risk. Because financial innovations are new, they may not be identified by agencies' existing monitoring and data collection systems. To ensure comprehensive visibility into innovation across the financial system, regulators should share relevant information on financial innovation with the Council and appropriate agencies. The Council also encourages regulators to consider appropriate approaches to regulation to reduce regulatory fragmentation while supporting the benefits of innovation.

The Council recommends that federal and state regulators continue to examine risks to the financial system posed by new and emerging uses of digital assets and distributed ledger technologies. The market capitalization of digital assets has grown rapidly in recent years, but so far, digital assets have not been widely adopted as a means of payment or store of value. Most recently, so-called stablecoins—digital assets designed to maintain a stable value relative to another asset (typically a unit of currency or commodity) or a basket of assets—have experienced growth in market capitalization and received increased public attention **(see Section 4.14.1)**. If a stablecoin became widely adopted as a means of payment or store of value, disruptions to the stablecoin system could affect the wider economy. Financial regulators should review existing and planned digital asset arrangements and their risks, as appropriate. These include risks to financial stability, including via both direct and indirect connections with banking services, financial markets, and financial intermediaries; risks to consumers, investors, and businesses associated with potential losses or instability in market prices; illicit financing risks; risks to national security; cybersecurity and privacy risks; and risks to international monetary and payment system integrity.

The Council encourages coordination among U.S. financial regulators to address potential issues that arise from financial innovation and will continue to use the Council's digital assets and distributed ledger technology working group to promote consistent regulatory approaches and to identify and address potential risks.

3.7 Housing Finance

The domestic housing market has improved over the past several years as sales of new and existing homes have increased, prices have risen, the share of mortgages with negative home equity has declined, and mortgage loan performance has improved. The federal government continues to back the majority of new mortgages, either directly through the FHA, U.S. Department of Veterans Affairs (VA), and U.S. Department of Agriculture (USDA), or indirectly through the Enterprises.

The Enterprises are now into their twelfth year of conservatorship. Although some progress has been made to reform the housing finance system and to end the Enterprises' conservatorships, the capital levels of the Enterprises remain low and signs of increased credit risk have begun to emerge. The Council reaffirms its view that housing finance reform is urgently needed to address the conservatorships, codify existing reforms, and implement a durable and vibrant housing finance system.

In September 2019, Treasury and the FHFA agreed to modifications to the Preferred Stock Purchase Agreements (PSPAs) that will permit Fannie Mae and Freddie Mac to retain additional earnings in excess of the $3 billion capital reserves previously permitted by their PSPAs. Under these modifications, Fannie Mae and Freddie Mac will be permitted to maintain capital reserves of $25 billion and $20 billion, respectively. Treasury and Fannie Mae and Freddie Mac also agreed to negotiate an additional amendment to the PSPAs adopting covenants that are intended to further enhance taxpayer protections.

In 2018, the FHFA issued a proposed rule on capital requirements for the Enterprises. Under

the proposal, the Enterprises would be subject to new risk-based capital requirements and a revised minimum leverage capital requirement. Any final rule would be suspended while the Enterprises remain in conservatorship. The Council recommends that the FHFA continue to develop capital and other prudential requirements for the Enterprises, which may help inform their application to future secondary market housing finance entities upon completion of housing finance reform.

Since 2013, the Enterprises have engaged in a credit risk transfer program to transfer mortgage credit risk to private market participants. The Enterprises have transferred a portion of the credit risk on over $3.1 trillion in unpaid principal balance. The Council recommends that regulators and market participants continue to take steps to encourage private capital to play a larger role in the housing finance system.

3.8 Regulatory Efficiency and Effectiveness

Actions taken by Council member agencies since the crisis have made individual financial institutions more resilient and improved the stability of the U.S. financial system. However, new regulations have also raised concerns about increased compliance costs and regulatory burdens for financial institutions, especially for smaller institutions.

Over the last year, Council member agencies have made financial services regulation more efficient and effective. Actions taken by Council member agencies to enhance regulatory efficiency include: the adoption of a final rule by the Federal Reserve that tailors capital, liquidity and stress testing requirements to the risk that large BHCs pose to the financial system **(see Sections 4.11.1 and 5.1.1)**; adoption of rules by the Federal Reserve, FDIC and OCC to simplify capital requirements and extend examination cycles for certain community banking organizations **(see Section 5.1.1)**; adoption of rules by the OCC, FDIC, Federal Reserve, SEC and CFTC that simplify requirements under the Volcker Rule **(see Section 5.1.4)**; adoption by the SEC of a new rule to modernize the regulation of ETFs **(see Section 5.2.2)**; and issuance by the FHFA of a final rule intended to improve the liquidity of agency mortgage-backed securities **(see Section 5.3.1)**.

The Council recommends that federal and state financial regulators continue to work together to evaluate regulatory overlap and duplication, modernize outdated regulations, and, where authority exists, tailor regulations based on the size and complexity of financial institutions.

4 Financial Developments

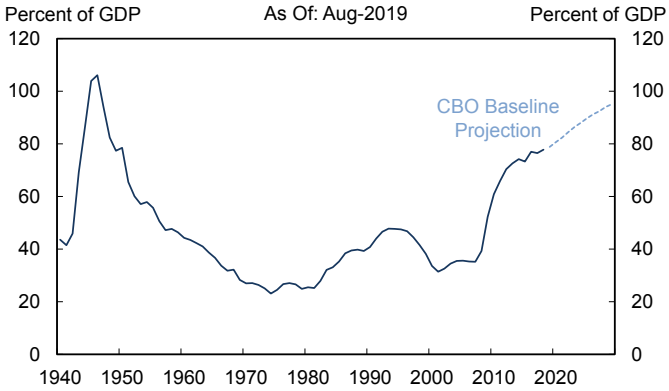
4.1 U.S. Treasury Markets

Publicly held U.S. sovereign debt outstanding grew to $16.8 trillion as of September 2019, up from $15.8 trillion in September 2018. The ratio of federal debt held by the public to U.S. GDP is estimated to be 79 percent in 2019, up from 78 percent in 2018. The CBO projects the ratio of debt held by the public to GDP will increase to 95 percent by 2029 **(Chart 4.1.1)**. The average maturity of outstanding marketable debt was 70 months in September 2019, unchanged from the past year. During the same period, foreign holdings of U.S. sovereign debt increased by 6.0 percent to $6.6 trillion. China and Japan continue to be the largest foreign holders of U.S. sovereign debt each with approximately $1.1 trillion in holdings.

Long- and short-term Treasury yields declined over the past year. The declines more than reversed the increases in the first three quarters of 2018 **(Chart 4.1.2)**. Over the past year, the yield on the 2-year Treasury has decreased by 118 basis points and the yield on the 10-year Treasury decreased by 137 basis points for the twelve months ended September 30, 2019. The already-low spread between the 10- and 2-year Treasury became negative in brief periods in August, the first time the yield spread has turned negative since 2007. The spread between the 3-month and 10-year Treasury yields briefly inverted in March 2019, inverted again in July, and remained inverted as of September 30, 2019. The yield on the 30-year Treasury fell to an all-time low of 1.94 percent in late August but has since increased to around 2.1 percent by September.

Market participants attributed the decline in rates to expectations of lower rates of economic growth and inflation and the shift to a more accommodative monetary policy by central banks both domestically and abroad. The

4.1.1 Federal Debt Held by the Public



Source: CBO, Haver Analytics

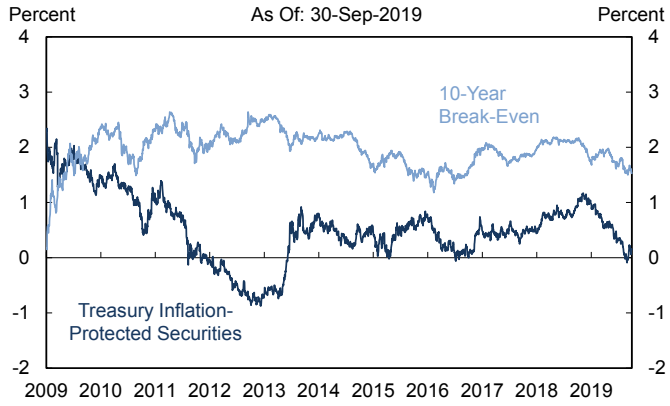
Note: Data for fiscal years. Years after 2018 are projected.

4.1.2 U.S. Treasury Yields and Yield Curve

Source: U.S. Department of the Treasury

Note: Spread equals the difference between the yield on the 10-year U.S. Treasury and 2-year U.S. Treasury.

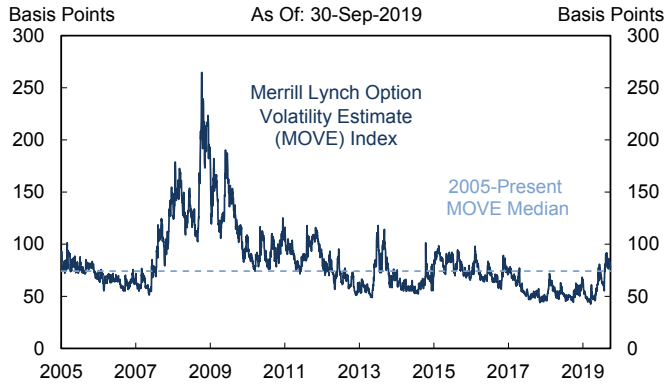
4.1.3 10-Year Treasury Yields



Source: U.S. Department of the Treasury

Note: Break-even represents the difference between the nominal and TIPS yield.

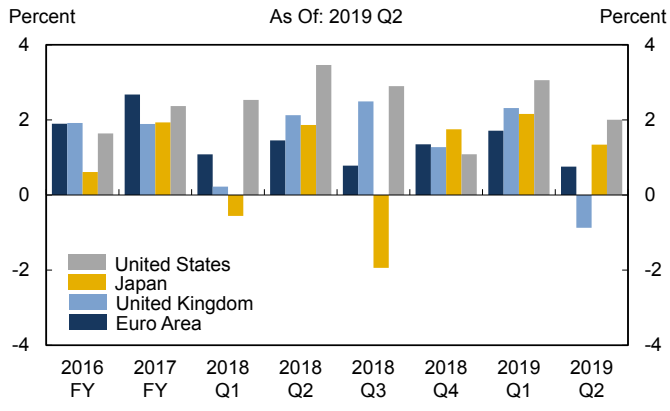
4.1.4 Fixed Income Implied Volatility



Source: Bloomberg, L.P.

Note: Implied volatility is calculated using a yield curve-weighted index of the normalized implied volatility on 1-month Treasury options.

4.2.1 Advanced Economies Real GDP Growth



Source: Eurostat, CAO, BEA, Haver Analytics

Note: Data represents seasonally adjusted quarter-over-quarter annualized real GDP growth rates.

Federal Open Market Committee (FOMC) lowered the federal funds target range on three occasions in the first eleven months of 2019, each time reducing the target range by 25 basis points. The third reduction, which took place on October 30, 2019, set the target range between 1.50 to 1.75 percent. In contrast, the FOMC increased the target range on four occasions in 2018 by a total of 100 basis points. Further interest rate reductions by the European Central Bank (ECB) coupled with the resumption of net purchases under its asset purchase program may also have contributed to the decline in U.S. Treasury yields as investors reportedly sought the comparatively attractive returns on U.S. sovereign debt relative to the very low and, in many cases, negative sovereign yields in advanced foreign economies.

From October 2018 to September 2019, the yield on 10-year Treasury Inflation-Protected Securities (TIPS) declined by 76 basis points to 0.15 percent **(Chart 4.1.3)**. Break-even inflation compensation, the difference between nominal and TIPS yields, declined by 61 basis points. Implied fixed-income volatility, as measured by prices of options on U.S. Treasury securities, increased in mid-2019 but remained slightly below its long-term average. Rising implied volatility may be attributable to increased uncertainty about short- and long-term interest rates **(Chart 4.1.4)**.

The three major credit ratings for U.S. sovereign debt were AA+, Aaa, and AAA. These ratings did not change since the Council's last annual report.

4.2 Sovereign Debt Markets

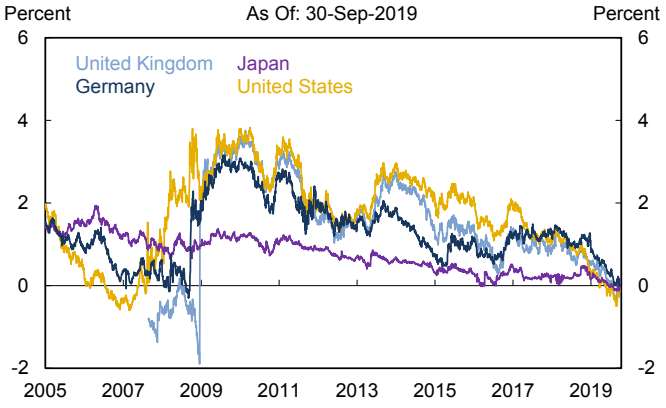
4.2.1 Developed Economies

Economic growth in most developed economies decelerated in the second half of 2018 and the first half of 2019. U.S. economic growth continued to outpace growth in other advanced economies. From the third quarter of 2018 through the second quarter of 2019, U.S. annualized growth averaged 2.3 percent, which

is substantially higher than in other developed economies **(Chart 4.2.1)**.

The slowdown in global economic growth, coupled with falling inflation expectations and increased political uncertainty, pushed long-term global interest rates lower in 2019. In mid-2019, yield curves in the largest developed economies inverted for the first time since the 2008 financial crisis **(Chart 4.2.2)**. Additionally, the supply of negative-yielding debt increased significantly, hitting a record $17 trillion in August 2019 before falling to $15 trillion at the end of September 2019 **(Chart 4.2.3)**. As of September 30, 2019, global sovereign bonds with negative yields totaled $11 trillion—approximately 50 percent of global sovereign bonds when U.S. Treasury securities are excluded. Negative-yielding sovereigns were reported in over twenty countries and, on September 30, 2019, German, Dutch, Danish, and Swiss debt was trading with negative yields through at least 20 years **(Chart 4.2.4)**.

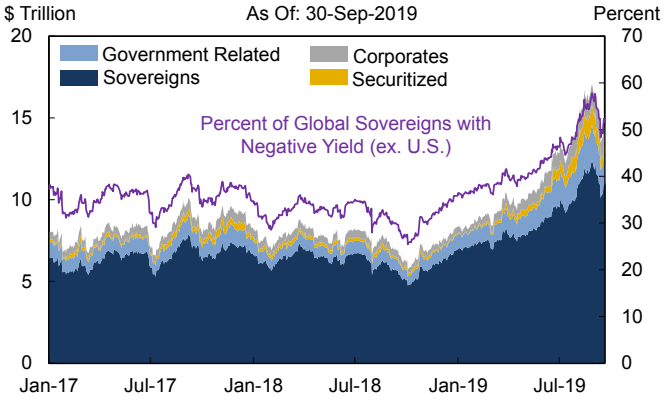
4.2.2 Sovereign Yield Spreads



Source: Bloomberg, L.P.

Note: Represents the spread between the 10-year and 3-month yield for select sovereign markets.

4.2.3 Outstanding Negative Yielding Debt



Source: Bloomberg, L.P.

Note: Market value of the Bloomberg Barclays Global Aggregate Negative Yielding Debt Index. Sovereigns include securities classified as Treasuries.

4.2.4 Sovereign Negative Yielding Debt

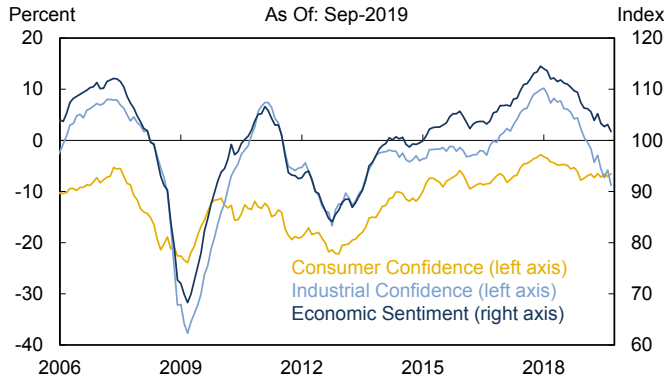
As Of: 30-Sep-2019

Country	S&P Rating	Negative Thru	Value ($B)	Country	S&P Rating	Negative Thru	Value ($B)
Euro Area			**4,932**	**Euro Area (Cont.)**			
France	AA	15 Yrs.	1,454	Latvia	A	9 Yrs.	5
Germany	AAA	31 Yrs.	1,202	Lithuania	A	10 Yrs.	5
Spain	A	8 Yrs.	589	Cyprus	BBB-	5 Yrs.	4
Italy	BBB	3 Yrs.	470	Malta	A-	2 Yrs.	1
Netherlands	AAA	27 Yrs.	353				
Belgium	AA-	15 Yrs.	302	**Japan**	A+	14 Yrs.	**5,931**
Austria	AA+	17 Yrs.	216				
Finland	AA+	15 Yrs.	93	**Other Europe**			**249**
Ireland	A+	10 Yrs.	90	Denmark	AAA	20 Yrs.	105
Portugal	BBB	7 Yrs.	89	Switzerland	AAA	45 Yrs.	83
Slovakia	A+	11 Yrs.	33	Sweden	AAA	13 Yrs.	59
Slovenia	AA-	9 Yrs.	20	Hungary	BBB	2 Yrs.	2
Luxembourg	AAA	8 Yrs.	7				

Source: Bloomberg, L.P.

Note: Includes securities classified as Treasuries in the Bloomberg Barclays Global Aggregate Negative Yielding Debt Index.

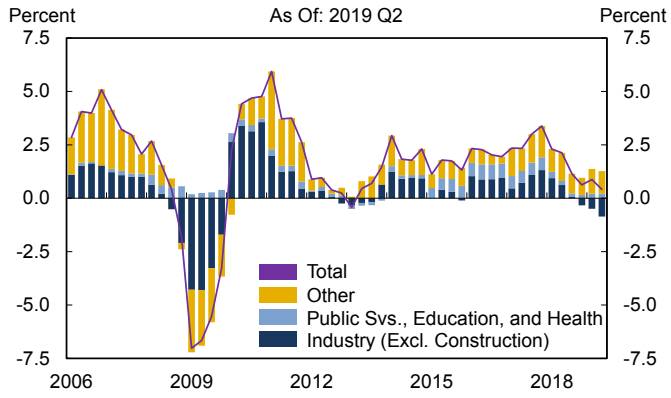
4.2.5 Euro Area Business and Consumer Surveys



Source: European Commission, Haver Analytics

Note: Confidence surveys calculated as the difference between positive and negative responses. For economic sentiment index, 100 = long-term average.

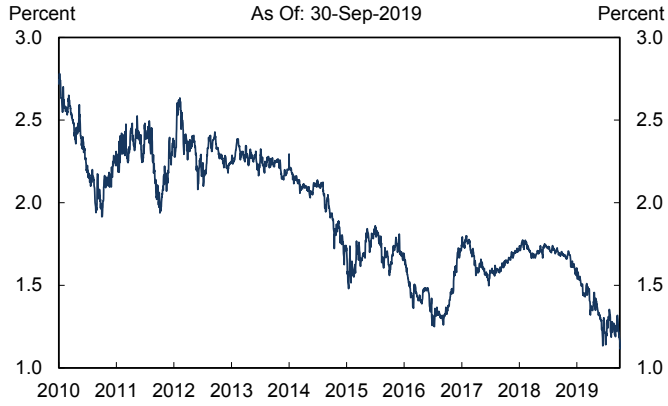
4.2.6 Sectoral Contributions to German GDP Growth



Source: FSO, Haver Analytics, Staff Calculations

Note: Select sectoral contributions to year-over-year real GDP growth rates.

4.2.7 Euro 5-Year, 5-Year Inflation Swap Rate



Source: Bloomberg, L.P.

Note: A market-based measure of the expected inflation rate over a 5-year period starting in five years' time.

Euro Area

Euro area real GDP growth remained positive through the third quarter of 2019, though economic sentiment has deteriorated considerably. In September 2019, the euro area industrial confidence index fell to its lowest level since 2013 **(Chart 4.2.5)**. The slowdown in economic activity has been particularly pronounced in export-driven economies such as Germany where the industrial sector has been contracting on a year-over-year basis since the third quarter of 2018 **(Chart 4.2.6)**.

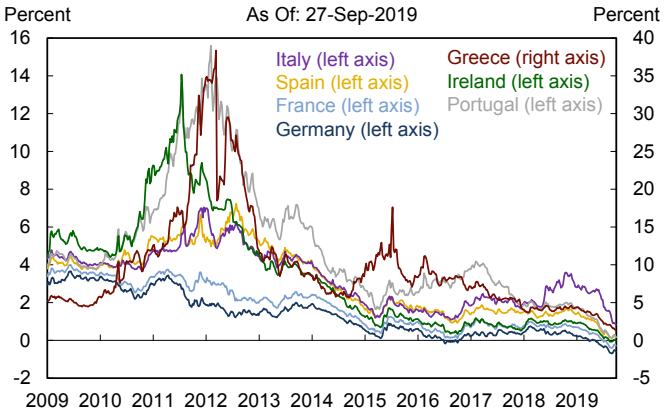
Euro area inflation expectations have declined considerably as the 5-year, 5-year forward swap rate, a key market-based indicator of euro area inflation expectations, fell to a record low of 1.1 percent in June 2019 **(Chart 4.2.7)**. In response to the deteriorating economic outlook and lower inflation expectations, the ECB eased its monetary policy stance at its September 2019 meeting. At the meeting, the ECB announced it would cut its deposit facility rate to -0.50 percent, introduce deposit tiering (whereby some EU commercial bank excess reserves will be exempt from the negative deposit facility rate), resume asset purchases at €20 billion per month for as long as necessary, and lower interest rates and lengthen the maturities on targeted longer-term refinancing operations.

As of the end of the second quarter of 2019, euro area central government debt totaled €8.7 trillion, up from €8.4 trillion at year-end 2017. Within the euro area, Italian, French, and German debt outstanding totaled €2.4 trillion, €2.0 trillion, and €1.3 trillion, or 134 percent, 86 percent, and 39 percent of GDP, respectively. Between the fourth quarter of 2017 and the second quarter of 2019, German central government debt outstanding has fallen by €30 billion, while Italian and French debt has risen by €117 billion and €142 billion, respectively.

Euro area sovereign debt yields fell significantly through 2019, and by August, the German 10-year yield approached -0.75 percent **(Chart 4.2.8)**. At the same time, spreads between German and other euro area sovereigns compressed substantially, and spreads for European Stability Mechanism and European Financial Stability Facility recipients (Greece, Spain, Portugal, and Ireland) were at or near levels prior to the euro area debt crisis **(Chart 4.2.9)**.

Year-to-date, the amount of negative yielding, euro-denominated public and private-sector debt has nearly tripled, from €3.0 trillion at year-end 2018 to €8.9 trillion as of September 30, 2019. Negative yielding sovereigns increased from €2.1 trillion to €5.0 trillion, while other negative yielding euro debt increased from just under €1 trillion to €3.8 trillion **(Chart 4.2.10)**. The stock of negative-yielding BBB-rated sovereigns (Italy, Cyprus, and Portugal) grew significantly in the third quarter of 2019, from €74 billion in June 2019 to €430 billion in September 2019. By late August, this negative yielding 'phenomenon' spilled over to lower quality credit, and in early September 2019, seven non-investment grade euro-corporates with a combined par value of €3 billion were trading with negative yields.

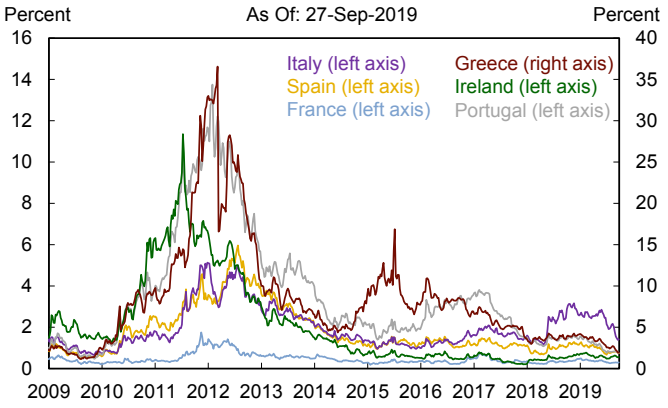
4.2.8 Euro Area 10-Year Sovereign Yields



Source: Reuters, Haver Analytics

Note: Weekly averages.

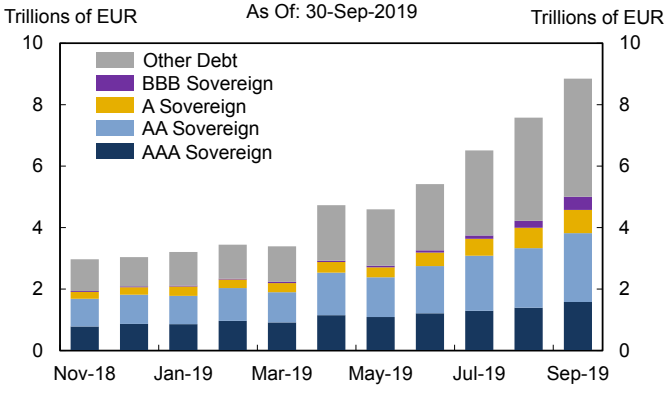
4.2.9 Euro Area 10-Year Spreads



Source: Reuters, Haver Analytics

Note: Calculated as the weekly average spread between local 10Y and German 10Y.

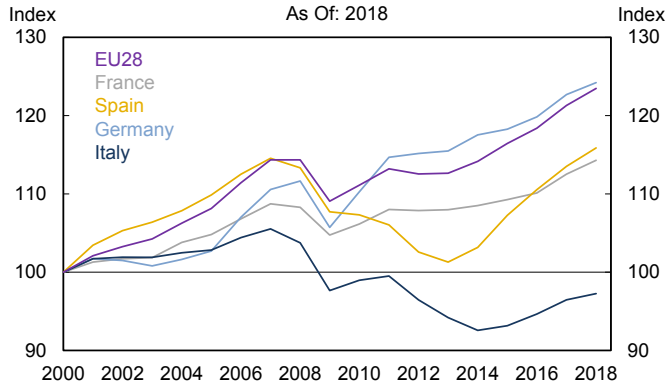
4.2.10 Euro Denominated Negative Yielding Debt



Source: Bloomberg, L.P.

Note: AAA = Germany, Netherlands, Luxembourg; AA = France, Austria, Belgium, Slovenia; A = Ireland, Latvia, Lithuania, Malta, Slovakia, Spain; BBB = Italy, Portugal, Cyprus; other debt includes government-related, securitized, and corporate debt.

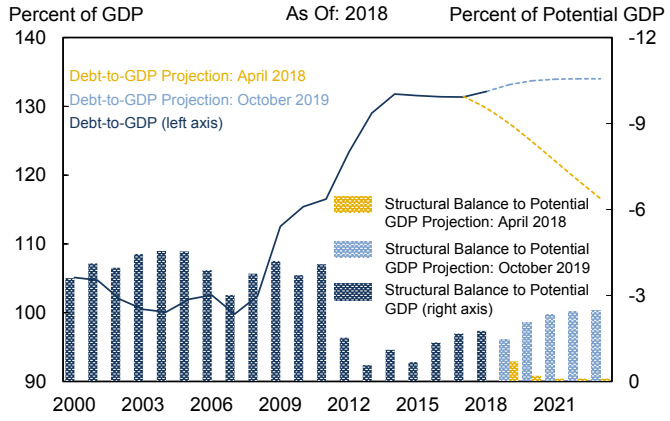
4.2.11 EU Real GDP Per Capita



Source: Eurostat, Haver Analytics

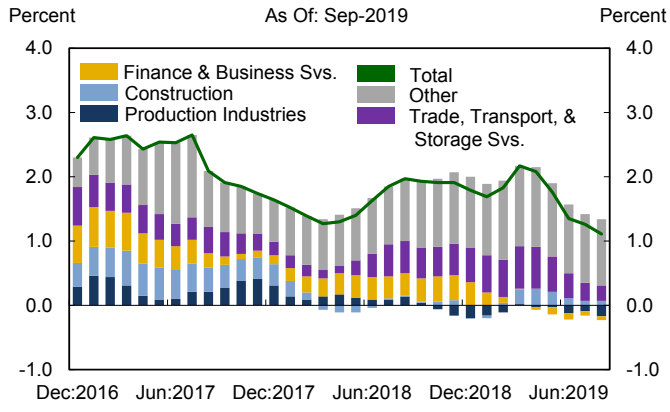
Note: 2000 = 100. EU28 includes the 28 member states of the European Union.

4.2.12 Italy Fiscal Projections



Source: IMF WEO, Haver Analytics

4.2.13 Contributions to UK Real Gross Value Added



Source: UK Office of National Statistics, Haver Analytics

Note: Contribution to year-over-year percent change in rolling 3 months real GVA.

In 2018, the Italian economy fell into a technical recession after annualized quarter-over-quarter GDP contracted by 0.3 percent and 0.5 percent in the second and third quarters of 2018, respectively. While Italy has since edged out of a recession, its economy continues to underperform. Real GDP per capita was lower in 2018 than it was in 2000 **(Chart 4.2.11)**. In 2018, Italian authorities announced plans to increase public investment. This spending program would have shifted the trajectory of Italy's public debt burden and could have led to disciplinary actions under the European Commission's Excessive Debt Procedure (EDP) **(Chart 4.2.12)**. Italian spreads tightened in July 2019 after the European Commission determined that an EDP was not warranted and a compromise was reached with the Commission on spending. Spreads tightened further in September 2019 when a new coalition government was formed. Nonetheless, Italian spreads have remained elevated in part due to political uncertainty. Italy is targeting to maintain its general government balance target as a percentage of GDP at 2019 levels in 2020.

United Kingdom

UK underlying growth rates were volatile in 2019 based in large part on uncertainty around the United Kingdom's withdrawal from the European Union. Stock-building before the original March 29, 2019, Brexit deadline lifted first quarter output by 2.3 percent, while inventory drawdowns and automobile factory shutdowns pulled second quarter output down by 0.9 percent on an annualized basis. Output from capital intensive sectors or those most likely to be affected by a disorderly Brexit has decelerated meaningfully. On a year-over-year basis, contraction in industrial production, construction, and the financial and business services sectors reduced GDP growth by an average of 0.2 percentage points in the three months ended September 2019, compared to an average contribution of 0.8 percentage points in the three months ended September 2017 **(Chart 4.2.13)**.

Despite continued economic uncertainty, the UK labor market has remained tight, and the UK unemployment rate remains near historic lows. At the same time, inflation has remained broadly in line with the Bank of England's (BoE's) 2 percent target and the BoE has maintained its base policy rate at 0.75 percent. Gilt yields have followed other sovereign yields lower and in August 2019, the 2-year/10-year portion of the Gilt yield curve inverted for the first time since 2008.

Japan

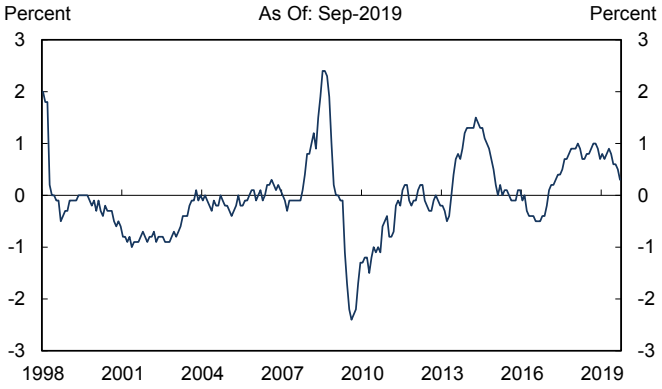
Despite the recent weakness in global manufacturing activity, Japanese real GDP growth has remained fairly stable in recent quarters; between the fourth quarter of 2018 and the second quarter of 2019, quarter-over-quarter GDP growth ranged from 1.3 percent to 2.2 percent on an annual basis. Inflation fell in 2019, but remained positive and ranged from an annual rate of 0.3 percent to 0.9 percent in the first nine months of 2019 **(Chart 4.2.14)**.

Yields on 10-year Japanese government bonds (JGBs) hovered just above zero throughout 2018 before turning negative in 2019 **(Chart 4.2.15)**. By September 30, 2019, the market value of JGBs with negative yields totaled approximately ¥640 trillion, up from ¥515 trillion at year-end 2018. Over the same period, the yield on 10-year JGBs fell from +1 to -21 basis points, slightly lower than the Bank of Japan's (BoJ's) target rate of zero percent. In October 2019, the BoJ revised its forward guidance. While policy rates did not change, the BoJ signaled a bias towards easing indicating that it intended to keep policy rates at present or lower levels as long as necessary to reach its inflation target. Previously, the BoJ had stated that it expected that rates would remain low until 2020 without discussing the potential for further easing.

4.2.2 Emerging Market Economies

According to the International Monetary Fund (IMF), economic growth in emerging market and developing economies slowed in 2018 and is projected to further decelerate in 2019, reflecting slower growth expectations in

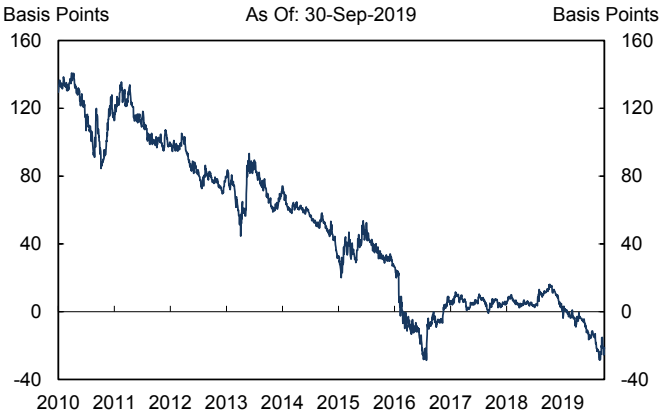
4.2.14 Japanese Consumer Price Inflation



Source: Bank of Japan, Haver Analytics

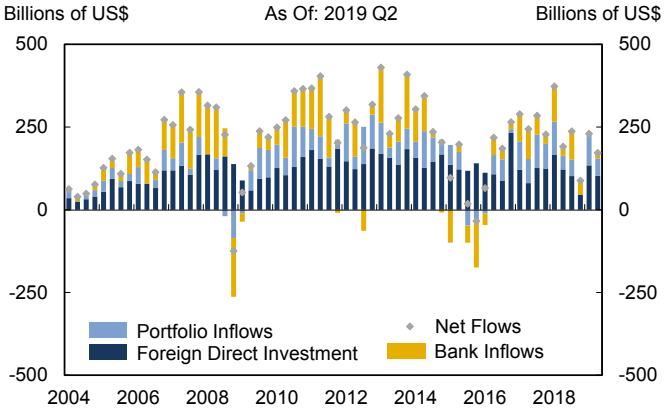
Note: Data represents year-over-year percent change. CPI excludes fresh food and is adjusted for the consumption tax increase that took effect in April 2014.

4.2.15 Japan 10-Year Government Bond Yield



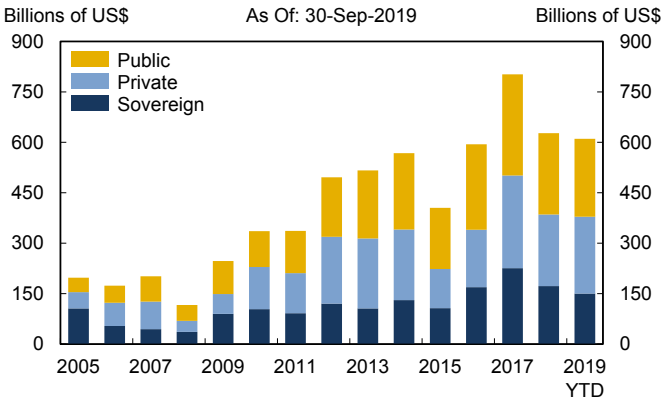
Source: Bloomberg, L.P.

4.2.16 Gross Foreign Investor Capital Inflows to EMEs



Source: IMF, Haver Analytics

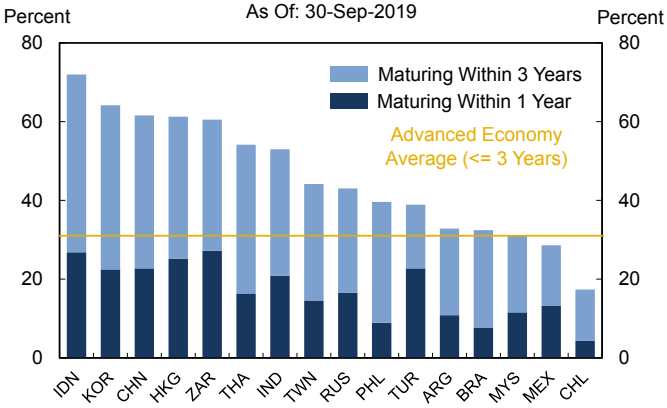
4.2.17 Emerging Market Gross Global Bond Issuance



Note: Bonds have maturities greater than one year and have been internationally marketed or placed. "Public" includes issuance by municipal and state-owned enterprises.

Source: Dealogic

4.2.18 EME Nonfinancial Corporate Debt Maturity Profile



Source: Bloomberg, L.P, Staff Calculations

Note: Represents percent of private nonfinancial corporate debt maturing within 3 years.

China and Mexico, disruptions from the unrest in Hong Kong, and uncertainty in Turkey and Argentina. While developing Asian economies continue to outpace other emerging economies, the region's annual growth rate was projected to fall below 6 percent for the first time since 1998. Economic growth in Latin American economies remained subdued in 2018 and was projected to remain below 1 percent in 2019 amid idiosyncratic challenges, including policy uncertainty in some countries.

Foreign investor capital flows to emerging market economies (EMEs) fell sharply in the fourth quarter of 2018, which can be largely attributed to a significant drop in net portfolio flows to China and large net portfolio outflows from Korea. Capital flows to EMEs recovered in the first half of 2019, with net capital inflows totaling $230 billion in the first quarter of 2019 and $172 billion in the second quarter of 2019 **(Chart 4.2.16)**.

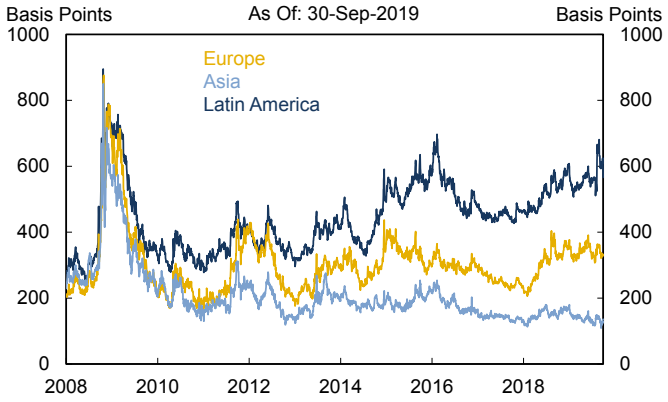
Since hitting a record pace in 2017, gross bond issuances moderated in 2018, averaging $52 billion per month **(Chart 4.2.17)**. As of September 30, 2019, gross EME debt issuances totaled $591 billion for the first nine months of 2019, a 19 percent increase compared to the same time last year. The pace of issuances by private nonfinancial corporations picked up significantly, and in the first nine months of 2019, issuances for the sector totaled a record $147 billion, compared to $129 billion and $103 billion for the first nine months of 2017 and 2018, respectively. Emerging market nonfinancial businesses continue to rely heavily on shorter-term funding, and in certain countries, over 50 percent of corporate debt is due to mature within three years **(Chart 4.2.18)**.

Sovereign bond spreads in Latin America and emerging Europe widened in late 2018 but stabilized in the first half of 2019 **(Chart 4.2.19)**. Latin American spreads widened to multi-year highs in August 2019, which was primarily attributed to stress in Argentine bond markets as well as broader risk-negative sentiment in EME assets due to U.S.-China trade tensions.

In 2018, Turkish financial conditions rapidly tightened; over the year, the Turkish lira depreciated by over 25 percent, credit default swap (CDS) spreads doubled, and inflation, as measured by the consumer price index, exceeded 20 percent. In 2019, the Turkish economy underwent a significant adjustment, and between the first quarter of 2018 and the second quarter of 2019, domestic demand fell by 8 percent while the current account balance shifted from a 6 percent deficit to a 1 percent surplus. However, financial headwinds remain given the elevated levels of dollar- and euro-denominated nonfinancial corporate debt, deteriorating asset quality at Turkish banks, and a high net borrowing requirement.

Argentina's macroeconomic outlook continued to deteriorate in 2019. Stubbornly high inflation, coupled with fiscal tightening, sapped public support for economic reforms. Financial conditions deteriorated sharply following Frente de Todos candidate Alberto Fernandez's significant outperformance in the August 11, 2019 national primaries. The following day, the Argentine peso depreciated by as much as 25 percent against the U.S. dollar, 5-year CDS spreads jumped almost 1,000 basis points, and the Merval index fell by 38 percent. While the peso and the stock index marginally retraced some of their losses, credit conditions continued to deteriorate, and on September 30, 2019 one-year dollar denominated bonds were trading at 50 cents on the dollar and 5-year CDS spreads were quoted at 4,000 basis points **(Chart 4.2.20)**.

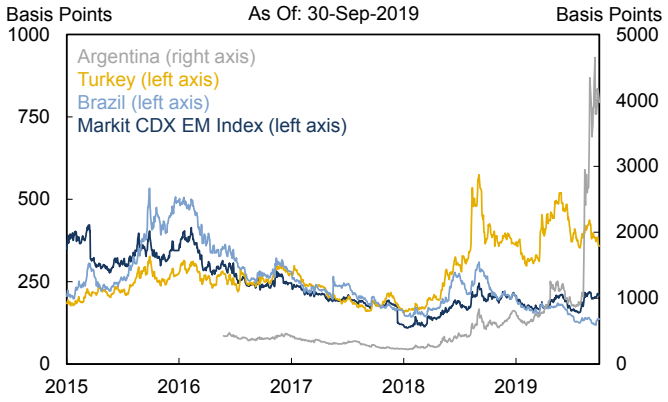
4.2.19 Emerging Market Bond Spreads



Source: JP Morgan, Haver Analytics

Note: JP Morgan EMBI+ Sovereign Spreads indices for each region.

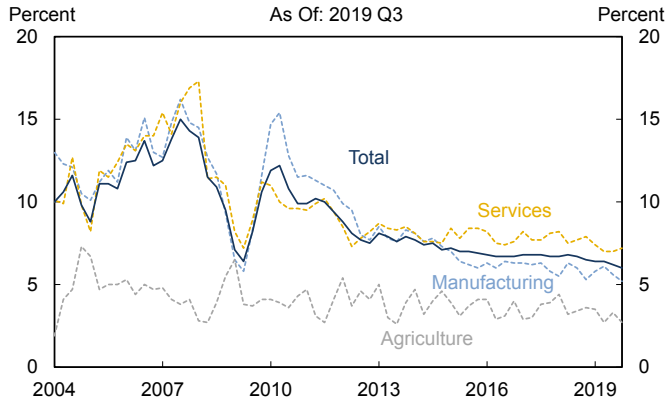
4.2.20 Emerging Market Sovereign CDS Spreads



Source: Bloomberg, L.P.

Note: 5-year USD spreads.

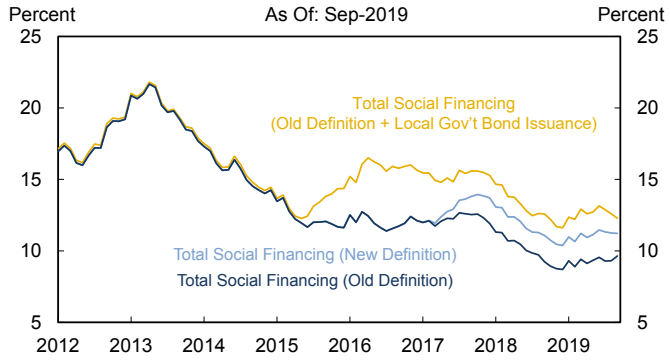
4.2.21 Chinese Real GDP Growth and its Components



Source: China National Bureau of Statistics, Haver Analytics

Note: Year-over-year percentage change.

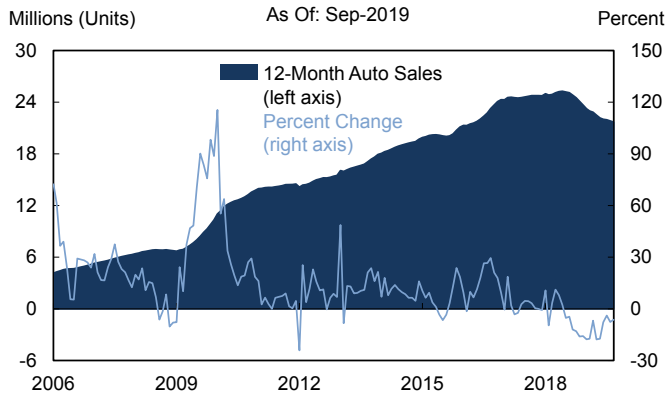
4.2.22 Chinese Credit Growth



Source: PBOC, CCDC, Haver Analytics, Staff Calculations

Note: Calculated as the year-over-year percent change total social financing (TSF) flows since 2002. TSF refers to the total volume of financing provided by the financial system to the real economy. TSF (old definition) excludes loan write-offs, ABS of depository institutions, and local gov't special bonds.

4.2.23 12-Month Chinese Auto Sales



Source: CAAM, Haver Analytics

Note: Total passenger car sales over the preceding 12 months. Percent change shows the number of passenger cars sold in a given month compared to the same month one year ago.

In late August, Argentina entered into a technical default when it delayed $7 billion of payments on its short-term local bonds while announcing an intention to pursue a voluntary restructuring of $50 billion of longer-dated debt, primarily held by foreign investors. The decision to postpone repayments came amid Argentina's inability to sell new short-term bonds while facing large payments due this year. Given capital flight fears and decreasing central bank international reserves, the government has implemented capital controls. Fernandez defeated President Macri in the October 2019 general election. Market reaction was muted, as the result was expected, but the central bank significantly tightened capital controls to safeguard international reserves. Markets are attentive to Fernandez's policy signals, including a plan to address the debt. Thus far, contagion risk to other emerging markets has been largely contained, given the idiosyncratic risks related to Argentina.

China

Chinese economic growth decelerated in 2019, with year-over-year real GDP growth slowing to 6.0 percent in the third quarter of 2019, compared to 6.5 percent in the third quarter of 2018 **(Chart 4.2.21)**. The deceleration has primarily been driven by slower credit growth and weaker external demand. Manufacturing sector growth fell to 5.2 percent in the third quarter of 2019. Service sector growth, which had been stable at around 8.0 percent over the past several years, also trended lower, ranging from 7.0 to 7.2 percent in the first three quarters of 2019.

The rate of Chinese credit growth continued to slow through 2018 as authorities undertook policies aimed at deleveraging **(Chart 4.2.22)**. Tighter credit conditions, however, negatively impacted consumer spending, and year-over-year auto sales fell by over 15 percent in late 2018 and early 2019 **(Chart 4.2.23)**. Authorities eased their deleveraging campaign in early 2019, and the rate of credit growth increased in early 2019 amid the slower economic growth.

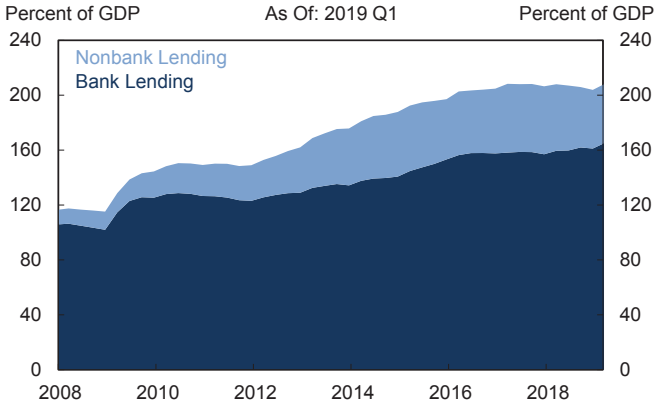
Similarly, the stock of nonfinancial private credit as a percent of GDP leveled off in 2017 and 2018 after experiencing significant growth in the first half of the decade **(Chart 4.2.24)**. Nonfinancial private lending resumed in the first quarter of 2019, with total lending nearing 210 percent of GDP. Nonbank lending has remained fairly stable at around 45 percent of GDP since the second quarter of 2018. In contrast, bank lending has picked up more significantly and exceeded 165 percent of GDP by the first quarter of 2019.

On May 24, 2019, the People's Bank of China (PBOC) and the China Banking and Insurance Regulatory Commission took over Baoshang Bank, citing serious credit risks. Baoshang Bank, which had an estimated $80 billion in assets, was the first Chinese bank taken over by regulators in more than 20 years. The authorities announced that while retail depositors will be protected, some corporate depositors and interbank lenders would face minor losses. Following the news, larger Chinese financial institutions reevaluated their credit and counterparty risk exposure, which led to small and mid-sized regional banks (SMBs) facing tighter credit conditions. For example, spreads between AAA and AA+ rated negotiable certificates of deposit (a money market instrument used by banks to obtain access to interbank funding) widened significantly following the takeover of Baoshang Bank **(Chart 4.2.25)**. In July, the authorities facilitated the takeovers of Bank of Jinzhou and Hengfeng Bank, which combined had an estimated $315 billion in assets. The PBOC has provided other support to SMBs, but liquidity in the interbank market remains thin due to continued uncertainty regarding the underlying asset quality of SMBs.

4.2.3 U.S. Municipal Markets

Total state and local government tax revenues in the first half of 2019 were 4.3 percent higher than in the first half of 2018 **(Chart 4.2.26)**. In 2018, tax revenues for the full year were 6.2 percent higher than in 2017. Municipal bond ratings continued to improve in 2018, with

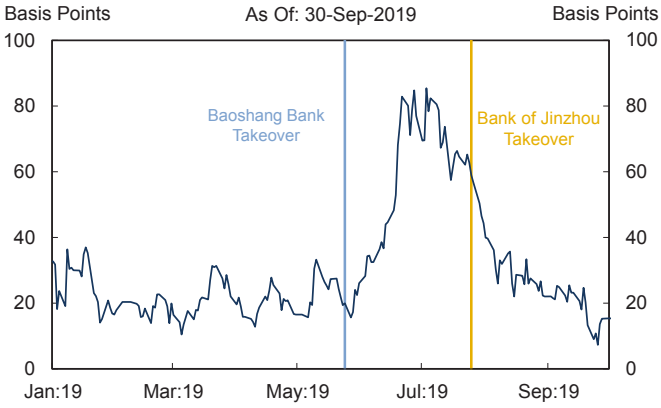
4.2.24 Credit to the Chinese Nonfinancial Private Sector



Source: China National Bureau of Statistics, BIS, Haver Analytics

Note: Rolling 4-quarter sum of GDP.

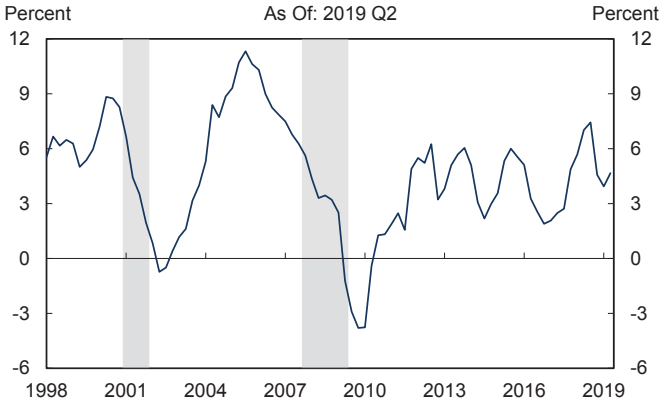
4.2.25 China Negotiable Certificate of Deposit Credit Spread



Source: Bloomberg, L.P.

Note: Spread between AAA and AA+ 6-month negotiable certificate of deposit.

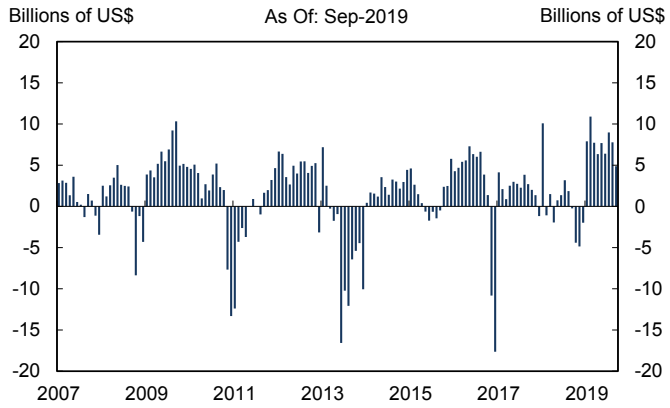
4.2.26 Change in State and Local Government Tax Revenues



Source: Census Bureau

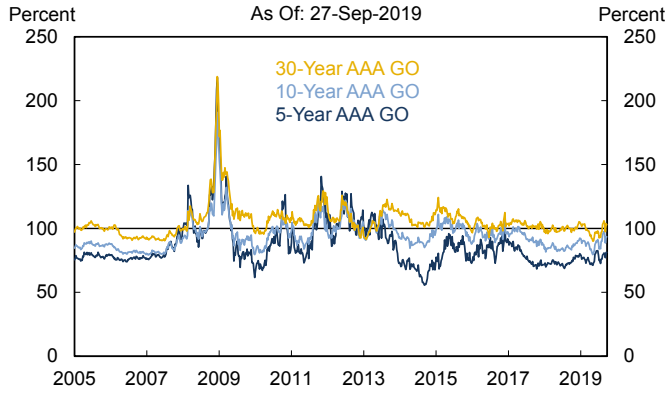
Note: Data represents year-over-year change. Revenue measures includes revenues from property, individual income, corporate income, and sales taxes. Gray bars signify NBER recessions.

4.2.27 Municipal Bond Mutual Fund Flows



Source: ICI, Haver Analytics

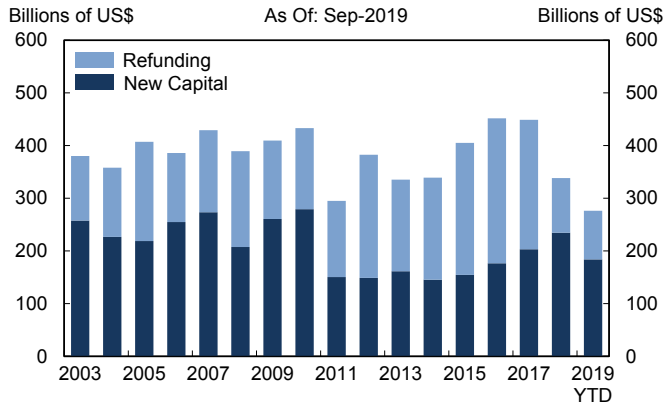
4.2.28 Municipal Bonds to U.S. Treasuries



Source: Municipal Market Analytics, Bloomberg, L.P.

Note: Calculated as the ratio between municipal general obligation bonds and U.S. Treasury securities of comparable maturities.

4.2.29 Municipal Bond Issuance



Source: Thomson Reuters, SIFMA

Note: Excludes maturities of 13 months or less.

upgrades outpacing downgrades. State reserve fund balances across the country increased in 2018, with the median rainy day fund balance as a share of general fund expenditures at a 20 year high of 6.4 percent, based on data aggregated from all 50 state budget offices. Strong retail demand, combined with constrained supply, has led to further increases in municipal bond prices.

Long-term municipal credit challenges remain due in part to health care expenses, public pension obligations, and the cost of repairs to declining infrastructure. Benefit liabilities and rising mandatory expenditures raise the risk of long-term fiscal imbalances for many state and local governments.

Municipal bond funds experienced record net inflows in the first nine months of 2019. By September 2019, net fund inflows totaled $69 billion compared to $4 billion of net inflows for the full-year of 2018 **(Chart 4.2.27)**. Market observers point to a post-tax reform shift toward additional retail flows. Credit spreads for tax-exempt general obligation bonds remained low in 2019 **(Chart 4.2.28)**.

From January to September 2019, municipal debt issuance was up 9.1 percent from issuance over the same period in 2018. In a change from the previous four years, issuance of new capital outpaced refunding in 2018 and through the first nine months of 2019, a dynamic driven by changes to the tax code eliminating the tax exemption for advance refunding of tax-exempt bonds **(Chart 4.2.29)**.

The fiscal crisis of Puerto Rico is distinctive in a sector with few defaults historically. The Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA), enacted in June 2016, provided for the establishment of the financial oversight and management board and a resolution process for Puerto Rico's $74 billion in public sector debt (excluding pension liabilities). In 2017, the Commonwealth and four of its instrumentalities filed to pursue debt

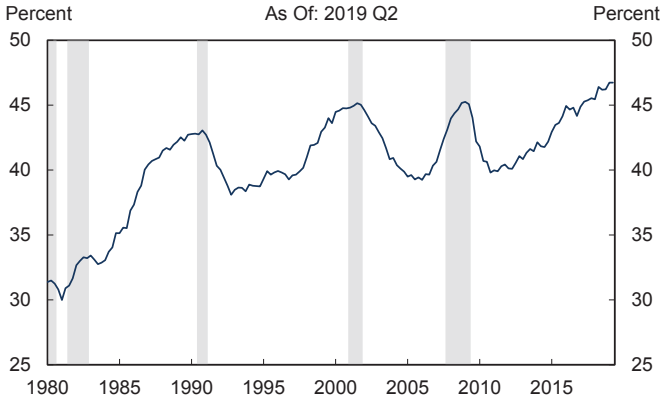
restructuring under Title III of PROMESA, followed by the filing of the Puerto Rico Public Buildings Authority (PBA) in September 2019. The Puerto Rico Urgent Interest Fund Corporation—a government-owned corporation created to securitize Puerto Rican sales and use tax proceeds—is the only Commonwealth entity to have reached a resolution of its debt obligations. In September 2019, the Federal Oversight and Management Board filed a draft Plan of Adjustment to restructure more than $50 billion of pension liabilities and $35 billion of debt and other claims against the Commonwealth, PBA, and the Employee Retirement System. If approved, the plan would reduce $35 billion of debt and other claims by more than 60 percent to $12 billion.

The Commonwealth's multi-year fiscal plan approved in 2019 requires fiscal measures and structural reforms expected to contribute to an average annual surplus of $2.1 billion between 2020 and 2024, before debt service payments. However, the Commonwealth projects a return to annual deficits by 2038. While federal disaster-related funds are having an ameliorative effect, Hurricane Maria highlighted weaknesses in the island's electric, water, and transport infrastructure that undermine the island's manufacturing base and feed outmigration.

4.3 Corporate Credit

Nonfinancial corporate debt grew faster than GDP over the past year, pushing the debt-to-GDP ratio to historically high levels **(Chart 4.3.1)**. Debt levels are also relatively high when compared to corporate earnings. The median ratio of gross debt-to-EBITDA (earnings before interest, taxes, depreciation, and amortization) for publicly-traded nonfinancial firms in the United States is near the high end of its historical range **(Chart 4.3.2)**. Nonetheless, firms continue to be able to service their debt, with default rates at moderate levels supported by strong interest coverage, low interest rates,

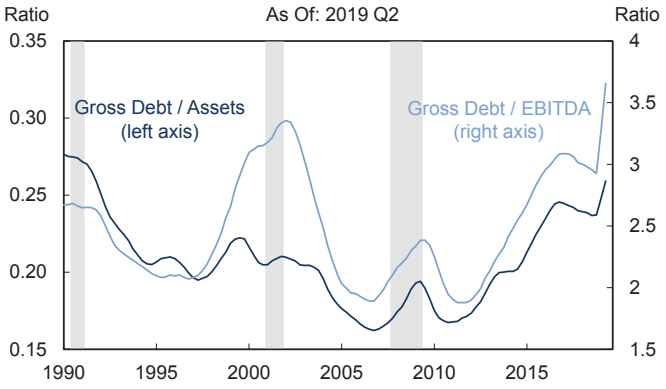
4.3.1 Nonfinancial Corporate Credit as a Percent of GDP



Source: Federal Reserve, Haver Analytics

Note: Gray bars signify NBER recessions.

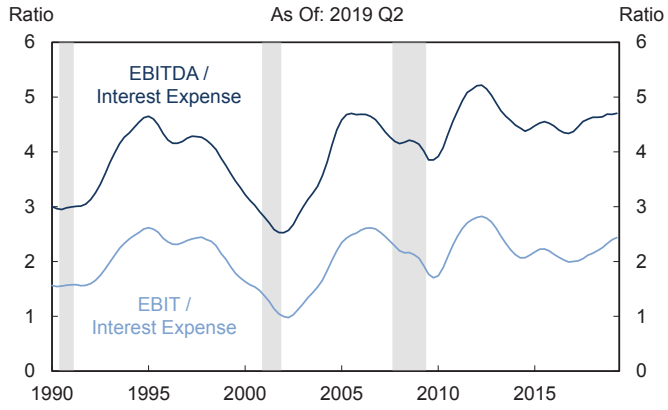
4.3.2 U.S. Nonfinancial Business Leverage



Note: Four-quarter moving average of the median ratio. Includes rated and unrated nonfinancial businesses. Gray bars signify NBER recessions. In 2019 FASB ASC 842 took effect. ASC 842 required companies to record operating leases on their balance sheets, resulting in higher reported debt levels.

Source: Compustat

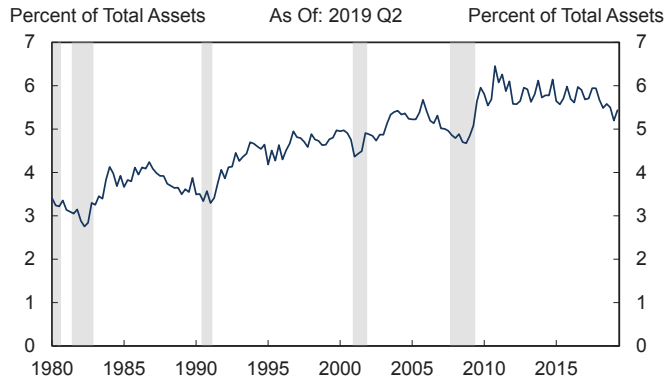
4.3.3 U.S. Nonfinancial Business Interest Coverage Ratios



Source: Compustat

Note: Four-quarter moving average of median ratio. Includes rated and unrated nonfinancial businesses. Gray bars signify NBER recessions.

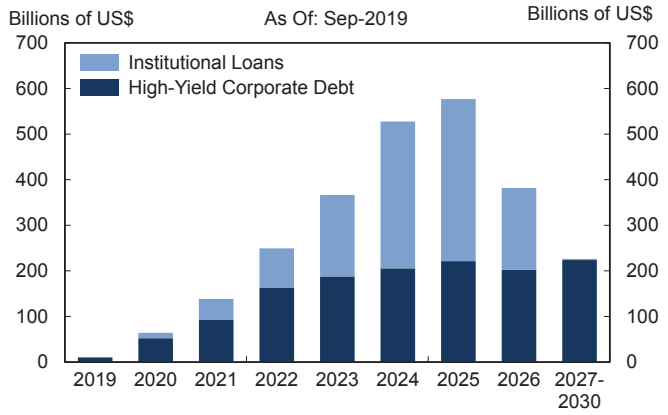
4.3.4 Nonfinancial Corporations Liquid Assets



Source: Federal Reserve, Haver Analytics

Note: Liquid assets includes foreign deposits, checkable deposits and currency, time and savings deposits, money market fund shares, security repurchase agreements, debt securities, and mutual fund shares. Gray bars signify NBER recessions.

4.3.5 Maturity Profile of Leveraged Debt



Source: Bank of America/Merrill Lynch Global High-Yield Strategy and S&P Capital IQ LCD

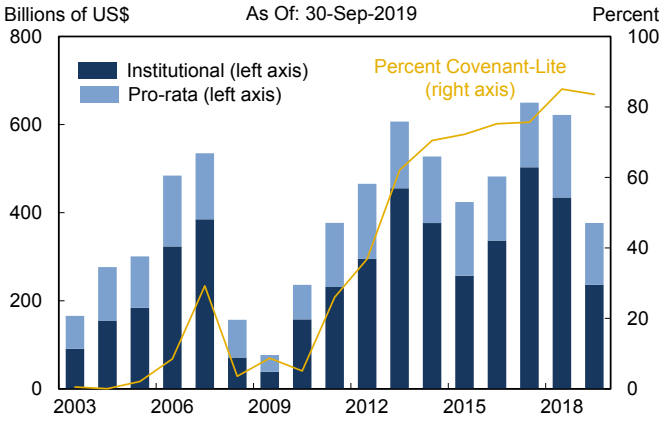
and the still-high, though declining, ratio of liquid assets to total assets **(Charts 4.3.3, 4.3.4)**.

Firms with high levels of debt may be vulnerable to unexpected financial or economic events that may negatively affect their repayment and refinancing capacity. Difficulties in servicing or refinancing outstanding debt could, if widespread, adversely impact the overall health of the economy. However, immediate rollover risk for leveraged corporations appears low, as less than 20 percent of high-yield bonds and leveraged loans mature before 2023 **(Chart 4.3.5)**.

Leveraged loan growth was particularly strong in 2018, in part reflecting investors' appetite for floating rate instruments amid a rising rate cycle **(Chart 4.3.6)**. Leveraged loan growth remained robust in the first nine months of 2019. However the pace of issuance slowed compared to 2017 and 2018 partially because of expectations of declining interest rates.

Concerns regarding deteriorating underwriting standards have been noted as some institutional leveraged loan deals have weaker credit and structure characteristics, coupled with increased reliance on optimistic projections of revenue growth and cost savings synergies to support borrower repayment capacity **(Chart 4.3.7)**. Notably, the number of large corporate highly leveraged deals—as measured by total debt to EBITDA of six times or higher—is well above pre-crisis highs **(Chart 4.3.8)**. In addition, the share of institutional leveraged loans that are covenant-lite has continued to grow. Institutional leveraged loans that are covenant-lite generally lack financial maintenance covenants, which reduce the ability of lenders to take actions if credit quality deteriorates. Covenant-lite loans accounted for 84 percent of leveraged loans issued in 2019 through September. By comparison, the share of leveraged loans that were covenant-lite did not exceed 30 percent in the pre-crisis period. While default rates are currently moderate and recovery rates are in line with historical averages, weaker financial maintenance covenants in leveraged loans, when combined with weaker credit quality, may mean that recovery rates could be lower; this implies that principal losses on leveraged loans in future downturns could exceed those experienced historically.

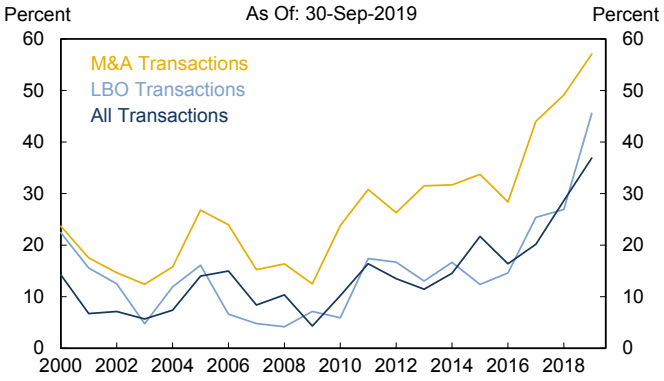
4.3.6 Leveraged Loan Issuance



Source: S&P LCD

Note: Percent covenant-lite limited to institutional loans.

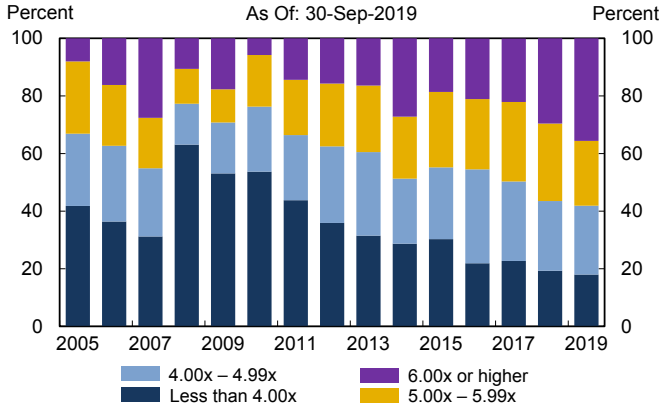
4.3.7 Leveraged Loan Transactions with EBITDA Adjustments



Note: Media and telecom loans excluded prior to 2011. Excludes existing tranches of add-ons, amendments & restatements with no new money, as well as DIPs, second liens and unsecured transactions. EBITDA adjusted for prospective cost savings or synergies.

Source: S&P LCD

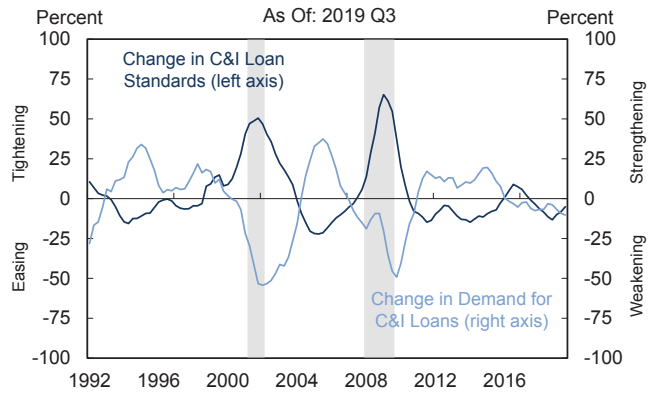
4.3.8 Distribution of Leveraged Loan Debt/EBITDA Ratios



Source: S&P LCD

Note: Includes issuers with EBITDA of more than $50M. Media and telecom loans excluded prior to 2011.

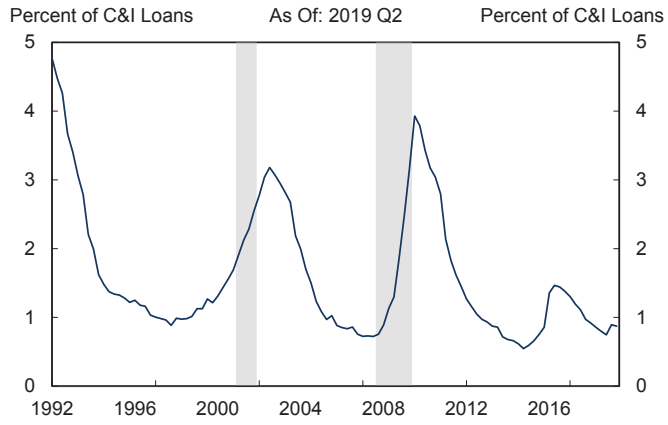
4.3.9 Bank Business Lending Standards and Demand



Source: Federal Reserve Senior Loan Officer Opinion Survey

Note: Represents net percent of banks reporting tightening standards or stronger demand for medium and large C&I loans; four period moving average. Gray bars signify NBER recessions.

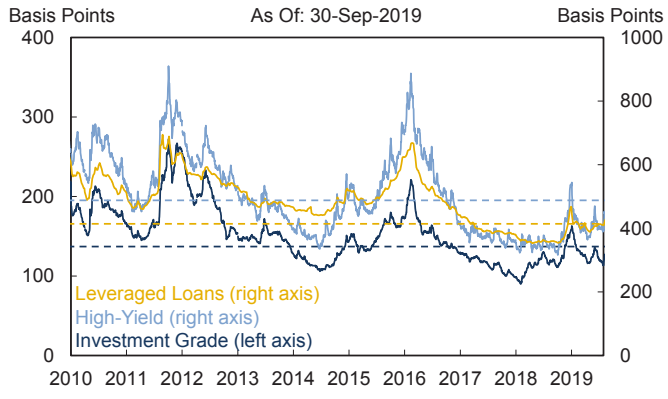
4.3.10 Non-Performing C&I Loans



Source: FRBNY, Haver Analytics

Note: Gray bars signify NBER recessions.

4.3.11 U.S. Corporate Credit Spreads



Source: Bank of America Merrill Lynch, Federal Reserve, S&P LCD

Note: Secondary market spreads. Investment grade and high-yield data represent option-adjusted spreads. Dotted lines represent 1997-present median.

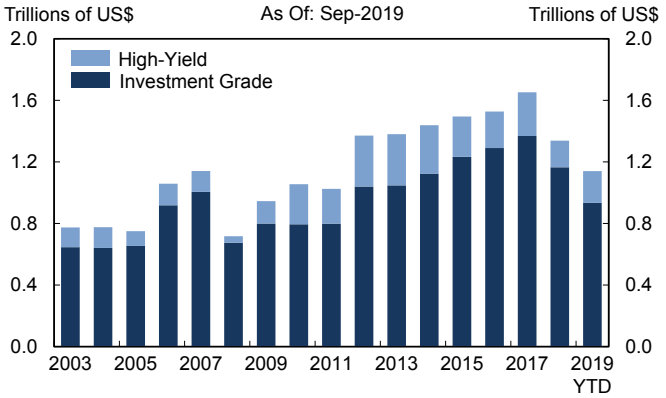
According to the Federal Reserve's Financial Accounts of the United States, commercial and industrial (C&I) lending to nonfinancial businesses by depository institutions grew 7.5 percent in calendar year 2018 to $1.1 trillion. Loan growth has slowed in 2019. In the first two quarters of 2019, C&I lending to nonfinancial businesses grew by 3.7 percent at an annual rate. Over the last year, more respondents to the Federal Reserve's Senior Loan Officer Opinion Survey on Bank Lending Practices reported experiencing weaker demand for C&I loans by firms and reported loosening or unchanged underwriting standards **(Chart 4.3.9)**. Following a small increase in the delinquency rate on C&I loans in the first quarter of 2019, the rate improved in the second quarter of 2019, although delinquencies remained higher than in most of 2018 **(Chart 4.3.10)**.

Corporate credit spreads have, on average, remained near the low end of their post-crisis range over the past year **(Chart 4.3.11)**. After spiking notably in December 2018, investment grade and high-yield bond spreads have since decreased to levels below their historical medians. Also, spreads on leveraged loans increased notably at the end of 2018 but have since decreased and were close to their long-term median.

Bond issuances from January through September 2019 amounted to $1.1 trillion, similar to that seen during the same period last year **(Chart 4.3.12)**. Bond issuances dropped sharply in late 2018 amid notable widening in corporate bond spreads. The amount of outstanding corporate bonds that are rated BBB—at the lower range of investment grade—is roughly 2.5 times the size of the entire high-yield market, and, as a share of investment-grade bonds, is at a record high.

Collateralized loan obligation (CLO) issuance in 2018 was strong. Issuances during the first nine months of 2019 were slightly lower than during the same period last year **(Chart 4.3.13)**. In 2018, CLOs continued to be the largest buyers of newly issued leveraged loans with an approximately 62 percent share of primary market issuances **(see Box A)**, followed by mutual funds that primarily invest in leveraged loans at approximately 19 percent, and banks at roughly 8 percent, respectively **(Chart 4.3.14)**. Through 2019, mutual funds have reduced their overall share of the leveraged loan primary market, while banks and hedge funds have stepped in. Mutual funds and ETFs that hold most of their assets in leveraged loans experienced cumulative outflows from November 2018 through September 2019 of $49 billion.

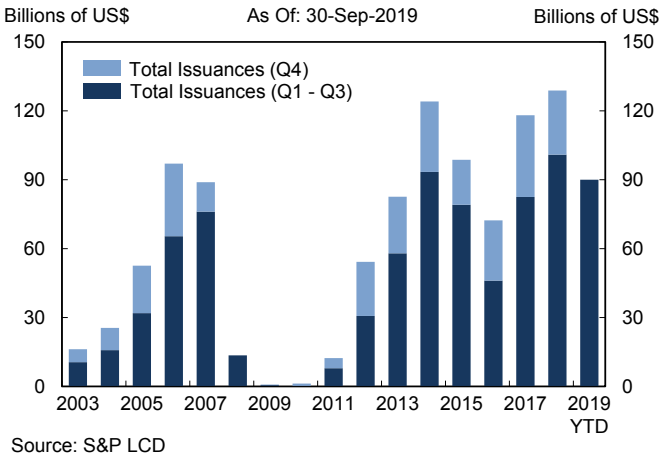
4.3.12 Gross Issuance of Corporate Bonds



Source: Thomson Reuters, SIFMA

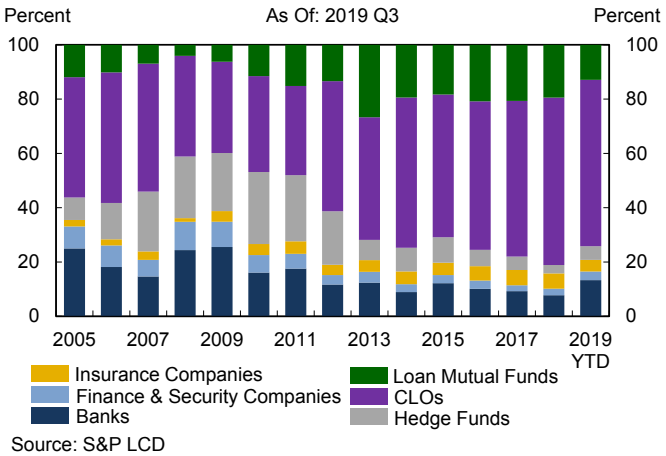
Note: Includes all non-convertible corporate debt, MTNs, and Yankee bonds, but excludes all issues with maturities of 1 year or less and CDs.

4.3.13 CLO Issuance



Source: S&P LCD

4.3.14 Leveraged Loan Primary Market by Investor Type



Source: S&P LCD

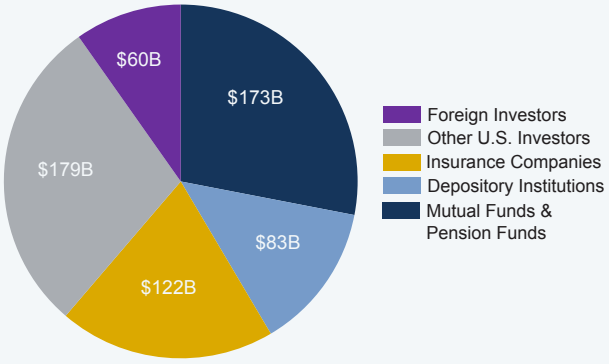
Box A: Nonfinancial Corporate Credit

U.S. nonfinancial corporate credit markets play an important role in supporting business investment and economic activity. As discussed in **Section 4.3**, U.S. nonfinancial corporate credit relative to GDP is now at historically high levels. According to the Federal Reserve Board's Financial Accounts of the United States, as of the second quarter of 2019, there was $10.0 trillion of U.S. nonfinancial corporate credit outstanding. Of this amount, corporate bonds were the largest component at roughly $5.7 trillion. Leveraged loans are also important sources of credit for business borrowers. Institutional leveraged loans, which are term loans originated by bank syndicates that are sold to institutional investors, totaled roughly $1.1 trillion as of the fourth quarter of 2018. However, a more comprehensive accounting of the leveraged loan market would include loans that are originated and held by banks, including the undrawn portion of revolving credit facilities, which is estimated at $500 billion to $600 billion; private debt fund assets of approximately $530 billion; and business development company loans of approximately $100 billion.

In evaluating how potential stress on corporate borrowers could impact the financial sector in a downturn, it is important to understand the financial condition of nonfinancial corporate credit investors and their ability to withstand downgrades on their debt holdings, mark-to-market losses, and credit losses, among other potential stress factors. The holders of leveraged loans are diverse and their composition has changed since the financial crisis. The share of the term portion of newly issued leveraged loans held by banks has shrunk from 18 percent in 2006 to approximately 13 percent in 2019, while the share in CLOs increased from 48 percent to roughly 60 percent **(see Section 4.3)**. Of the $1.1 trillion in outstanding institutional leveraged loans, CLOs hold about half, or roughly $617 billion. Estimates from Federal Reserve Board staff indicate that U.S. investors account for about $556 billion of CLO exposures, and U.S. depository institutions account for about 15 percent of total CLO exposures **(Chart A.1)**.

Banks hold a significant amount of the revolving portion of leveraged loans in addition to their direct holdings of institutional leveraged loans. Banks also play an important role in the origination and distribution of loans, though pipelines today are generally less than one-third of pre-crisis peak levels and banks have the ability to manage syndicated loan pipeline risk through the use of flexes and discounts. Banks are also indirectly exposed through financing of non-bank market participants, including in the context of leveraged loans, CLOs, mutual funds, and derivatives referencing leveraged credits.

A.1 CLO Investors as of Year-End 2018



Source: Federal Reserve, NAIC, TIC Data, Staff Calculations

Note: Other U.S. Investors includes holding companies, broker-dealers, private funds, nonfinancial companies, and households.

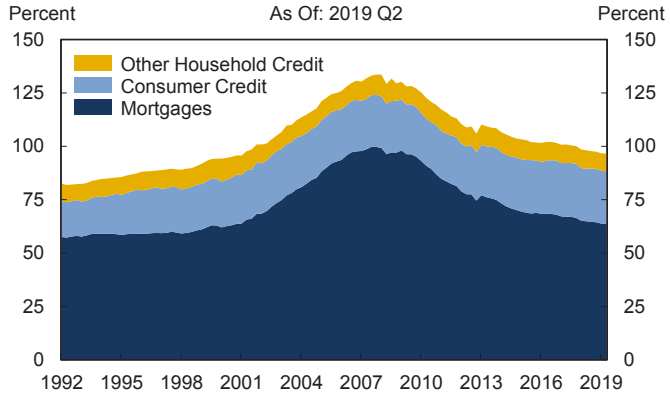
CLO structures today are more robust than they were prior to the crisis. The underlying loans in CLOs are generally marked at par by the CLO manager and are therefore generally not subject to mark-to-market volatility, except under certain circumstances. This is in contrast to pre-crisis collateralized debt obligations (CDOs) and some CLOs where the underlying assets were marked-to-market. These types of vehicles were forced to sell portfolio assets into a deteriorating market during the crisis. The capital structure of CLOs has also improved since the financial crisis. CLOs today have a greater share of subordinated tranches that would face principal losses before more senior tranches, such as the AAA tranches in which banks are primarily invested, experience a loss. While CLO capital structures are more robust, the underlying loans held in these portfolios are more vulnerable because borrowers generally have less subordinated debt outstanding that could serve as a cushion against potential losses.

A more diversified investor base could reduce the risk that losses and market dislocations will be borne by any particular type of holder. However, if credit markets deteriorate, investors—including those invested in CLOs and certain investment vehicles holding most of their assets in leveraged loans—may face liquidity risks or shortfalls in loss-absorbing capacity. How these holders will fare in a stressed environment and the impact of potential spillover effects to market liquidity and prices remains a key uncertainty.

Some mutual funds are also significant holders of institutional leveraged loans (though funds with higher concentrations of bank loans tend to be funds with lower amounts of total assets). The aggregate holdings of leveraged loans by mutual funds stood at roughly $165 billion at the end of 2018 but have declined since then. In contrast to CLOs, which do not generally have liquidity risk, mutual funds that have significant holdings of leveraged loans permit daily investor redemptions and may face liquidity risk. These funds are subject to a number of SEC requirements designed to mitigate liquidity risk **(see Section 6.2.4)**. However, if funds experienced significant redemptions during a period of market stress, funds with ineffective liquidity risk management programs could be forced to sell assets to meet redemptions, which, if significant in the aggregate, could contribute to loan pricing distortions.

The growth in nonfinancial corporate credit and the increased participation and diversity of nonbank holders of corporate loans are trends that warrant continued monitoring. There are several areas where information in this market is incomplete, including data on direct and indirect exposures of various holders of U.S. nonfinancial corporate credit and the effects of potential liquidity risk in certain mutual funds, easing covenant and documentation requirements, potential mark-to-market losses, credit derivative exposures, and potential credit rating downgrades, among other potential considerations. It is also important to continue to assess ways in which leverage may amplify the economic effects of a rapid repricing of risk or a slowdown in economic activity.

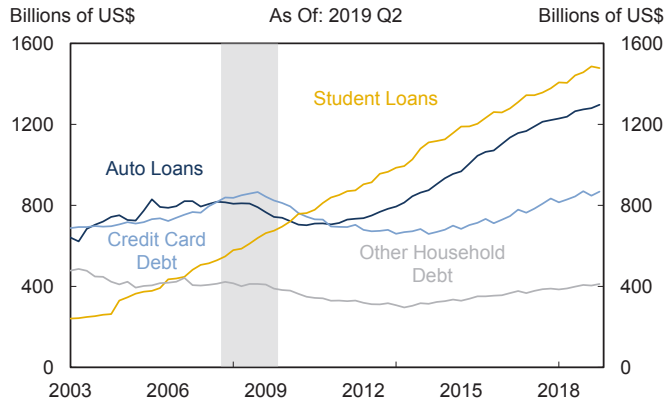
4.4.1 Household Debt as a Percent of Disposable Personal Income



Source: BEA, Federal Reserve, Haver Analytics

Note: Other Household Credit includes debts of both households and nonprofits.

4.4.2 Components of Consumer Credit



Source: FRBNY Consumer Credit Panel/Equifax, Haver Analytics

4.4 Household Credit

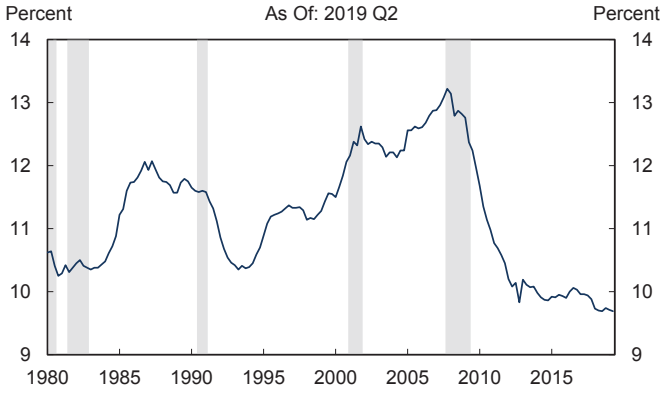
Following a sharp decline between 2008 and 2011, household debt has grown since 2012. As of the second quarter of 2019, total household debt grew by 3.1 percent year-over-year, in line with household debt growth in recent years. The ratio of household debt-to-disposable-personal-income continues to decline moderately and is well below the peak levels recorded in the last decade **(Chart 4.4.1)**. Aggregate household net worth increased over the past year with the increase primarily concentrated among upper-income households.

The rate of growth in non-mortgage consumer credit outpaced the growth in mortgage debt over the past year. Consumer credit now constitutes about one-quarter of household debt. This share is higher than the 18 percent it represented just before the financial crisis and comparable to its share before the rapid increase in house prices of the early and mid-2000s. The growth rate of the major components of consumer credit—student loans, auto loans, and credit card debt—in 2019 was similar to 2018, with student loans and auto loans continuing to predominantly drive the growth in consumer credit **(Chart 4.4.2)**. Student loan debt, estimated to be almost $1.5 trillion by the Federal Reserve Bank of New York (FRBNY) Consumer Credit Panel, remains the largest category of non-mortgage consumer debt. Approximately 14 percent of U.S. consumers owe student loan debt.

Continuing the trend that began in 2013, increases in loan balances of all types were driven by borrowers with prime credit scores. Total loan balances for borrowers with subprime credit scores remain well below the pre-crisis peak. These trends may reflect an increase in household credit from migration of subprime consumers to prime, as well as credit availability remaining somewhat tight for higher-risk borrowers.

Rising incomes and years of very low interest rates have helped move the household debt service ratio—the ratio of debt service payments to disposable personal income—to a 30-year low. The household debt service ratio was little changed in 2018 and the first half of 2019 **(Chart 4.4.3)**. Similarly, the household financial obligation ratio, which includes rent and auto-lease payments, is relatively low by historical standards. Other measures of household financial conditions also show continued improvement. The share of owners' equity in household real estate has increased by over 20 percentage points since 2009 and has returned to the range prevailing before the financial crisis **(Chart 4.4.4)**. These figures represent national trends and do not necessarily reflect local conditions, such as areas with notably higher housing costs.

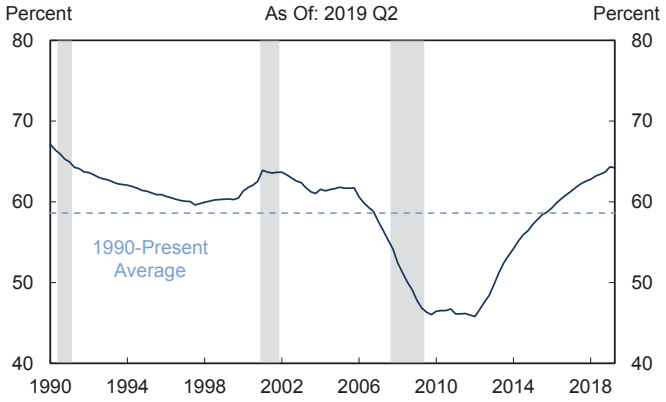
4.4.3 Household Debt Service Ratio



Source: Federal Reserve, Haver Analytics

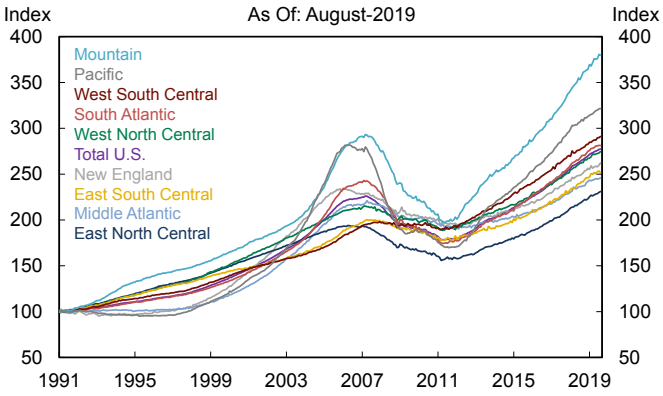
Note: Ratio of debt-service payments to disposable personal income. Seasonally adjusted. Gray bars signify NBER recessions.

4.4.4 Owners' Equity as Share of Household Real Estate



Source: Federal Reserve, Haver Analytics

4.5.1 House Prices by Census Region



Source: FHFA, Haver Analytics

Note: Purchase-only price index. Jan-1991 = 100.

4.5 Real Estate Markets

4.5.1 Residential Housing Markets

U.S. home prices continued to rise in 2019, buoyed by record-low unemployment, a healthy economy, and a limited inventory of homes. Home prices have increased steadily since 2011, the low point of the post-2007 housing downturn. However, signs point to a gradually slowing housing sector.

As of August 2019, FHFA's seasonally-adjusted purchase-only House Price Index grew 4.6 percent from one year earlier **(Chart 4.5.1)**. Each census division posted positive home price appreciation albeit at a slower pace compared to one year prior.

Housing affordability—as measured by the National Association of Realtors (NAR) Housing Affordability Index—increased in the first eight months of 2019. This is a reversal of the trend from 2013 to 2018 when the median monthly mortgage payment grew faster than median family income. The increase in housing affordability in 2019 is primarily attributable to the decline in the average 30-year fixed mortgage rate, which fell from 4.99 percent in December 2018 to 3.66 percent in August 2019. However, home price growth continues to outpace income growth. In August 2019 the ratio of the twelve month average home sale price to family income reached 3.4, the highest level since February 2008.

As has been the case for several years, most local housing markets remain tight, with demand generally outpacing supply. According to the NAR, in September 2019 there was 4.1 months of inventory of existing homes for sale nationwide, down from 4.4 months of inventory in September 2018. This remains well below the six months of inventory typically associated with a housing market in normal conditions.

The trends for the sales of existing and new homes diverged in the past year. According to the NAR, existing single family home sales totaled 4.7 million in the twelve months ended

September 2019. Sales were 2.4 percent lower compared to the same period one year earlier. In contrast, new home sales rose over the twelve months ended September 2019. Census data indicates that new single family home sales totaled 652,000 for this period, which was a 2.5 percent increase compared to the twelve month period ended September 2018.

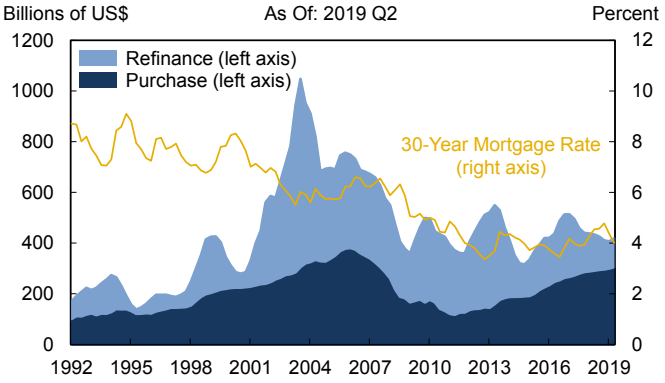
New single family construction starts have been increasing since the financial crisis, and reached 876,000 starts in the twelve months ended September 2019, though this remains below historic averages. The sluggish pace of housing development is particularly notable when considering the dramatic increase in house prices over recent years, which typically spurs new home construction. As in recent years, labor shortages and increasing land prices contributed to the slow pace. Costs and uncertainty created by lengthy local regulatory processes may have reduced the profit incentive for homebuilders.

The national homeownership rate rose slightly, from 64.4 percent in the third quarter of 2018 to 64.8 percent in the third quarter of 2019. For comparison, the U.S. homeownership rate rose from around 64 percent in the early 1990s, which was close to the average homeownership rate for the preceding 30 years, to an all-time high of 69.2 percent in 2004. Following the financial crisis, the homeownership rate fell precipitously to 62.9 percent in the second quarter of 2016—the lowest rate in decades.

Mortgage Originations, Servicing, and Loan Performance

Mortgage originations fell in 2017 and 2018, as higher rates made refinancing a less attractive option for many borrowers **(Chart 4.5.2)**. In the second quarter of 2019, falling rates have helped stabilize and boost overall mortgage originations, and, in particular, refinances. Refinances fell to a low in the first quarter of 2019 before rising again to a volume of $146 billion in the following quarter.

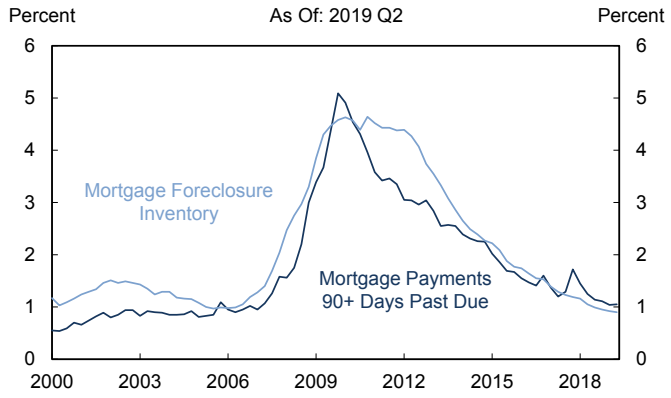
4.5.2 Mortgage Originations and Rates



Source: Mortgage Bankers Association, Freddie Mac Primary Mortgage Market Survey

Note: Originations represent all 1-4 family homes. Originations calculated as 4-quarter moving averages. Mortgage rates calculated as quarterly averages.

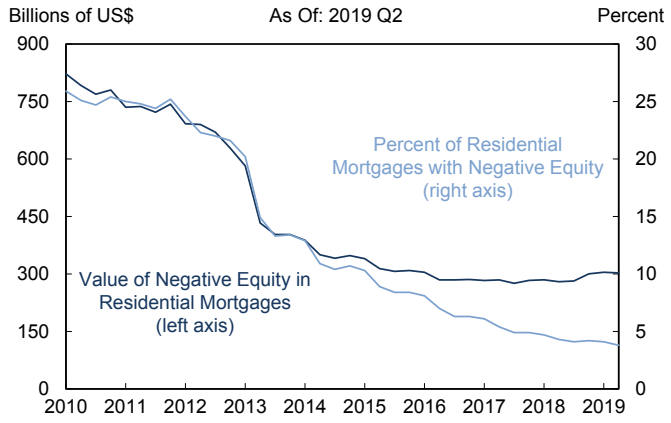
4.5.3 Mortgage Delinquency and Foreclosure



Source: Mortgage Bankers Association, Haver Analytics

Note: Percent of all mortgages.

4.5.4 Mortgages with Negative Equity



Source: CoreLogic

The share of mortgage loans originated and serviced by nonbanks continued its upward trend from late 2018 through the first half of 2019 **(see Box B)**.

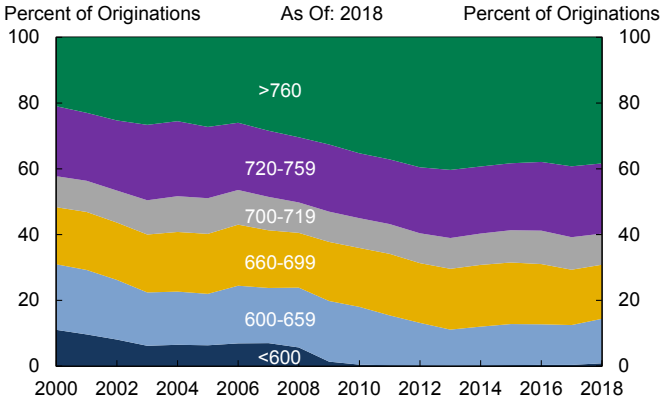
Delinquencies and foreclosures remain at very low levels by historical standards due to favorable economic conditions, rising home prices, and the use of conservative underwriting standards in recent years. Between the second quarter of 2018 and the second quarter of 2019, the percentage of borrowers who were more than 90-days delinquent, but not in foreclosure, fell from 1.3 percent to 1.1 percent **(Chart 4.5.3)**. Foreclosure activity also declined over this period, with the foreclosure rate falling from 1.1 percent to 0.9 percent. Hurricanes Irma, Harvey, and Maria caused an increase in delinquencies in 2017, but the effects of these weather-related events on delinquency rates have now passed.

The percentage of residential mortgages with negative equity continued its decade-long decline, falling from 4.3 percent in the second quarter of 2018 to 3.8 percent one year later. The actual dollar value of negative equity, however, increased over this period from $282 billion in the second quarter of 2018 to $303 billion in the second quarter of 2019 **(Chart 4.5.4)**. In comparison, near the low point of the last housing cycle in the fourth quarter of 2011, the negative equity rate was 25 percent, with a total value of $742 billion.

Credit quality, as measured by Fair Isaac Corporation (FICO) scores, remained relatively strong in 2018 **(Chart 4.5.5)**. Borrower credit quality has improved significantly since 2000, even when considering the lower underwriting standards leading up to the financial crisis. However, nearly all of this change occurred prior to 2012. Since then, the FICO score distribution for new mortgage borrowers has remained fairly constant. The highest FICO score category, above 760, has grown from approximately 20 percent of mortgage borrowers in 2000, to 30 percent in 2008, to nearly 40 percent of the market in recent years. Conversely, the lowest FICO score category, below 600, went from making up over 11 percent of borrowers in 2000, to 6 percent in 2008, and then fell to nearly zero in 2010. In the past year, the below-600 share of the market has increased slightly.

Similar trends in borrower credit quality are also apparent from the stressed default rate **(Chart 4.5.6)**. The stressed default rate is a metric that provides a loan's expected default rate if it experiences severely stressed conditions similar to the financial crisis shortly after the loan is originated. This metric shows much lower levels of credit risk for home purchase loans since 2006. The improvement is due in part to the near elimination of no-income-documentation loans and reductions in other products associated with high levels of credit risk. The stressed default rate reached its low point in 2013 and has increased moderately since then, primarily due to increases in average debt-to-income.

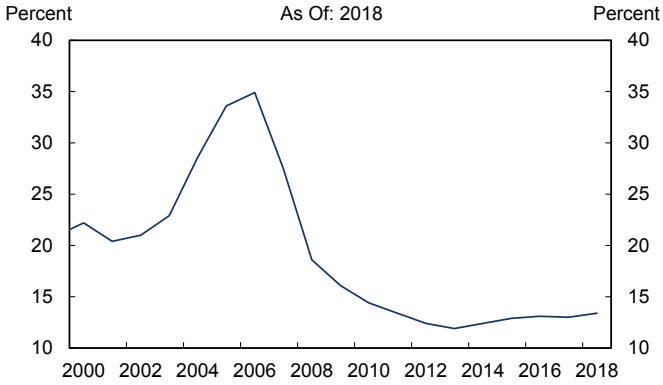
4.5.5 Purchase Origination Volume by Credit Score



Source: Black Knight's McDash Dataset, FHFA calculations

Note: Includes first lien purchases only.

4.5.6 Average Stressed Default Rate for Home Purchase Loans

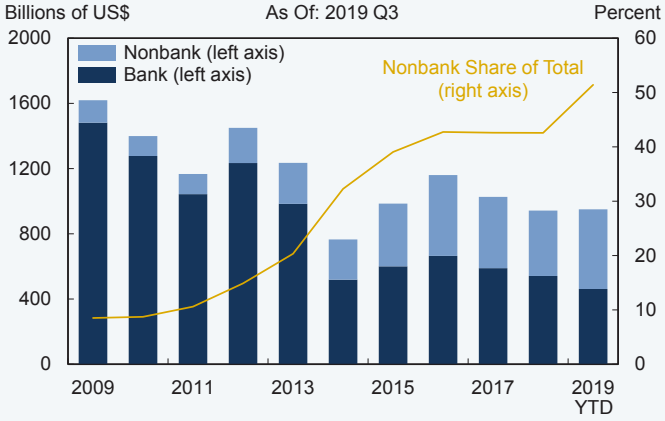


Source: Davis, Larson, Oliner, and Smith, *A Quarter Century of Mortgage Risk*, FHFA, (Oct. 2019).

Note: The sample reported includes all first-lien purchase mortgages originated in a given year.

Box B: Nonbank Mortgage Origination and Servicing

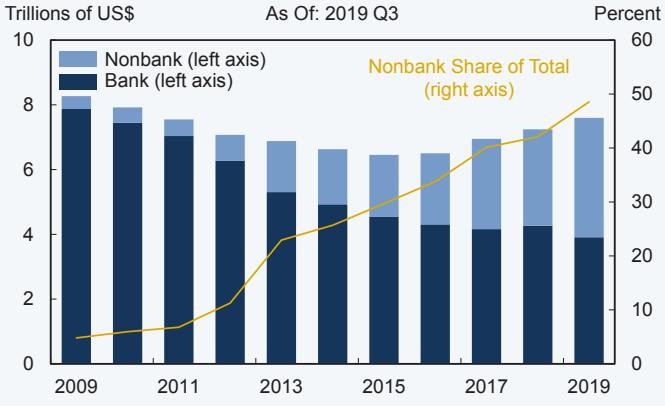
B.1 Mortgage Origination Market



Source: Inside Mortgage Finance

Note: Data covers top 25 originators in each year.

B.2 Mortgage Servicing Market



Source: Inside Mortgage Finance

Note: Data is as of fourth quarter each year except 2019, which is as of the third quarter. Data covers top 25 servicers in each quarter.

Nonbank mortgage companies have assumed a larger role in the origination and servicing of residential mortgages over the past decade. The typical nonbank mortgage company is a monoline specializing in mortgage origination, servicing, or both. Among the 25 largest originators and servicers, nonbanks currently originate approximately 51 percent of mortgages and service approximately 47 percent, up from just 10 percent and 6 percent in 2009, respectively **(Charts B.1, B.2)**. Nonbanks are particularly heavily involved in the origination of mortgages that are securitized by Ginnie Mae and the Enterprises, accounting for 85 percent of Ginnie Mae MBS, 60 percent of Fannie Mae MBS, and 53 percent of Freddie Mac MBS in 2019. As with originations, nonbank servicers have a larger market share for Ginnie Mae than for the Enterprises.

Several factors have driven the increased nonbank share of originations and servicing. Some large banks have reduced their share of mortgage lending to riskier borrowers in recent years. As a result, loans originated by nonbank lenders have, on average, marginally higher debt-to-income ratios and lower borrower credit scores than those originated by banks. Various hypotheses have been offered for the change in large bank mortgage origination market share, such as an aversion to potentially significant legal and reputational risks that may arise from delinquencies and foreclosures. These risks may be more salient for banks than nonbanks because banks have multiple business lines into which investment may be shifted, whereas nonbanks are often monolines. In addition, some research has found that banks have higher overhead costs for loan origination compared to

nonbanks and that nonbanks have been more aggressive in adopting financial technology to lower origination and servicing costs and increase consumer convenience. Banks also face a different regulatory regime than nonbanks, and, in some cases, the more stringent capital treatment of certain mortgage-related assets may discourage their growth.

Risks in Nonbank Origination and Servicing

Though their business models vary, most nonbanks do not have a stable funding base, and instead rely heavily on short-term funding for both originations and servicing advances. Analysis of nonbank financial statements by the Conference of State Bank Supervisors (CSBS) found that, in general, the largest nonbank servicers have limited liquidity, often just enough cash and securities held for sale to cover a few months of operating and interest expenses. Nonbank liquidity levels are significantly below those maintained by banks. Nonbanks often obtain liquidity from warehouse lines provided by banks, and these lines can be a significant portion of nonbank liabilities. In times of significant stress, warehouse lenders may face strong incentives to cancel the lines and seize the collateral as quickly as contractually permitted.

In some cases, servicers have the obligation to make payments to the investor even when a borrower does not make a mortgage payment ("servicing advances") or to repurchase a mortgage out of the MBS pool. The servicer may also have to satisfy tax and insurance obligations for the delinquent borrower. The servicer may have to fund these advances until the loan is brought current, the property is liquidated, or the servicer is reimbursed. These obligations can be costly for delinquent loans, especially for a delinquent mortgage in a Ginnie Mae MBS, given the higher default rates and the extended time until the servicer is reimbursed by the FHA or another agency. Financing servicing advances can also be challenging for servicers of Ginnie Mae MBS because of Ginnie Mae's first claim on servicing advances. Nonbanks' significant role in the Ginnie Mae segment makes them particularly exposed to these issues.

Nonbanks also have relatively few resources to absorb adverse economic shocks. Their largest assets, mortgages held for investment or sale and mortgage servicing rights (MSRs), are often pledged as collateral or partially monetized for upfront cash. The value of MSRs can move dramatically with changes in interest rates, and MSRs can be particularly illiquid and difficult to price when default rates are high or uncertain. Analysis by the CSBS shows that the largest nonbank servicers have an average ratio of MSRs to total equity of 151 percent and that this ratio has increased in recent years. In addition, nonbanks typically have relatively low capital levels. CSBS data reports that, among the largest nonbank mortgage originators/servicers, nonbanks have approximately four times as much debt as equity. Though this asset-liability structure may be a function of their business models, it raises questions about nonbanks' ability to perform during a downturn in the housing or mortgage markets.

Box B: Nonbank Mortgage Servicing and Originations (continued)

Given these fragilities, the nonbank sector could potentially be a source of weakness as a contraction in the largest nonbanks' ability to originate and service mortgages may transmit risk to the broader financial system through several channels. Nonbanks are significant counterparties to the FHA, to Ginnie Mae, and to the Enterprises. If delinquency rates rise or nonbanks otherwise experience solvency or liquidity strains, Ginnie Mae and the Enterprises could experience losses and operational challenges associated with transferring servicing to a financially sound servicer, especially the servicing of delinquent mortgages. The FHA and the Enterprises may also have difficulty enforcing contractual provisions that require nonbank originators to remedy defective loans. With their lines of credit to nonbanks, banks are also exposed to losses should a nonbank fail, though the exposures are somewhat limited in size and are generally well-secured by collateral.

Nonbanks could also transmit risk through contagion. During a period of significant market stress, strains in one nonbank could cause counterparties to question the viability of others. This could cause stress to spread among market participants. Broader contagion could lead to dislocation in the housing and mortgage markets during periods of stress.

Nonbanks are important providers of mortgage credit and mortgage servicing. It is unclear whether substitutes would be available if the largest nonbanks experienced stress or widespread failure during a market downturn. Nonbanks are disproportionately large players in key market segments, such as FHA lending, which is often used by low-income, minority, and first-time homebuyer segments. Should nonbanks not be able to extend credit, these market segments could potentially experience significant changes in the terms of available loans. Banks may also be reluctant to step in to assume servicing from a failing nonbank servicer, creating significant challenges if multiple nonbank servicers simultaneously experienced financial stress.

4.5.2 Government-Sponsored Enterprises and Secondary Mortgage Market

The federal government continues to back the majority of new mortgages either directly through the FHA, the VA, and the USDA, or indirectly through the Enterprises, although the federal government share of mortgage originations—which had been stable at around 70 percent in recent years—fell to 62 percent in the first three quarters of 2019 **(Chart 4.5.7)**.

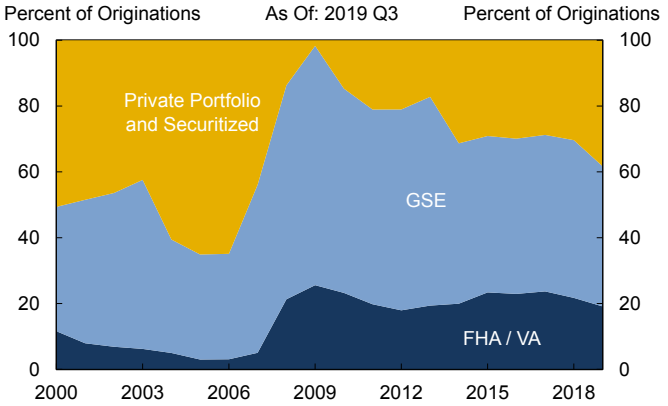
New mortgages not securitized by Ginnie Mae or the Enterprises continue to be held mostly in lender portfolios rather than securitized in the private-label market, with nonagency residential mortgage-backed securities (RMBS) accounting for less than 25 percent of outstanding mortgages (excluding agency MBS). Nonagency RMBS issuance totaled $49 billion in the first nine months of 2019, a 65 percent decline compared to the same period in 2018 **(Chart 4.5.8)**. In contrast, agency RMBS issuance totaled $1.1 trillion in the first nine months of 2019, up 14 percent compared to the same period in 2018.

Fannie Mae and Freddie Mac

Fannie Mae and Freddie Mac have been among the most active issuers of SOFR-linked notes **(see Box C)**. After issuing the first-ever SOFR securities in July 2018, Fannie Mae has returned to the market five additional times to issue a total of $22 billion in SOFR-linked securities. Freddie Mac issued its first SOFR-linked securities in November 2018 and has issued $66 billion of SOFR-linked securities through September 2019. Maturities on Fannie Mae securities range from 6 to 18 months while maturities on Freddie Mac securities range from 3 months to 3 years.

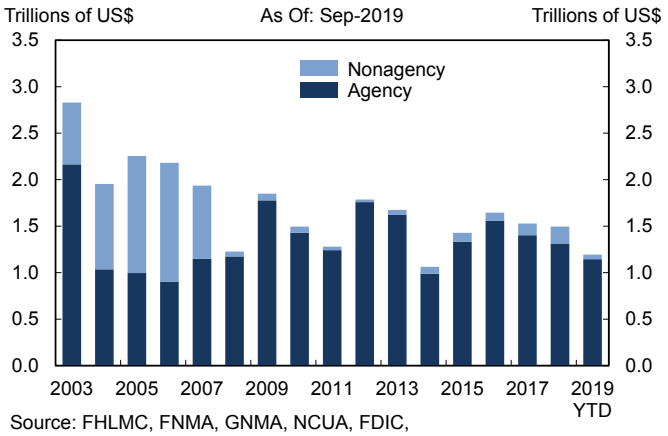
Fannie Mae continues to lay off risk to private capital in the mortgage market and reduce taxpayer risk through its credit risk transfer transactions. This is done primarily through its issuance of Connecticut Avenue Securities and Credit Insurance Risk Transfer transactions. For the six months ended June 30, 2019, Fannie Mae transferred a portion of the credit risk

4.5.7 Mortgage Originations by Product



Source: Inside Mortgage Finance

4.5.8 RMBS Issuance



Source: FHLMC, FNMA, GNMA, NCUA, FDIC, Bloomberg, L.P., Dealogic, Thomson Reuters, SIFMA

on single-family mortgages with unpaid principal balance (UPB) of $154 billion. Since inception of its risk transfer programs, Fannie Mae has transferred a portion of the credit risk on single-family mortgages with UPB of over $1.7 trillion.

Freddie Mac transferred a portion of the credit risk on $311 billion in UPB of single family mortgage loans in the first half of 2019, primarily through its issuance of Structured Agency Credit Risk securities and through its Agency Credit Insurance Structure transactions. Since it began undertaking credit risk transfers, as of the second quarter of 2019, Freddie Mac has executed transactions covering $1.3 trillion in UPB.

As discussed in **Section 5.3.1**, Treasury and the FHFA have agreed to modifications to the PSPAs that will permit Fannie Mae and Freddie Mac to retain earnings that had previously been paid out to the Treasury as dividends. Through September 30, 2019, dividends to the Treasury have totaled $301 billion, with cumulative dividends paid by Fannie Mae and Freddie Mac totaling $181 billion and $120 billion, respectively.

The credit profile of the Enterprises' books of business have generally improved in recent years, but signs of increased credit risk have begun to emerge. For example, the Enterprises' serious delinquency rates have decreased and the median borrower credit score for Enterprise mortgage acquisitions has been relatively unchanged in recent years, but the share of the Enterprises' purchase money mortgage acquisitions with debt-to-income ratios above 43 percent increased to 32 percent in the first quarter of 2019 compared to 16 percent in 2013. Similarly, the Enterprises' share of purchase money mortgage acquisitions with loan-to-value ratios greater than 95 percent increased to 11 percent from 3.5 percent in the same time period.

Federal Home Loan Banks

The Federal Home Loan Banks (FHLBs) continued to be an important source of liquidity for the mortgage market and to exhibit strong financial performance. The FHLBs reported aggregate net income of $3.6 billion in 2018, an all-time high for the FHLB System. While net income in 2016 and 2017 was also strong, results in these two years reflected significant litigation settlement gains related to private-label MBS investments. Conversely, 2018 earnings were driven more by traditional business functions at the FHLBs. The FHLBs' aggregate net income totaled $2.3 billion for the first three quarters of 2019. These high levels of earnings have also led to significant dividends to FHLB members. The FHLBs paid a dividend rate of 5.7 percent in 2018, which corresponds to a 61 percent payout ratio.

The total assets of the FHLBs have increased from $970 billion at year-end 2015 to $1,086 billion as of September 30, 2019. Advances are the largest component of FHLB holdings. Advances are a credit product FHLBs extend to their members to help them meet short- and long-term liquidity and housing finance needs. They carry a yield slightly higher than a FHLB debt obligation of similar maturity. Advances reached their post-crisis peak of $735 billion in June 2018. Since then, demand has subsided. As of September 30, 2019, the FHLBs had $659 billion in outstanding advances to member institutions.

Increased holdings of liquid assets also contributed to growth in FHLB balance sheets in the first three quarters of 2019. The FHFA released new liquidity guidance in 2018, advising the FHLBs to hold more days of liquid assets beginning on March 31, 2019. As a result, the FHLBs added $41 billion of Treasury securities in the first nine months of 2019. The FHLBs have been regular issuers of SOFR-linked debt securities, issuing approximately $140 billion as of September 2019.

4.5.3 Commercial Real Estate

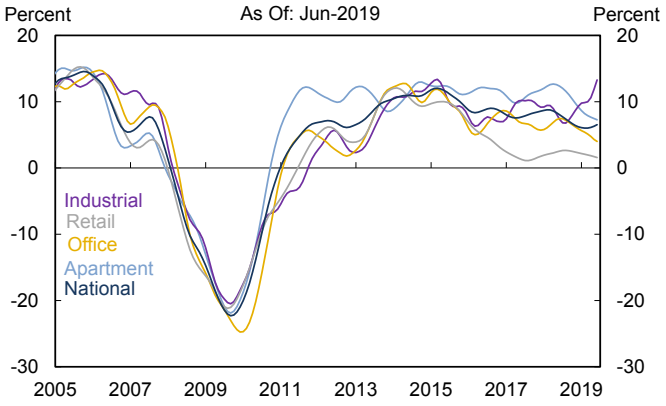
Commercial real estate (CRE) prices increased in 2018 and in the first half of 2019. However, the rate of increase has slowed recently, with national CRE price growth increasing by 6.6 percent year-over-year as of June 2019 versus 8.0 percent the previous year. Price growth was led by the industrial sector. Price growth for retail properties continue to lag other CRE sectors **(Chart 4.5.9)**.

CRE capitalization rates—the ratio of a property's annual net operating income to its price—remain very low by historical standards **(Chart 4.5.10)**. One measure of the risk premium in CRE—the spread between CRE capitalization rates and the 10-year Treasury yield—remains notably higher than the lows reached prior to the financial crisis, when Treasury yields were higher.

The volume of CRE property sales increased 15 percent year-over-year in 2018. Sales have slowed modestly in the first half of 2019. Sales by property type have diverged, with transactions involving office and retail properties generally declining from prior years.

As of the second quarter of 2019, outstanding CRE loans totaled $4.4 trillion, a 5.2 percent increase year-over-year. The total amount of outstanding CRE loans is approximately 21 percent of GDP, up from 19 percent in the second quarter of 2014, but below the 24 percent level reached in the second quarter of 2009. The Enterprises continue to be a major player in multifamily lending and hold a collective share of more than 46 percent of total outstanding multifamily mortgages, inclusive of agency MBS. CRE loans held by life insurance companies continued to increase, with CRE loan percentage growth at insurance companies outpacing that of banks. As of June 2019, CRE loans outstanding at U.S. chartered banks were $2.2 trillion (a 3.9 percent increase year-over-year) and the corresponding total for life insurers was $540 billion (a 9.5 percent increase year-over-year).

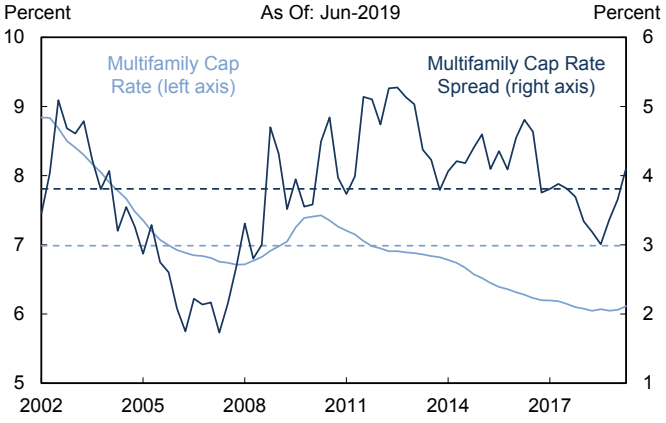
4.5.9 Commercial Property Price Growth



Source: Real Capital Analytics, Bloomberg, L.P.

Note: Year-over-year price change.

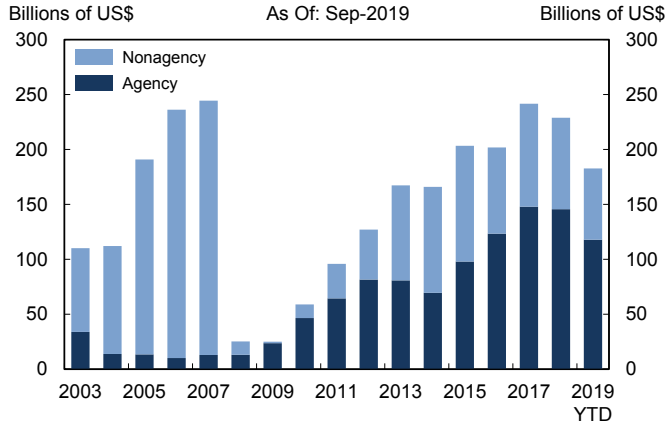
4.5.10 Multifamily Capitalization Rates and Spreads



Source: Real Capital Analytics

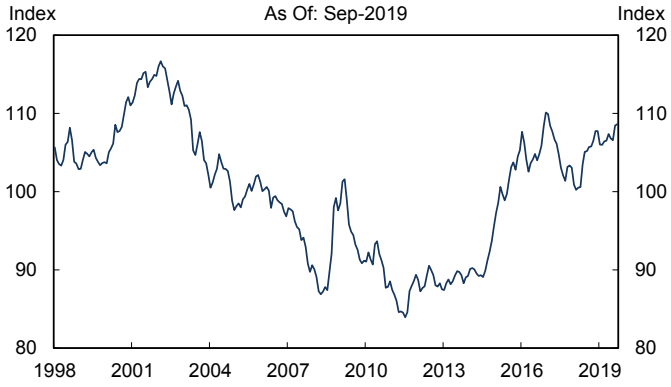
Note: Dotted lines represent 2002-present avg.

4.5.11 CMBS Issuance



Source: Inside Mortgage Finance

4.6.1 Real U.S. Dollar Trade-Weighted Index



Source: Federal Reserve, Haver Analytics

Note: Index shown as a share of its 1998-present average. Real USD Trade-Weighted Index is a weighted average of the FX value of the USD against the currencies of a broad group of major U.S. trading partners.

Overall, CRE delinquency rates remained stable in 2018. However, one area that showed notable improvement was the delinquency rate of the CRE loans held in commercial mortgage-backed securities (CMBS), as problem loans that were originated at the peak of the previous credit cycle in 2006 and 2007 have been resolved.

As of the second quarter of 2019, nonagency CMBS constituted approximately 13 percent of the CRE market, unchanged over the prior two years. Overall CMBS issuance was 14 percent higher year-to-date through September 2019 compared to the same period in 2018. Agency CMBS issuance by the Enterprises, which is predominantly multifamily, showed continued growth in 2019, as the GSEs continued to expand their securitization programs. Agency CMBS issuance accounted for 64 percent of total CMBS issuance in 2019 to date. Nonagency CMBS issuance increased 2.7 percent as of September 2019, compared to the same period in 2018 **(Chart 4.5.11)**.

4.6 Foreign Exchange

The U.S. dollar appreciated modestly in the first nine months of 2019 after strengthening notably over 2018. As of the end of September, the nominal trade-weighted dollar exchange rate was 2.1 percent higher year-to-date. Dollar appreciation in 2019 was concentrated between late July and early September, when a deterioration in global risk appetite generated a flight to safety that pushed the dollar higher against most currencies other than the Japanese yen and Swiss franc. The dollar remained elevated from a longer-term perspective, with the real trade-weighted dollar standing 9 percent above its 20-year average as of the end of September **(Chart 4.6.1)**. The dollar was supported in 2018 and 2019 by continued outperformance of the U.S economy and the associated interest rate differentials between the U.S. and other large economies.

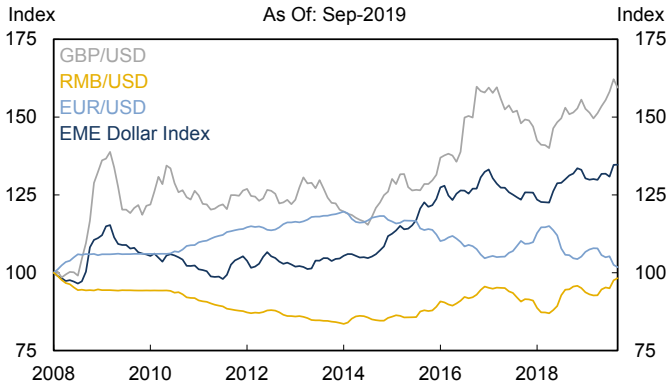
The euro continued its depreciation trend that started in early 2018 as economic data across the euro area generally disappointed and

the ECB announced that interest rates would remain at or below current low levels until it saw the inflation outlook robustly converge to a level sufficiently close to, but below, 2 percent **(Chart 4.6.2)**. Broader concerns about the global growth outlook—an important factor for the export-oriented euro area economy—have also weighed on the currency. Pound sterling remained volatile in 2019, on the back of Brexit and negative second quarter economic growth in the United Kingdom. In early August 2019, the pound sterling closed at its lowest level against the U.S. dollar since 1985, after losing about 5 percent of its value from January 2019. Pound sterling retraced some of the losses in October, following the announcement of a potential new Brexit deal between the United Kingdom and the European Union. However, investors remained cautious given ongoing Brexit uncertainty and the December 2019 UK general election.

After considerable depreciation between May and November 2018, the Chinese renminbi (RMB) fell modestly through the first seven months of 2019. On August 5, 2019, amid heightened concerns about the U.S.-China trading relationship and a lack of PBOC action to defend the currency, the RMB depreciated through seven RMB to the dollar for the first time since 2008. Volatility of the RMB since mid-2018 came in the context of concerns about the Chinese domestic growth outlook and trade tensions. While capital outflow pressures in China were significantly diminished relative to the heightened level they reached in 2015, outflows picked up in late 2018 and early 2019.

Emerging market currencies continued to depreciate in the first nine months of 2019, albeit at a slower pace relative to 2018 with a few exceptions **(Chart 4.6.3)**. The Argentine peso depreciated by 50 percent in 2018 and a further 35 percent in the first nine months of 2019 amidst renewed sovereign credit concerns and political uncertainty **(see Section 4.2.2)**. The Turkish lira, which depreciated by nearly 30 percent in 2018, fell a further 6.4 percent over the first nine months of 2019 due to continued political uncertainty.

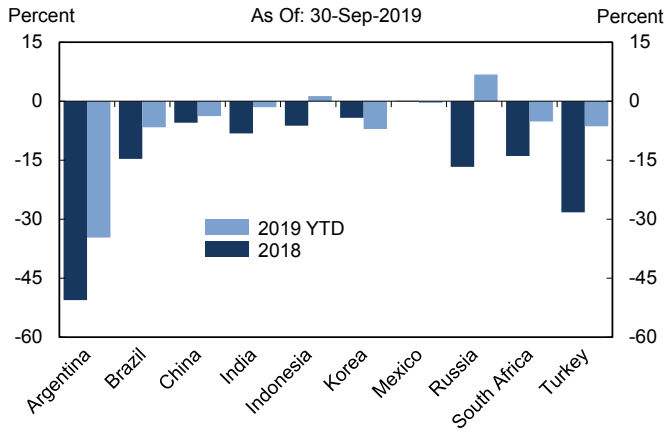
4.6.2 Nominal Value of the U.S. Dollar



Source: Federal Reserve, Haver Analytics

Note: Jan 2008 = 100. Above 100 indicates dollar strengthening, while below 100 indicates dollar weakening. EME dollar index is a weighted average of the FX value of the USD against a subset of the broad index currencies that are EMEs.

4.6.3 Change in U.S. Dollar Exchange Rates



Source: Wall Street Journal, Haver Analytics

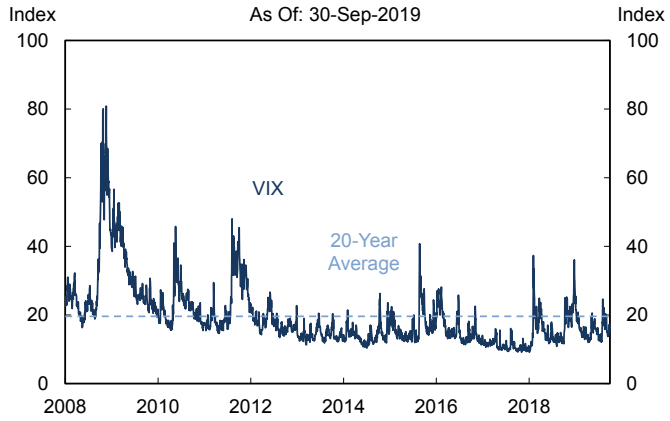
4.7 Equities

While U.S. equity markets saw strong performances in recent years, they have been largely flat between January 2018 and September 2019. The S&P 500 gained over 9 percent in the first three quarters of 2018 before falling sharply at the end of 2018 on broadening concerns about global growth, trade tensions, and less accommodative monetary policy from the Federal Reserve. As a result, the index was little changed on net for the year. Despite some softening global economic data and a slowdown in corporate earnings growth, the S&P 500 was up nearly 20 percent for the first nine months of 2019 amid more accommodative monetary policy communications from the Federal Reserve and central banks in other advanced nations. Equity market volatility was low for much of 2019, with fluctuating global trade tensions leading to brief spikes **(Chart 4.7.1)**.

European equities were more resilient compared to Japanese and emerging market equities. As of September 2019, the Euro Stoxx and DAX indices were up 5.0 percent and 1.5 percent year-over-year, respectively, despite the weaker growth outlook and escalating trade risks. However, equity returns presented a mixed picture in EMEs, and markets with large exposures to global supply chains—namely, Korea and Taiwan—underperformed other markets **(Chart 4.7.2)**.

U.S. equity market valuations remain elevated relative to historical levels **(Chart 4.7.3)**. The cyclically adjusted price-to-earnings (CAPE) ratio, in which market price is divided by the moving average of the last ten years of earnings, and the Buffett Indicator, in which market capitalization is presented relative to the U.S. gross national product, are both at or above the 95th percentile relative to historical levels. Valuation measures using current corporate earnings are high relative to historical levels.

4.7.1 S&P 500 Volatility



Source: Bloomberg, L.P.

4.7.2 Returns in Selected Equities Indices

As Of: 30-Sep-2019

	6 Month Returns	1 Year Returns	5 Year Annualized Returns
Major Economies			
U.S. (S&P 500)	5.0%	2.2%	8.6%
Euro (Euro Stoxx 50)	6.5%	5.0%	2.0%
Japan (Nikkei 225)	2.6%	(9.8%)	6.1%
U.K. (FTSE 100)	1.8%	(1.4%)	2.3%
Selected Europe			
Germany (DAX)	7.8%	1.5%	5.6%
France (CAC 40)	6.1%	3.4%	5.2%
Italy (FTSE MIB)	3.9%	6.7%	1.1%
Spain (IBEX 35)	0.0%	(1.5%)	(3.1%)
Emerging Markets			
MSCI Emerging Market Index	(5.4%)	(4.5%)	(0.1%)
Brazil (Bovespa)	9.8%	32.0%	14.1%
India (S&P BSE Sensex)	(0.0%)	6.7%	7.7%
China (Shanghai SE Composite)	(6.0%)	3.0%	4.2%
Hong Kong (Hang Seng)	(10.2%)	(6.1%)	2.6%
Taiwan (TAIEX)	1.8%	(1.6%)	3.8%
South Korea (KOSPI)	(3.6%)	(12.0%)	0.4%

Source: Bloomberg, L.P.

4.7.3 U.S. Stock Valuations

As Of: 2019 Q3

Metric	Current	Historical Percentile
CAPE Ratio	29.3	95%
Buffett Indicator	146%	96%
Price-to-Book	3.4	83%
Trailing Price-to-Earnings	19.6	77%
Forward Price-to-Earnings	17.5	77%

Source: Bloomberg, L.P., Wilshire Associates, Haver Analytics, OFR

Note: Percentiles are based on historical data since, respectively, 1881, 1970, 1990, 1954, and 1990. CAPE, price-to-book, and price-to-earnings ratios are based on the S&P 500 aggregate index. Buffett Indicator is based on the Wilshire 5000 and is as of 2019 Q2.

4.8 Commodities

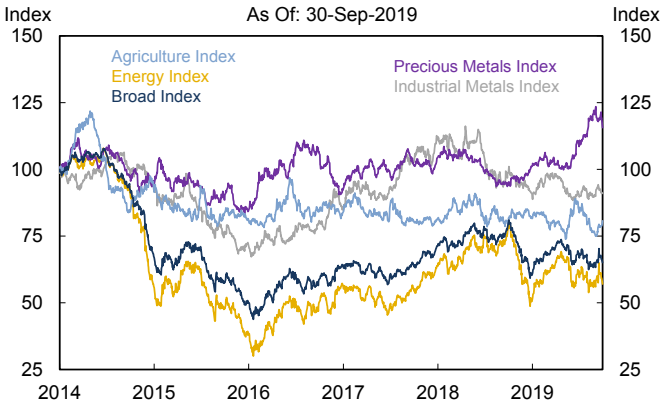
Over the past year, commodity prices broadly declined as expectations of slowing global growth cut into demand. The S&P GSCI Index of global commodity prices fell by 17 percent over the twelve months ended September 2019, though performance varied across commodity types for idiosyncratic reasons **(Chart 4.8.1)**.

On the back of production limits agreed upon by the Organization of Petroleum Exporting Countries (OPEC) countries plus other major oil producers like Russia (OPEC+), Brent crude oil prices reached a four-year high of $86 per barrel in October 2018. However, crude prices fell substantially in late 2018 because of concerns about a slowdown in global growth and idiosyncratic supply-demand imbalances in the oil market. Crude oil prices steadily rebounded in the first half of 2019 as some OPEC+ countries limited production. In September 2019, oil prices moved sharply higher in response to an attack on a Saudi oil facility. However, the increase was short lived as production was restored and prices soon moved below pre-attack levels.

Industrial metals fell sharply over the past year. The S&P GSCI Industrial Metals Spot Index was down 7.5 percent for the twelve months ended September 2019. Similar to other commodity prices, industrial metal prices fell as uncertainty from trade tensions and slowing global growth reduced demand. One major outlier was iron ore, a commodity for which supply disruptions, including a major dam disaster at the Vale SA operation in Brazil, helped push prices up by over 100 percent between mid-2018 and mid-2019.

Agricultural prices also trended lower because of trade tensions and concerns about the global economy. Over the past year, prices for the basket of commodities in the S&P GSCI Agriculture Index approached ten-year lows. As of September 2019, corn and soybean prices were more than 20 percent lower than historical averages **(Chart 4.8.2)**. In addition to being affected by low prices, U.S. farm incomes were depressed by unprecedented flooding

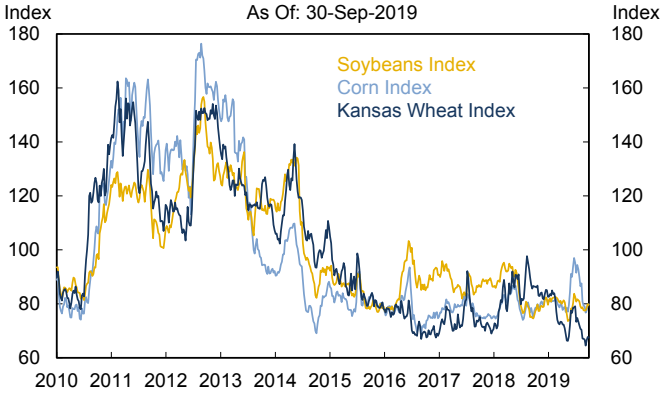
4.8.1 Commodities



Source: S&P GSCI Spot Indices, Haver Analytics

Note: 01-Jan-2014 = 100.

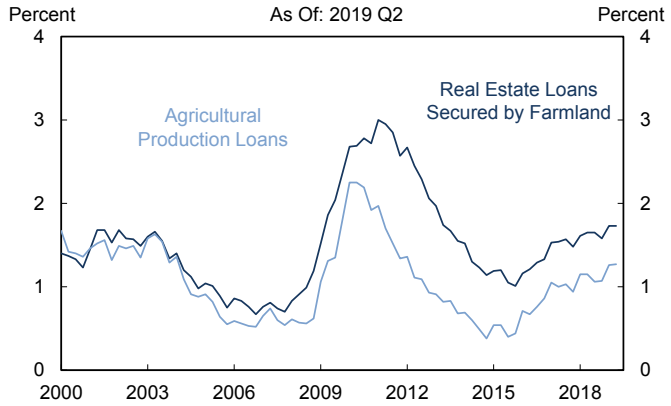
4.8.2 Agricultural Prices



Source: S&P GSCI Spot Indices, Haver Analytics

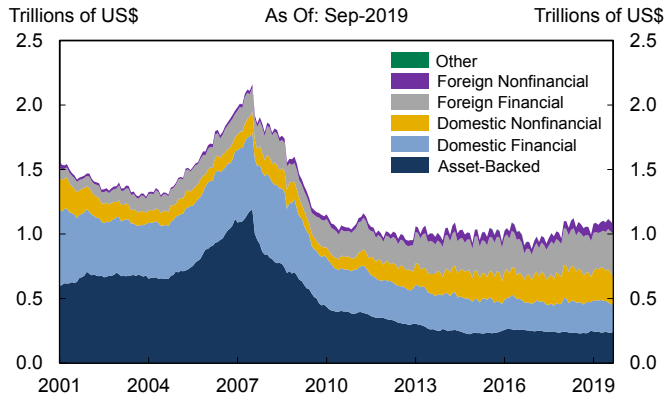
Note: Index shown as a share of its 2010-present average.

4.8.3 Agricultural Loans: Noncurrent Rate



Source: FDIC, Haver Analytics

4.9.1 Commercial Paper Outstanding



Source: Federal Reserve, Haver Analytics

Note: Not seasonally adjusted. Domestic includes CP issued in the U.S. by entities with foreign parents.

impacting spring planting, which resulted in lower yields and reduced quality for both grain and oilseed crops. As a result these factors, overall net farm income was nearly 50 percent below its 2013 peak.

Farm banks are a large source of financing to the agricultural sector, and represented approximately 25 percent of banks in the United States and $127 billion of loans in June 2019. According to USDA projections, farm debt was expected to rise by 3.4 percent in 2019 to $416 billion. Last year, farm debt-to-income was at the highest level since 1984. Delinquency rates for commercial agricultural loans for both real estate and agricultural production were at a six-year high **(Chart 4.8.3)**. Farm bankruptcies were at their highest levels since 2012, up 13 percent year-over-year, with 535 farms filing for Chapter 12 bankruptcy over the past twelve months.

4.9 Wholesale Funding Markets

4.9.1 Unsecured Borrowing

Commercial Paper

After reaching a multi-decade low of $885 billion in December 2016, commercial paper (CP) outstanding increased to $1.1 trillion in January 2018 and remained at approximately the same level through September 2019 **(Chart 4.9.1)**. During the same period, foreign financial CP outstanding has nearly doubled, increasing from a low of $198 billion in November 2016 to $337 billion in September 2019. Asset-backed CP outstanding has remained at approximately $240 billion since the beginning of 2017.

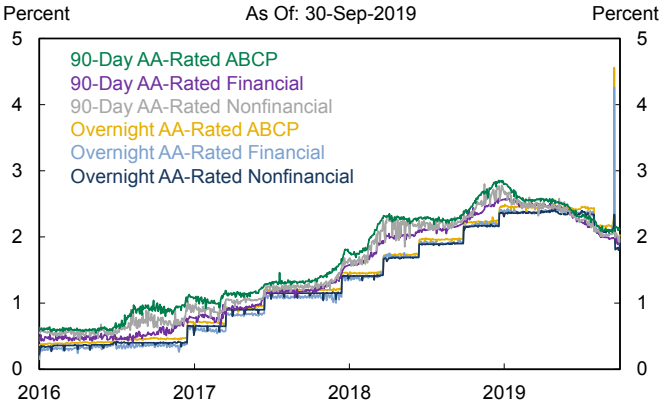
Over the past year, domestic financial CP outstanding declined slightly, from $220 billion in September 2018 to $214 billion in September 2019. Domestic financial issuers with a foreign bank parent continue to be the largest issuers in this segment of the market, accounting for over 50 percent of domestic financial CP outstanding.

Interest rates on overnight, AA-rated CP trended up through July 2019, in tandem with the effective federal funds rate. However, in June 2019, three-month AA-rated CP rates began moving below overnight CP, reflecting market participants' expectations of a future decline in short-term rates **(Chart 4.9.2)**. In mid-September, certain overnight CP rates temporarily spiked along with other short-term interest rates, notably overnight repo rates **(see Section 4.9.2)**.

Deposits

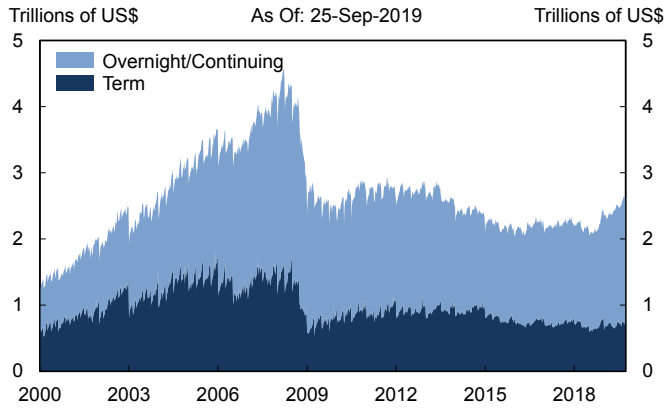
Large time deposits at commercial banks, which include wholesale certificates of deposit (CDs), stood at $1.8 trillion in September 2019, up from a low of $1.5 trillion in October 2016. The current total is around 20 percent higher than October 2016 but 14 percent below the 2008 peak of $2.1 trillion.

4.9.2 Commercial Paper Interest Rates



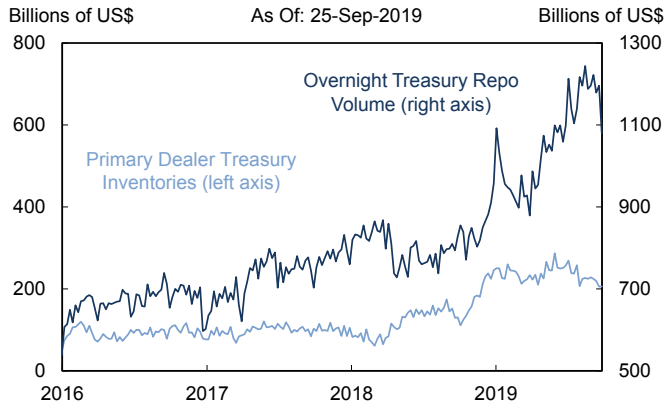
Source: Federal Reserve, Haver Analytics

4.9.3 Primary Dealer Repo Agreements



Source: FRBNY, Haver Analytics

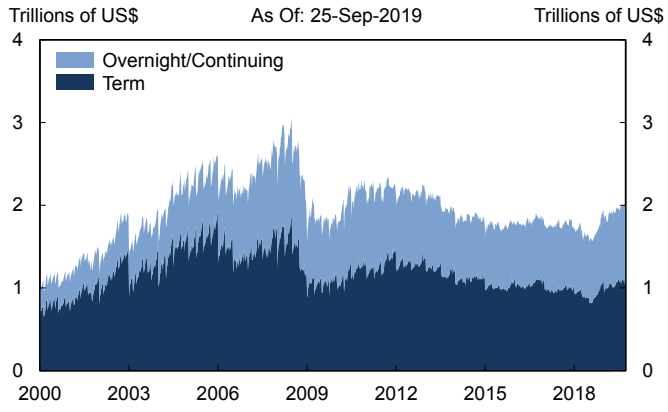
4.9.4 Overnight Repo Volumes and Dealer Inventories



Source: FRBNY, Haver Analytics

Note: Overnight Treasury repo volume includes published volumes for SOFR.

4.9.5 Primary Dealer Reverse Repo Agreements



Source: FRBNY, Haver Analytics

4.9.2 Secured Borrowing

Repo Markets

Activity in the U.S. repo market has increased over the past year. The market consists of two segments: tri-party repo, in which settlement occurs within the custodial accounts of a clearing bank (Bank of New York Mellon), and bilateral repo, which typically refers to all activity not settled within the tri-party system. Primary dealers, which are trading counterparties of FRBNY and are expected to bid in all Treasury auctions, are active in both segments of the market.

Total repo borrowing, as reported in the Federal Reserve Board's Financial Accounts of the United States, exceeded $4.2 trillion as of the second quarter of 2019, up from $3.4 trillion as of the first quarter of 2018. Within the tri-party repo market, repo volumes increased to $2.4 trillion in September 2019, up from $1.6 trillion in 2010, but short of the $2.7 trillion peak before the crisis. The total repo volumes reference all tenors and collateral types.

Primary dealer cash borrowing in the repo market increased from $2.1 trillion in September 2018 to $2.6 trillion in September 2019, the highest level since July 2013 **(Chart 4.9.3)**. The recent increase can be primarily attributed to an increase in overnight cash borrowing as a result of several factors, including primary dealers financing elevated Treasury inventories via repo markets **(Chart 4.9.4)**.

Similarly, cash lending by primary dealers in the repo market (reverse repo) increased over the past year, from $1.6 trillion in September 2018 to $2.0 trillion in September 2019, the highest level since June 2013 **(Chart 4.9.5)**. The share of overnight reverse repo has remained fairly stable at just under 50 percent. Lending at maturities of one month or longer continues to account for approximately two-thirds of term reverse repo lending.

Over the twelve months ended September 25, 2019, the proportion of high-quality collateral backing primary dealer and tri-party repo

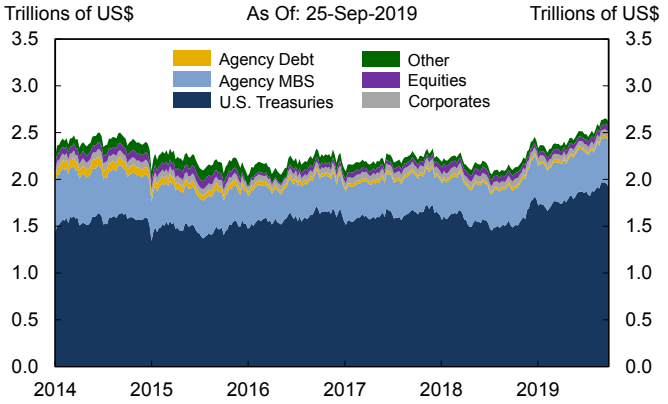
transactions recorded a modest increase **(Charts 4.9.6, 4.9.7)**. Median haircuts on collateral used in tri-party repo transactions were relatively flat for the year across most collateral classes.

Over the past twelve months, overnight Treasury repo rates experienced notable spikes, particularly at year-end 2018 and in mid-September 2019 **(Chart 4.9.8)**. On December 31, 2018, SOFR spiked by 54 basis points. The year-end impact of some banks making temporary balance sheet adjustments may have been exacerbated by relatively elevated demand for repo borrowing, in part reflecting a high volume of Treasury auction settlements and large dealer inventories. While year-end repo volatility was higher than expected, repo rates quickly returned to more normal levels, and spillovers to other benchmark short-term funding rates were negligible.

In mid-September 2019, overnight repo rates again spiked, with SOFR increasing by approximately 300 basis points. The unexpectedly high volatility in September appeared to be attributed to technical factors, including an increase in demand for funds (for example, to finance new Treasury settlements and margin calls from oil market volatility), and a decline in funds available, as corporations withdrew assets from MMFs to make quarterly tax payments. However, unlike at year-end, repo volatility spilled over to other short-term rates, including the effective federal funds rate.

In accordance with the FOMC's directive, beginning on September 17, the Open Market Trading Desk (the Desk) at the FRBNY began to conduct a series of overnight and term repo operations to help maintain the federal funds rate within the target range by adding reserves to the system. The operations have been effective in stabilizing conditions in funding markets. In October, the Desk committed to continuing these open market operations through at least January 2020. Additionally, the Federal Reserve announced it will increase the overall size of reserves to help ensure an ample

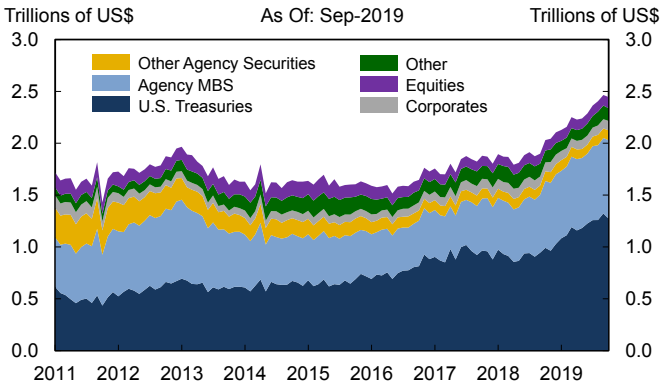
4.9.6 Primary Dealer Repo Collateral



Source: FRBNY, Haver Analytics

Note: U.S. Treasuries includes TIPS; other includes ABS.

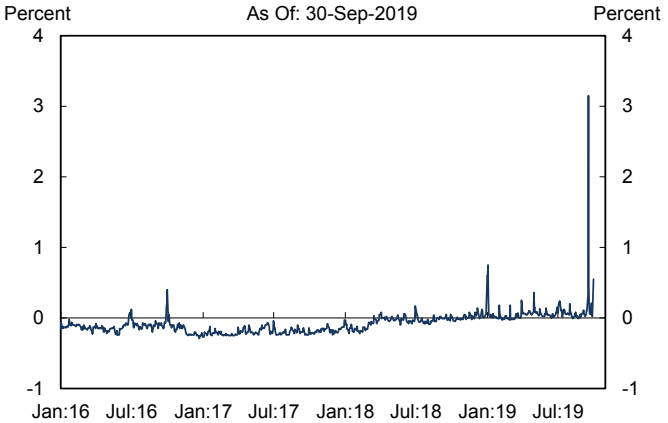
4.9.7 Collateral in the Tri-Party Repo Market



Source: FRBNY, Haver Analytics

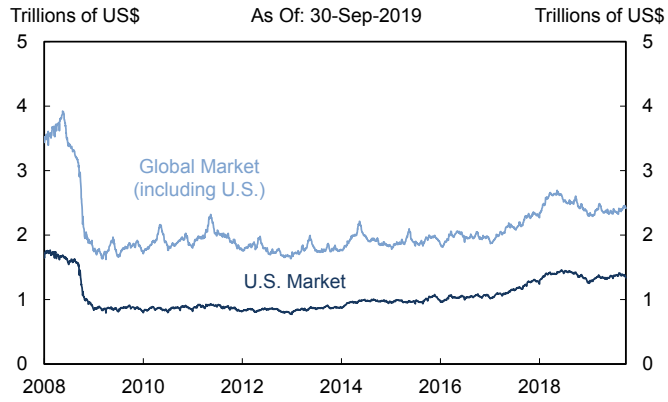
Note: Other includes ABS, CDOs, private label CMOs, international securities, money markets, municipal debt, and whole loans.

4.9.8 SOFR Spread to IOER



Source: Federal Reserve, Haver Analytics

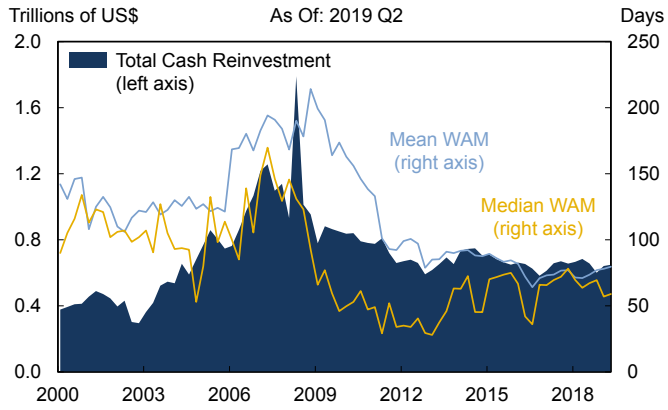
4.9.9 Value of Securities on Loan



Source: Markit Group Limited

Note: Data is based on a survey of agent-based lenders.

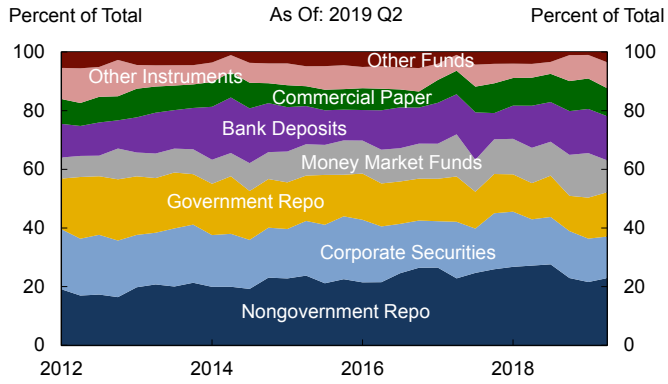
4.9.10 U.S. Securities Lending Cash Reinvestment



Source: The Risk Management Association

Note: Data is based on a survey of agent-based lenders.

4.9.11 U.S. Securities Lending Cash Reinvestment



Source: The Risk Management Association, Office of Financial Research

Note: Nongovernment repos have collateral of whole loans, equity, and corporate debt. Data is based on a survey of agent-based lenders.

level by purchasing Treasury bills, with an initial pace of $60 billion per month starting in October 2019.

Securities Lending

The value of securities on loan globally declined slightly, from $2.5 trillion in September 2018 to $2.4 trillion in September 2019 **(Chart 4.9.9)**. This decrease can largely be attributed to a decline in government bond and equity lending, which fell by $84 billion and $46 billion, respectively. The estimated U.S. share of the global activity has remained relatively flat at approximately 55 percent.

Government bonds and equities continue to account for the majority of the securities on loan globally. In September 2019, the share represented by equities was around 43 percent, while government securities accounted for approximately 45 percent of the total securities on loan.

Reinvestment of cash collateral from securities lending fell slightly over the past year, from $684 billion in second quarter of 2018 to $649 billion in the second quarter of 2019 **(Chart 4.9.10)**. The mean weighted average maturity (WAM) of cash reinvestment portfolios steadily increased while the median WAM fell over this period. This data indicates that a growing number of cash reinvestment managers are comfortable extending portfolio duration, against the backdrop of low interest rates.

The share of cash reinvestment portfolios allocated to repos backed by non-government collateral declined modestly over the past twelve months but remained over 20 percent as of the second quarter of 2019. The share of government repos increased slightly to 15 percent, while the share of corporate securities, which primarily consist of floating rate notes, fell slightly to 14 percent **(Chart 4.9.11)**.

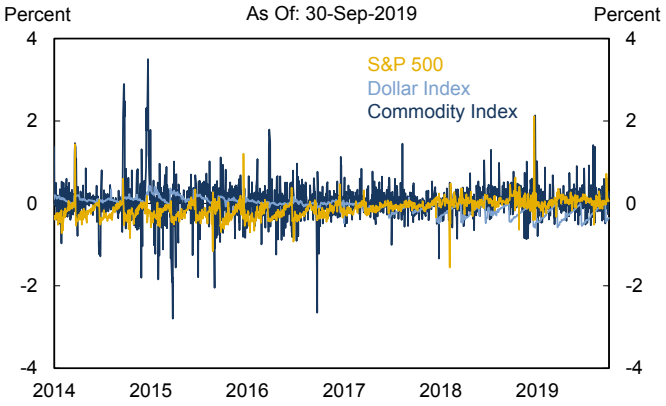
4.10 Derivatives Markets

4.10.1 Futures

Over the past year, prices for futures contracts moved in tandem with their counterparts in the underlying cash markets, and front-month futures generally traded within 1 percent of cash market prices **(Chart 4.10.1)**. However, in late December 2018, E-mini S&P 500 futures traded at a 2 percent premium, the largest spread to the cash market in over five years.

Broadly speaking, cross-market volatility rose in late 2018 and 2019 amid increased global economic and policy uncertainty **(Chart 4.10.2)**. Equity market volatility, as measured by the Chicago Board Options Exchange Volatility Index (VIX), peaked in early and late 2018 with the sell-offs in the U.S. stock market. Volatility in crude oil rose to its highest level in the past year as prices contracted in the late fall of 2018. Interest rate volatility, as measured by the 10-year U.S. Treasury Volatility Index (TYVIX), hit an all-time low of 3.16 in September 2018. Since then, interest rate volatility rose during periods of increased economic uncertainty, and in August 2019, the TYVIX reached its highest level since 2016. At the same time, speculative traders have increased their directional positions in rates futures products, and in August 2019, leveraged funds held record net short positions in longer-term Treasury futures **(Chart 4.10.3)**.

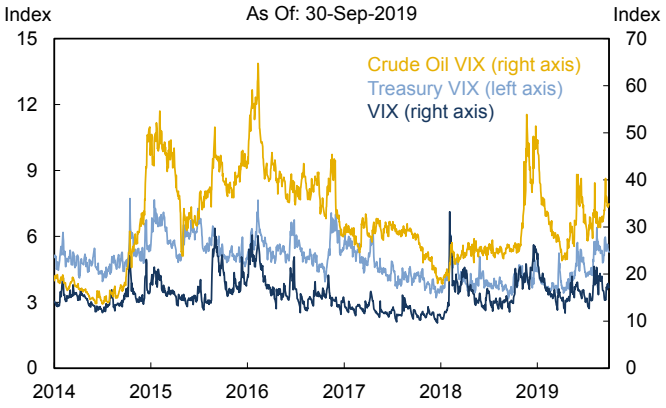
4.10.1 Futures-Spot Price Spread



Source: Bloomberg, L.P.

Note: Represents the percent spread between the front-month future and the spot price.

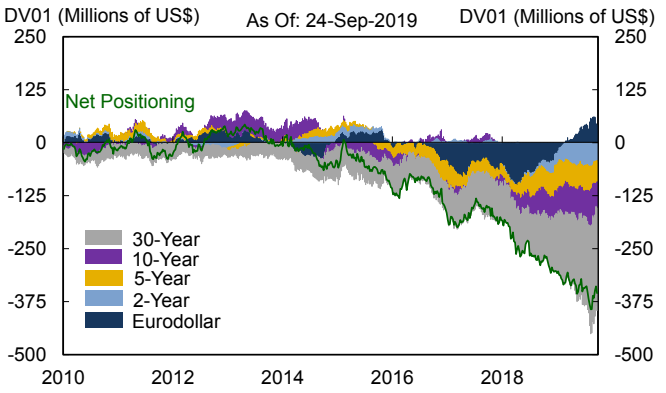
4.10.2 Market Volatility Indices



Source: Bloomberg, L.P.

Note: Crude VIX and Treasury VIX are implied volatility measures. VIX is the 1-month VIX future.

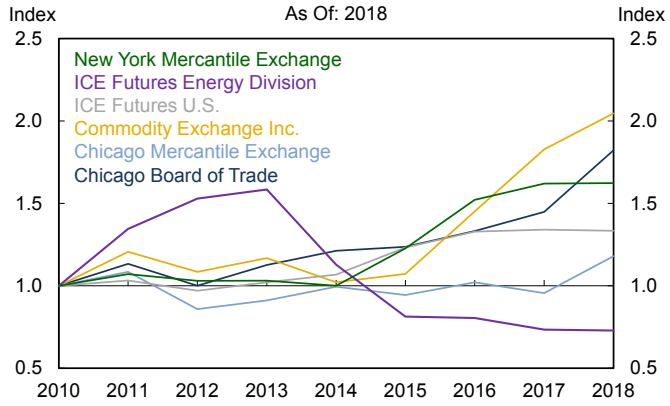
4.10.3 Leveraged Funds Net Position: Treasury & Eurodollar Futures



Source: CFTC Commitment of Traders Report, Bloomberg, L.P., Staff Calculations

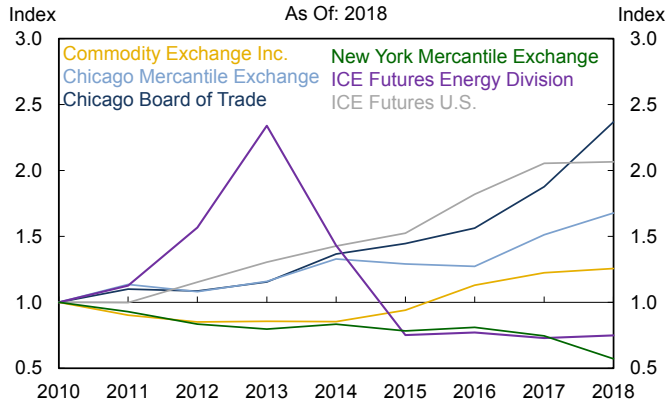
Note: Futures contracts adjusted to represent the estimated dollar value per one basis point (DV01); 10-year includes 10-Year and 10-Year Ultra Treasury Note futures; 30-Year includes Treasury Bond and Ultra Treasury Bond futures.

4.10.4 Normalized Futures Exchange Volume



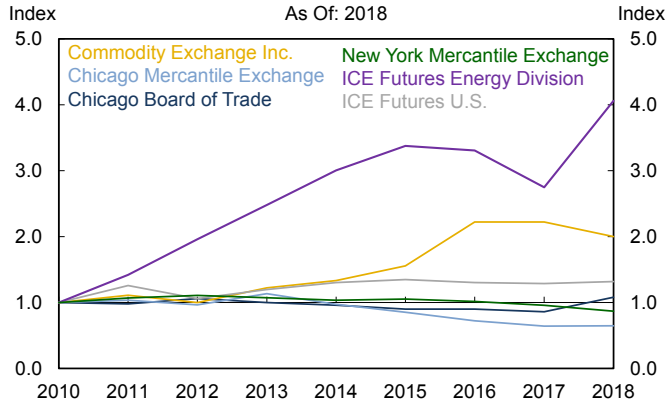
Source: CFTC

4.10.5 Normalized Futures Exchange Open Interest



Source: CFTC

4.10.6 Normalized Futures Exchange Number of Products



Source: CFTC

Volume and open interest increased on most U.S. futures exchanges in 2018, especially those where interest rate and equity index derivatives are traded **(Charts 4.10.4, 4.10.5)**. On exchanges that focus on physical commodity contracts—like energy—volume was relatively flat and open interest declined.

The number of products listed on U.S. futures exchanges was generally flat from 2017 to 2018 **(Chart 4.10.6)**. However, one exchange saw a nearly 50 percent increase in the amount of products offered, primarily in the energy sector.

4.10.2 Options

Exchange-Traded Options

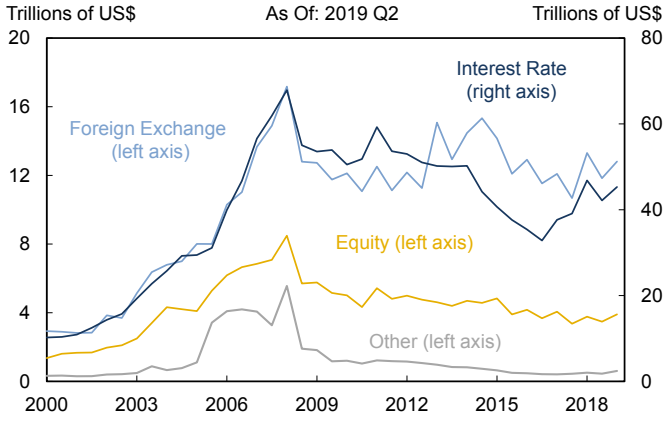
There are sixteen registered national securities exchanges that list and trade standardized equity options. About half of these exchanges (or options facilities of existing exchanges) were established in the last decade. Transactions in securities-based standardized options are all centrally cleared by the Options Clearing Corporation. The Options Clearing Corporation required approximately $46 billion in total initial margin against those transactions as of June 2019. The Options Clearing Corporation is also the issuer and guarantor of each standardized options contract. Total exchange-traded equity option volume increased by almost 24 percent in 2018. As of June 2019, there were over 4,300 equity securities underlying exchange-traded equity options.

OTC Options

Bank for International Settlements (BIS) data shows that the global notional amount outstanding of over-the-counter (OTC) options increased slightly to $63 trillion as of June 2019 **(Chart 4.10.7)**. The increase in notional amount outstanding can primarily be attributed to an increase in the notional amount of interest rate options, which have been trending upward since year-end 2016. In contrast, the amount of OTC equity options continued to trend downwards, and as of the fourth quarter of 2018, the notional amount of equity options outstanding totaled $3.5 trillion, down 60 percent from the peak of $8.5 trillion in the second quarter of 2008. It should be noted that the definition of an OTC option can vary among jurisdictions. In particular, while an OTC equity option is a derivative in the United States, these types of options (either referencing broad-based or single-name) generally are securities under the Securities Exchange Act of 1934.

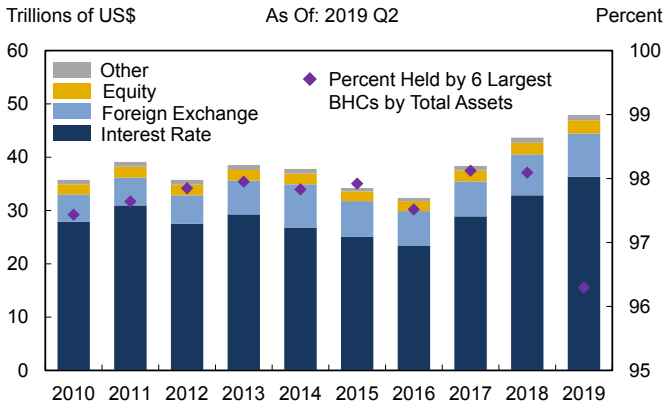
In recent years, BHCs have increased their exposure to OTC options and as of the second quarter of 2019, the notional amount of purchased and written options held by BHCs totaled $48 trillion **(Chart 4.10.8)**. Between the fourth quarter of 2016 and the second quarter of 2019, BHC exposures to OTC interest rate options (swaptions) increased by 55 percent, while exposures to OTC FX, equity, and other options increased by 26, 33, and 69 percent, respectively. At the same time, BHC net notional exposures to options—as measured by written minus purchased options—have increased from $0.9 trillion to $2.7 trillion. This increase can primarily be attributed to certain large BHCs increasing net exposures to swaptions and OTC equity options **(Chart 4.10.9)**. OTC option exposures continue to be concentrated in a small number of major institutions. According to Y-9C data, the six largest BHCs continue to account for over 95 percent of total OTC option exposures.

4.10.7 OTC Options: Global Notional Outstanding



Source: BIS, Haver Analytics

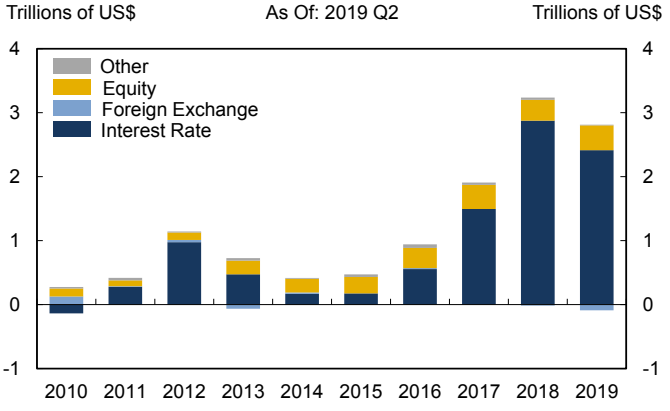
4.10.8 OTC Options: BHC Gross Notional Outstanding



Source: FR Y-9C, Staff Calculations

Note: Other includes credit, commodity, and other OTC options.

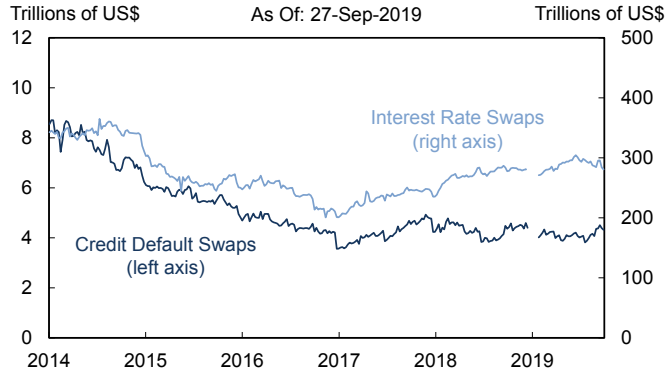
4.10.9 OTC Options: BHC Net Notional Outstanding



Source: FR Y-9C, Staff Calculations

Note: Other includes credit, commodity, and other OTC options.

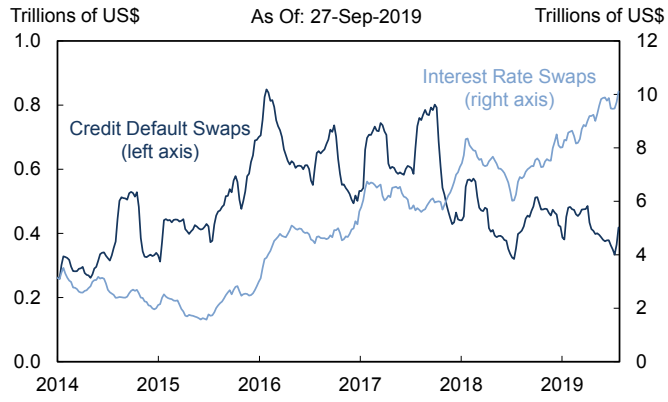
4.10.10 Derivatives Notional Amount Outstanding



Source: CFTC Weekly Swaps Report, Haver Analytics

Note: Weekly Swaps Report not issued between Dec. 22, 2018 and Jan. 26, 2019 due to a lapse in government funding; excludes security-based swaps.

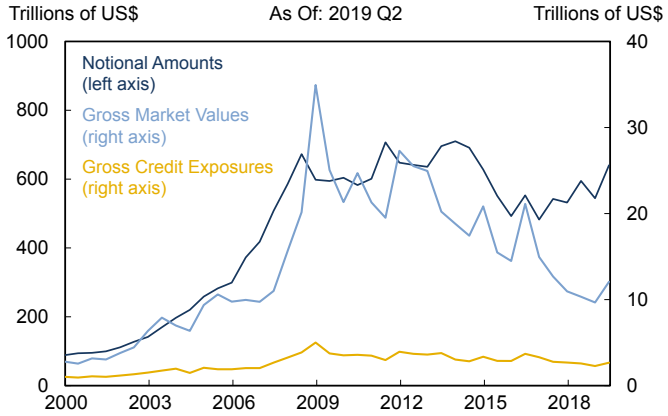
4.10.11 Derivatives Notional Volume



Source: CFTC Weekly Swaps Report, Haver Analytics

Note: 12-week moving-averages; excludes security-based swaps.

4.10.12 Global OTC Positions



Source: BIS, Haver Analytics

4.10.3 OTC Derivatives

Trends in U.S. OTC activity during the last year generally followed those seen in 2018. The notional amount of interest rate swaps outstanding continued to rise through the period, peaking at just over $300 trillion in June 2019 **(Chart 4.10.10)**. Positions on a risk-adjusted basis grew less rapidly than this gross notional trend. Outstanding interest rate swap risk, as measured on an entity-netted notional basis, increased by just over 1 percent from the end of 2018 through the first half of 2019, from $14.3 trillion to $14.5 trillion. During the same period, the notional amount of CDS outstanding remained roughly flat at just over $4 trillion. Similarly, interest rate swap volumes continued to increase through 2019, while CDS volumes were flat or falling **(Chart 4.10.11)**.

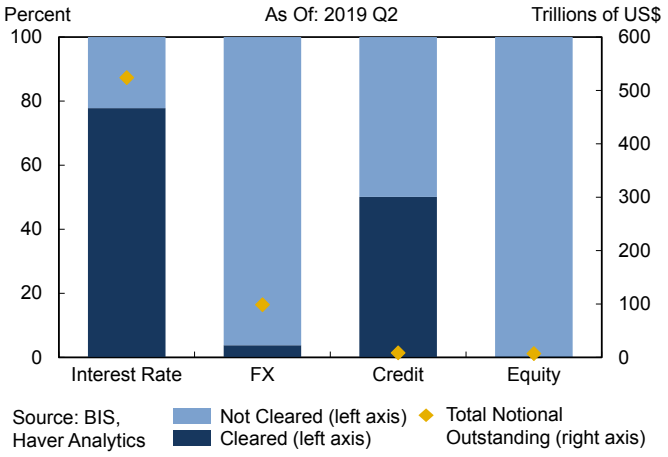
Global OTC derivative positions increased over the past year, with the total notional amount of derivatives increasing from $595 trillion in June 2018 to $640 trillion in June 2019. Market values experienced a similar increase, from $10.3 trillion in June 2018 to $12.1 trillion in June 2019 **(Chart 4.10.12)**.

4.10.4 Central Counterparty Clearing

Measured by gross notional outstanding, approximately 78 percent of global OTC interest rate derivatives and 50 percent of OTC credit derivatives were centrally cleared as of June 2019. OTC equity and FX derivatives continue to have lower clearing rates. As of June 2019, less than 4 percent of outstanding OTC equity and FX derivatives were centrally cleared globally, while approximately $408 trillion in notional outstanding OTC interest rate derivatives and $4.2 trillion in notional outstanding OTC credit derivatives were centrally cleared **(Chart 4.10.13)**.

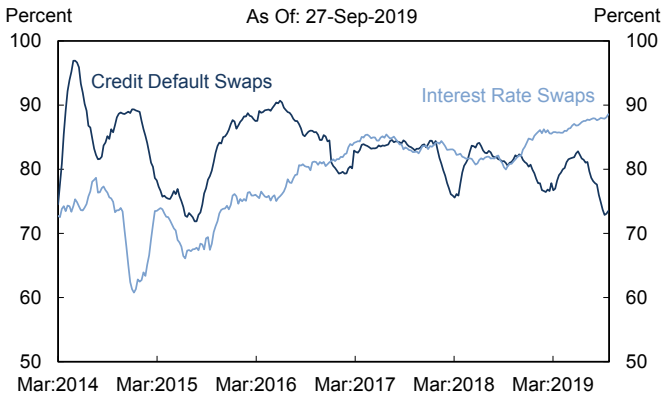
U.S. clearing rates were broadly similar to global clearing rates, and as of September 2019, 81 percent of outstanding OTC interest rate derivatives were centrally cleared, while 44 percent of OTC credit derivatives were centrally cleared. Nearly 90 percent of new U.S. interest rate swap volumes were centrally cleared as of the third quarter of 2019, slightly higher than in the previous year **(Chart 4.10.14)**. Clearing rates on new OTC credit derivative transactions fell below 75 percent in the third quarter of 2019, the lowest level in four years. This decline can primarily be attributed to an increase in the volume of products with low clearing rates. These include exotic credit products, credit swaptions, and credit total return swaps. New index CDS products continue to report clearing rates above 95 percent.

4.10.13 Global OTC Central Clearing Market Share



Source: BIS, Haver Analytics

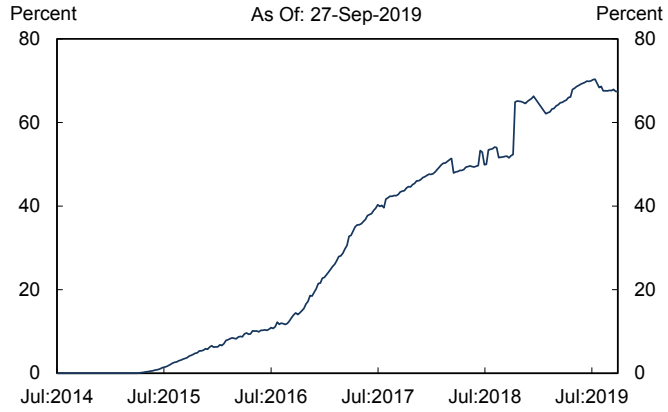
4.10.14 Average Clearing Rates for OTC Trading



Source: CFTC Weekly Swaps Report, Haver Analytics

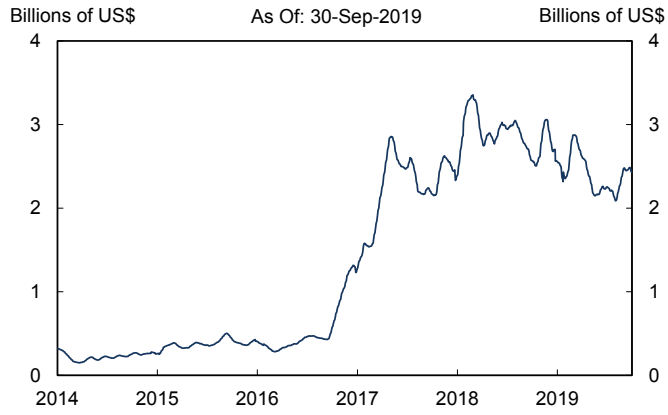
Note: 12-week moving-averages; excludes security-based swaps.

4.10.15 Clearing Rates for U.S. Inflation Swap Positions



Source: CFTC

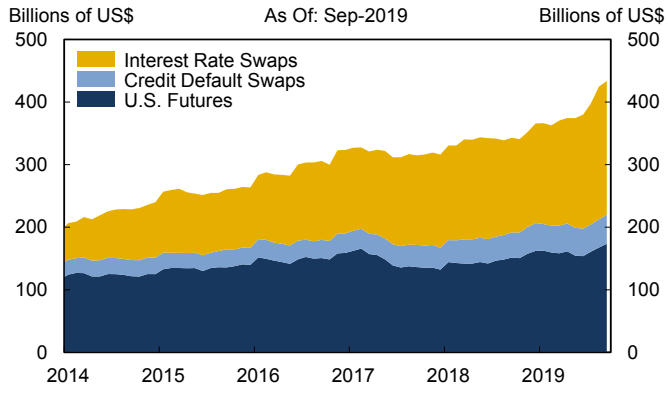
4.10.16 Initial Margin Posted against Cleared FX Positions



Source: CFTC

Note: 20-day moving-average.

4.10.17 Cleared Initial Margin Requirements



Note: Includes house and customer margin requirements. Futures margin include CME, ICEU, and ICUS. Interest rate swap margin include CME and LCH Ltd. Credit default swap margin include CME, ICC, ICEU, and LCH SA). All data are as of month-end.

Source: CFTC

Central clearing has become more prevalent throughout the world as clearing mandates have been introduced in a number of jurisdictions for the most standardized products such as fixed-float rate swaps and major credit index swaps. In addition, and more recently, margin requirements for uncleared swaps have led some market participants to centrally clear swaps voluntarily in cases where central clearing is more cost efficient. As a result, clearing rates and the amount of margin posted for centrally clearable, but not mandated, products like inflation swaps and non-deliverable forwards are significantly higher than they were a few years ago, prior to the uncleared margin requirements **(Charts 4.10.15, 4.10.16)**.

As of September 30, 2019, futures and swap initial margin held at CCPs totaled $434 billion, nearly double the amount of initial margin held by CCPs five years ago **(Chart 4.10.17)**. Much of the recent growth in initial margin held at CCPs has been margin for cleared interest rate swap products. These products now account for nearly 50 percent of total margin at CCPs, up from about 30 percent in early 2014. As of September 30, 2019, total futures customer initial margin held at CCPs was $141 billion, with $80 billion at the top five firms; total swaps (primarily interest rate and CDS) customer initial margin was $156 billion, with $95 billion held by the top five firms.

4.10.5 Futures Commission Merchants

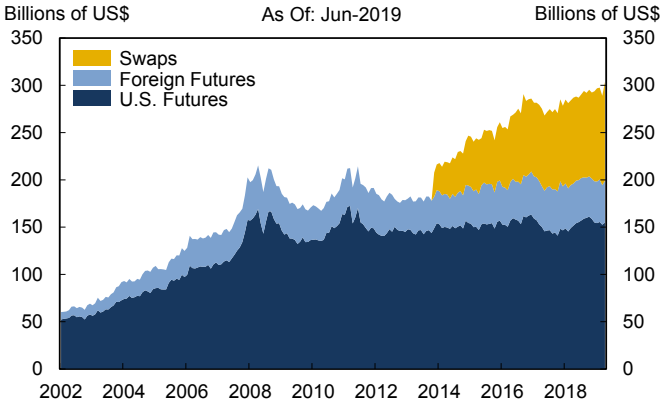
Futures Commission Merchants (FCMs) are market intermediaries registered with the CFTC. FCMs provide customers with a mechanism for access to the centrally cleared derivatives market. FCMs collect funds from customers to margin centrally cleared futures, options on futures, and swap transactions. Margin funds collected by FCMs from customers are deposited with CCPs to support customer positions and to protect the CCP in the event of customer losses.

The increased use of central clearing for certain derivative products has highlighted the critical role performed by FCMs in the reduction of systemic risk. In addition to managing the deposit and withdrawal of customer margin funds with CCPs, FCMs provide a financial guarantee to the CCP for their customers' futures, options on futures, and swap positions. Accordingly, in the event of a customer default, the FCM carrying the customer's account is obligated to use its own capital or other proprietary source of funds to satisfy the customer's financial obligation to the CCP. FCMs also may have contingent financial obligations under a CCP's mutualized loss allocation protocols.

With respect to the more established businesses of centrally cleared futures and options on futures, the level of customer margin funds held by FCMs has remained fairly flat since the financial crisis **(Chart 4.10.18)**. For the centrally cleared swaps business, where customer clearing and associated data collection have been more recently introduced, the level of customer margin funds held by FCMs has increased from about $44 billion at year-end 2014 to $109 billion as of June 2019.

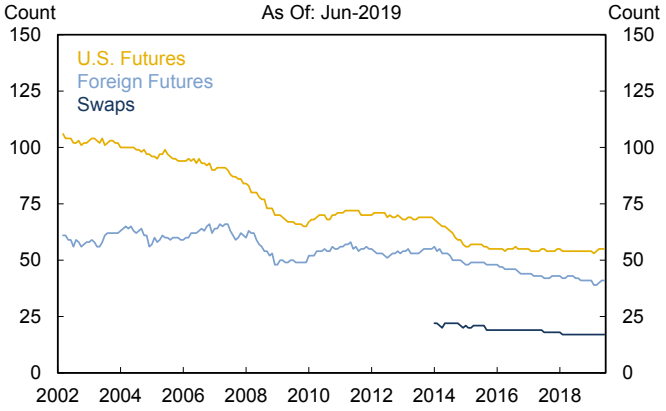
For futures and options on futures (including foreign futures traded under Part 30 of CFTC regulations), the number of FCMs registered with the CFTC holding customer funds has fallen from just over 100 in 2002 to 55 (of which 26 are bank-affiliated FCMs) as of June 2019 **(Chart 4.10.19)**. The total number of FCMs holding customer funds has remained stable over the past year. The number of FCMs reporting holding segregated client funds for the centrally cleared swaps business decreased from 23 at year-end 2014 to 17 (of which 15 are bank-affiliated FCMs) as of June 2019. The number of FCMs clearing swaps for customers remained consistent between 2018 and 2019.

4.10.18 Margin Funds Held at CFTC Registered FCMs



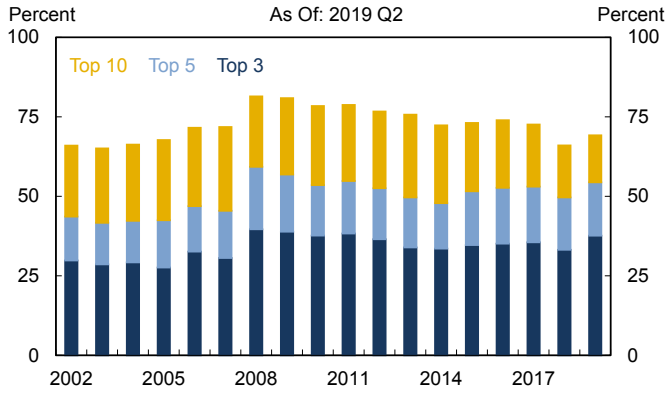
Source: CFTC

4.10.19 CFTC Registered FCMs Holding Client Funds



Source: CFTC

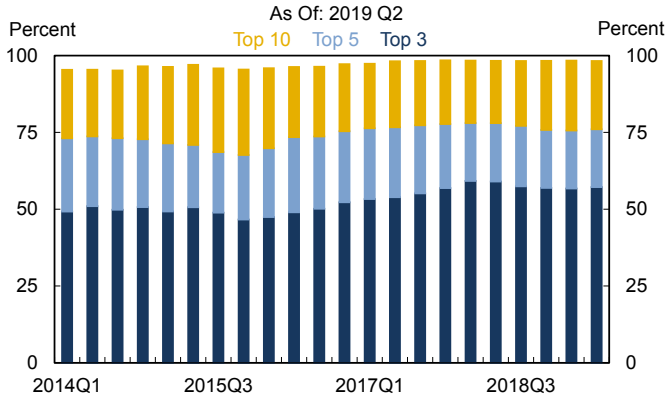
4.10.20 FCM Concentration: Customer Future Balances



Source: CFTC financial data for FCMs

Note: Represents total amount of funds that an FCM is required to segregate on behalf of customers who are trading futures and options on futures at U.S. exchanges.

4.10.21 FCM Concentration: Customer Swap Balances



Source: CFTC financial data for FCMs

Note: Represents the amount of funds an FCM is required to segregate for customers who trade cleared swaps.

Although the number of registered FCMs has fallen considerably since 2002, the clearing business has remained highly concentrated over a long period. Between 2002 and 2019, the top five clearing members at futures exchanges held 40 to 60 percent of client margin for futures products, and since 2014, the top five swap clearing members have held between 70 and 80 percent of client margin for swaps products **(Charts 4.10.20, 4.10.21)**.

The decline in the number of FCMs reflects a long-term trend of business consolidation due to technology and changes in market structure. In addition, some bank-affiliated FCMs have stated that Basel-based bank capital requirements, including the supplementary leverage ratio (SLR), have impacted their decisions regarding providing client clearing services. On June 26, 2019, the Basel Committee on Banking Supervision released a revision to the SLR's treatment of client-cleared derivatives that would allow a bank to recognize cash and non-cash initial and variation margin posted by customers in determining the bank's exposure for purposes of computing the SLR. Commenters noted that such treatment, if adopted by U.S. banking regulators, may incentivize new market entrants or expansion of clearing services that may help alleviate the concentration of client clearing services noted above. As the structure of OTC derivatives markets and clearing continues to evolve, regulators continue to monitor FCM industry trends and the possible implications for financial stability, particularly in stressed market conditions.

4.10.6 Swap Dealers

Section 1a(49) of the Commodity Exchange Act defines the term "swap dealer" (SD) to include any person who: (1) holds itself out as a dealer in swaps; (2) makes a market in swaps; (3) regularly enters into swaps with counterparties as an ordinary course of business for its own account; or (4) engages in any activity causing the person to be commonly known in the trade as a dealer or market maker in swaps. Registered SDs must comply with regulations

that address, among other things, registration, internal and external business conduct standards, reporting, recordkeeping, risk management, and margin.

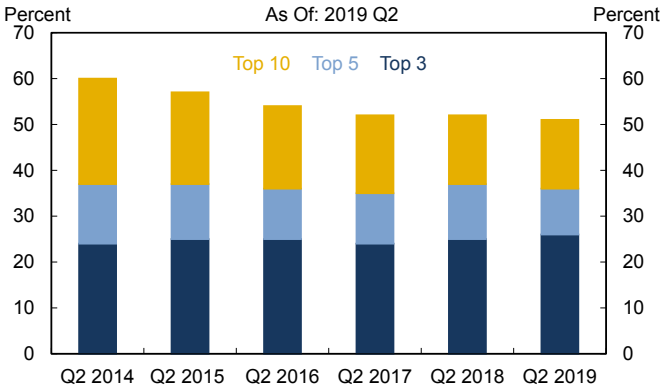
In lieu of certain CFTC and SEC requirements, registered SDs, security-based SDs, major swap participants, and major security-based swap participants for which one of the banking agencies is the prudential regulator, are subject to the margin and capital requirements of that banking agency. Additionally, in some circumstances, non-U.S. SDs may comply with foreign jurisdiction regulations rather than CFTC regulations (for example, margin requirements of a foreign jurisdiction for which a substituted compliance determination has been made by the CFTC).

SDs began registering with the CFTC in December 2012. As of September 2019, there were 107 registered SDs, an increase from the 80 provisionally registered SDs as of the end of 2013. The number of registered SDs has remained relatively steady, at approximately 90 or greater, since the end of 2014.

The swaps activity of registered SDs is relatively concentrated. For example, as of the end of the second quarter of 2019, the top three SDs by number of swap positions outstanding accounted for 26 percent of the total swap positions of registered SDs **(Chart 4.10.22)**.

Additionally, in calendar year 2017—the latest period for which this analysis was conducted—ten financial institutions were party to 78 percent of all swaps, after aggregating activity by corporate family. Registered SDs were party to over 99 percent of swaps in calendar year 2017. In both instances, the statistics do not include interaffiliate transactions or transactions between two non-U.S. persons.

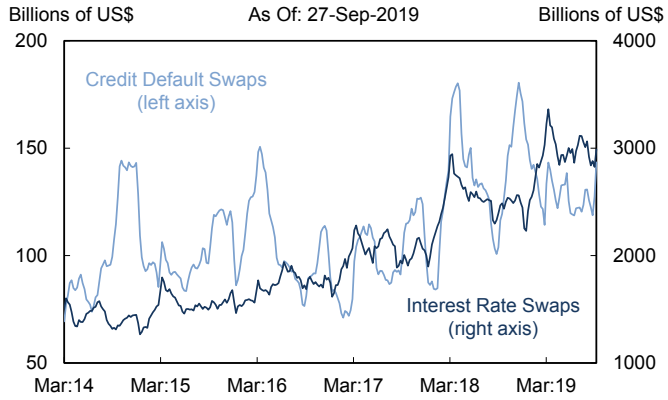
4.10.22 Concentration of Swap Positions for Registered SDs



Source: CFTC

Note: Positions between two Swap Dealers (SDs) in the same category (*e.g.*, Top 3 or Top 5) are double-counted (*i.e.*, a trade between the #1 SD and #3 SD would be counted twice).

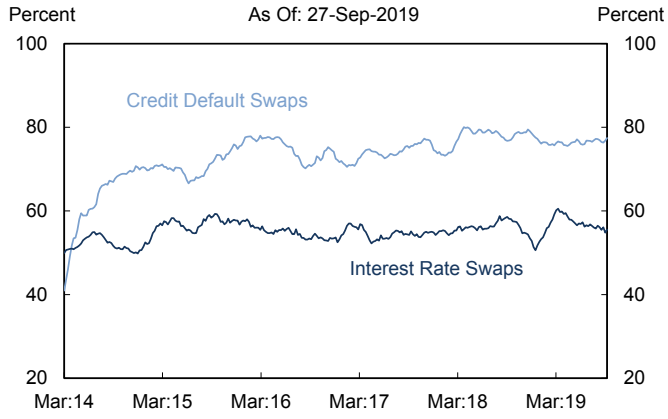
4.10.23 On-SEF Weekly Trading Volume



Source: ISDA SwapsInfo

Note: 12-week moving averages. Excludes security-based swaps.

4.10.24 On-SEF Trading Share



Source: ISDA SwapsInfo

Note: Share of notional volume. Excludes security-based swaps. 12-week moving averages.

4.10.7 Regulated Platform Trading

Similar to trends in swap clearing, the level of U.S.-regulated swaps executed on a centralized platform (that is, a Swap Execution Facility, or SEF) has continued to rise. In 2019, the average weekly notional volume for interest rate swaps was up approximately 15 percent during the first nine months of 2019 as compared to the same period in 2018. Though trading volumes for CDS indices trended down through the first nine months of 2018, the average weekly notional CDS volume on SEFs has remained at approximately the same level **(Chart 4.10.23)**. The share of interest rate swap trading that occurred on SEFs versus off SEFs decreased slightly in 2018, though it has generally returned to prior levels in 2019; the share of CDS index trading that occurred on SEFs versus off SEFs also appeared relatively unchanged in 2019 **(Chart 4.10.24)**.

Although SEF trading has increased over time, the number of fully registered SEFs decreased from 2018 to 2019, with certain SEFs going dormant as a result of a lack of trading activity. Certain interest rate swaps and CDS indices have been "made available to trade," and therefore are required to be executed on a SEF, an exempt SEF, or a designated contract market. Combined with mandatory central clearing, these regulated trading platforms have increased pre-trade price transparency, reduced operational risk due to electronic execution, and improved end-to-end processing.

4.11 Bank Holding Companies and Depository Institutions

4.11.1 Bank Holding Companies and Dodd-Frank Act Stress Tests

BHCs, including financial holding companies (FHCs), are companies that typically own at least one commercial bank subsidiary. BHCs may also include nonbank subsidiaries such as broker-dealers, investment advisers, or insurance companies. There are eight U.S. global systemically important banks (G-SIBs) (Category I BHCs) and two groups of large BHCs: large complex BHCs (Category II and III BHCs) and large noncomplex BHCs (Category IV BHCs) **(Chart 4.11.1)**. As of the second quarter of 2019, BHCs in the United States, excluding the U.S. intermediate holding companies (IHCs) of foreign banking organizations (FBOs), held approximately $17 trillion in assets. U.S. G-SIBs account for 65 percent of this total. Large complex BHCs account for 8 percent. Large noncomplex BHCs account for 10 percent. All other BHCs account for the remaining 17 percent of assets **(Chart 4.11.2)**.

Capital Adequacy

Equity capital provides a buffer to absorb losses that may result from losses on loans, securities, or trading portfolios, or other operational and legal risks. Regulatory capital at BHCs has risen significantly since the 2008 financial crisis. The ratio of common equity tier 1 (CET1) capital to risk-weighted assets of U.S. G-SIBs has more than doubled since the crisis. The groups of large complex and large noncomplex BHCs rapidly built up regulatory capital in line with U.S. G-SIBs until 2014. From 2014 through the first quarter of 2018, the CET1 ratios for these two groups of large BHCs declined. But while the CET1 ratio for the large noncomplex group continued to decline through the second quarter of 2019, the CET1 ratio for the large complex group has been rising. Both remain about 2 percentage points below the average U.S. G-SIB CET1 ratio. This difference is largely explained by the additional capital surcharges imposed on the U.S. G-SIBs. Finally, the CET1

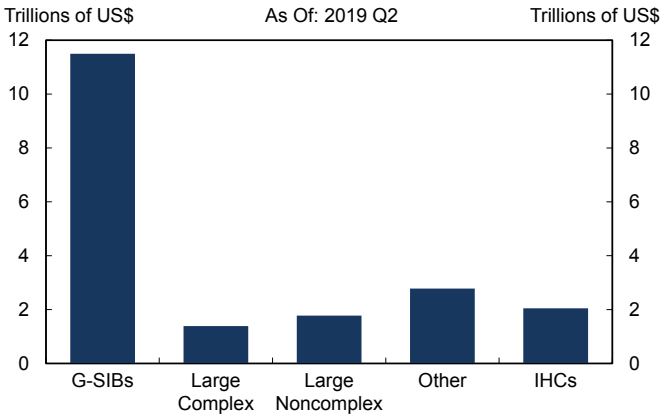
4.11.1 Categorization of Large U.S. BHCs

Description	U.S. Domestic Banking Org.	
Category 1 (U.S. G-SIBs)	Bank of America Bank of New York Mellon Citigroup Goldman Sachs	JPMorgan Chase Morgan Stanley State Street Wells Fargo
Category II (≥$700b total assets or ≥ $75b in cross-jurisdictional activity)	Northern Trust	
Category III (≥$250b total assets or ≥ $75b in nonbank assets, wSTWF, or off-balance sheet exposure)	Capital One Charles Schwab	PNC Financial U.S. Bancorp
Category IV (Other firms with $100b to $250b total assets)	Ally Financial American Express BB&T Corp. Citizens Financial Discover First Third	Huntington KeyCorp M&T Bank Regions Financial SunTrust Inc. Synchrony Financial
Other firms ($50b to $100b total assets)	Comerica Inc. CIT Group Inc. E*TRADE Financial	NY Community Bancorp Silicon Valley Bank

Source: Federal Reserve

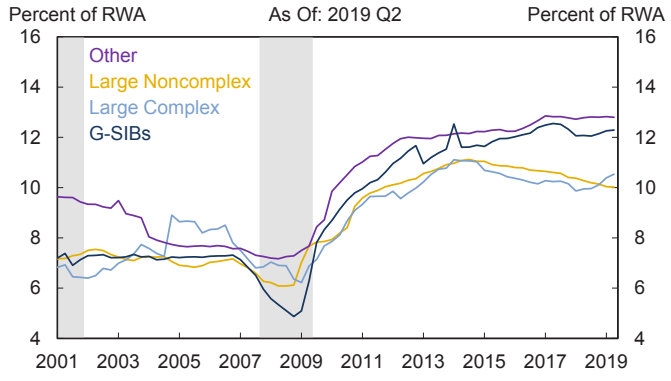
Note: Northern Trust is included in Category II because of its large cross-jurisdictional activity.

4.11.2 Total Assets by BHC Type



Source: FR Y-9C

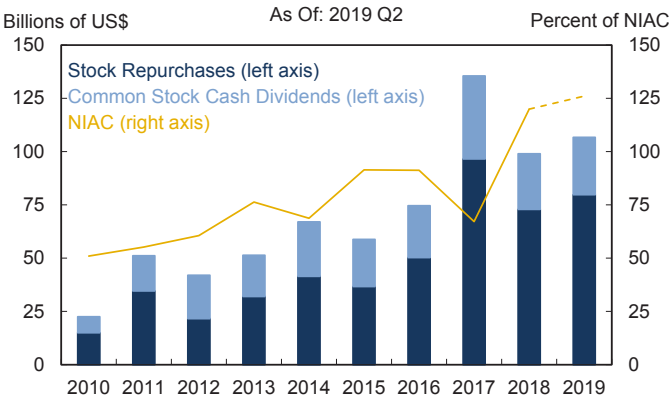
4.11.3 Common Equity Tier 1 Ratios



Note: Tier 1 common capital is used as the numerator of the CET1 ratio prior to 2014:Q1 for G-SIBs and large complex BHCs, and prior to 2015:Q1 for large noncomplex and other BHCs. The denominator is risk-weighted assets (RWA). Shaded areas indicate NBER recessions.

Source: FR Y-9C

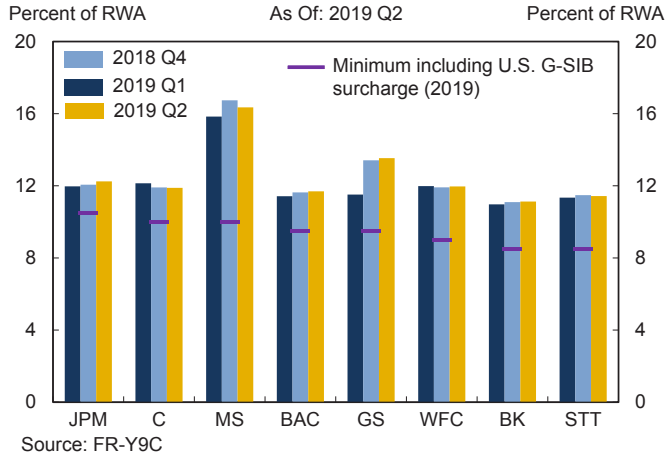
4.11.4 Payout Rates at U.S. G-SIBs



Note: Payout rates are the ratios of stock repurchases plus cash dividends to net income available to common shareholders (NIAC). NIAC is net income minus preferred dividends. 2019 data are through Q2 and are annualized.

Source: FR Y-9C

4.11.5 Common Equity Tier 1 Ratios at U.S. G-SIBs



Source: FR-Y9C

ratio of the group of other BHCs has increased by over 50 percent since the financial crisis and remains slightly above the average domestic G-SIB CET1 ratio **(Chart 4.11.3)**.

The Federal Reserve, in consultation with the FDIC and the OCC, announced on March 6, 2019, that it had voted to affirm the countercyclical capital buffer (CCyB) at the current level of 0 percent. The buffer is a macroprudential tool that would be activated when systemic vulnerabilities are meaningfully above normal and would be removed or reduced when the conditions that led to its activation abate or lessen and when the release of CCyB capital would promote financial stability.

U.S. G-SIBs meet the domestically implemented Basel III standards for the minimum risk-weighted capital ratios, the enhanced supplementary leverage ratio, capital conservation buffers, and surcharges. In addition, the stress test results show that BHCs are well capitalized and would be able to continue lending to households and firms during a severe economic downturn.

High levels of regulatory capital, coupled with improving bank profitability over the past several years, allowed U.S. G-SIBs to increase their overall payout rates, including both cash dividends and stock repurchases, above their pre-2017 averages. The overall payout rates were close to 100 percent of the net income available to common equity in 2018 and exceeded 100 percent for some firms in the first two quarters of 2019 **(Charts 4.11.4, 4.11.5)**. Public statements by some of the firms suggest capital levels may continue to decline. For example, some U.S. G-SIBs reported medium-term target CET1 ratios that are 1 to 2 percentage points below current levels. In part, the projected declines in capital ratios are driven by higher payouts.

Profitability

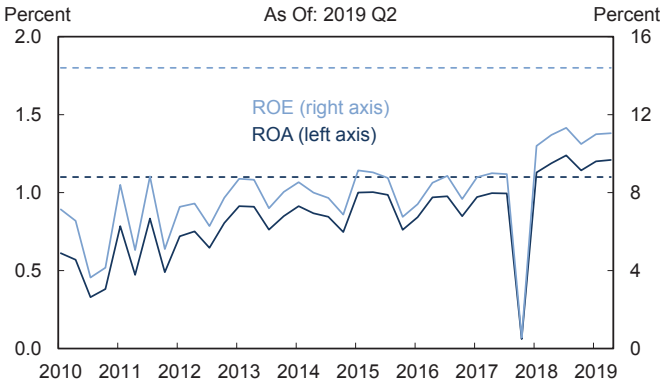
Bank profitability as measured by return on assets (ROA) and return on equity (ROE) continued to increase in 2018 and reached its highest post-crisis levels before declining in the fourth quarter of 2018. Profitability flattened in the first two quarters of 2019 **(Chart 4.11.6)**. While ROA is now around its pre-crisis average, the higher levels of capital have kept ROE about 30 percent below the average BHC ROE between 2003 and 2007.

Net interest margins (NIMs) remain near historical lows for U.S. G-SIBs. Although interest income has been rising, those gains were almost entirely offset by increasing interest expenses. In contrast, NIMs at BHCs other than U.S. G-SIBs have reached pre-crisis levels **(Chart 4.11.7)**. Growth in NIMs and bank profitability are expected to be negatively impacted by low interest rates. Deposit rates at certain BHCs have declined in recent months along with the decline in the federal funds rate.

Funding Sources

During the 2008 financial crisis, BHCs experienced disruptions in access to short-term wholesale funding. Since then, the ratio of this unstable funding source to total assets has declined to well below its 2007 level and has remained largely unchanged for the past four years. At the same time, BHCs attracted large inflows of more stable sources of funding such as core deposits. BHCs also maintained a steady share of long-term debt in recent years, including at U.S. G-SIBs, for the purposes of meeting the minimum long-term debt requirement under total loss-absorbing capacity **(Chart 4.11.8)**.

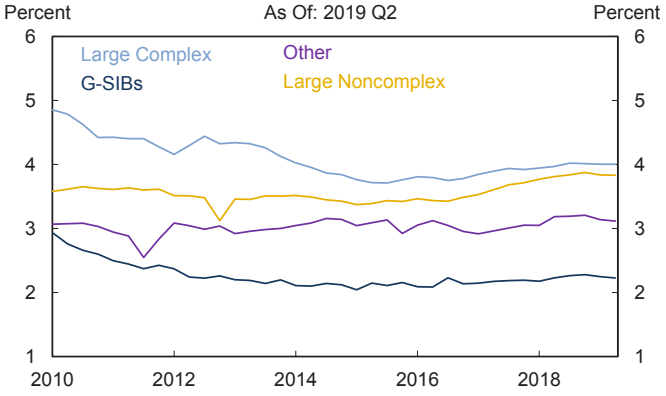
4.11.6 Return on Equity and Return on Assets



Source: FR Y-9C

Note: Dashed lines represent 2001 – 2007 averages. Return on equity is equal to net income divided by average equity. Return on assets is equal to net income divided by average assets.

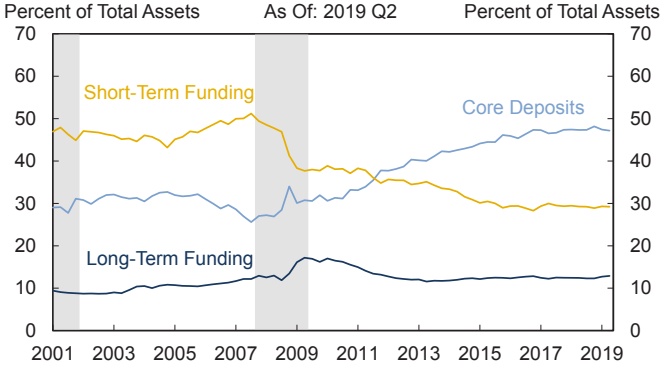
4.11.7 Net Interest Margins



Source: FR Y-9C

Note: Net interest margin is equal to net interest income divided by the quarterly average of interest-earning assets.

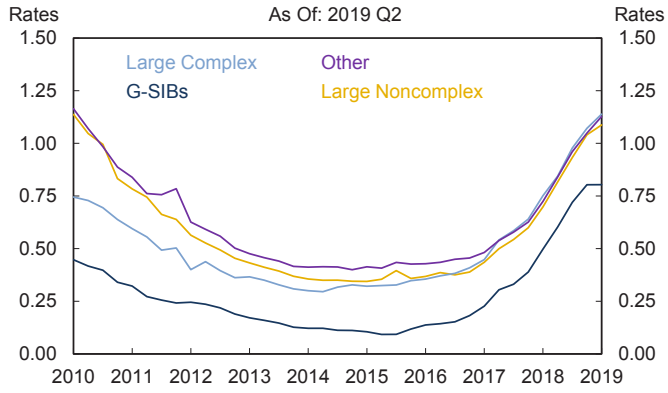
4.11.8 Selected Sources of Funding at CCAR BHCs



Source: FR Y-9C

Note: ST funding: liabilities with maturities =< 1 yr, trading liabilities, repos, CP and foreign deposits. LT funding: other borrowed money, subordinated notes and large time deposits with maturities > 1 yr. Core deposits: demand deposits, non-interest bearing balances, transaction accts, money mkt deposits and time deposits < $250K. Gray bars signify NBER recessions.

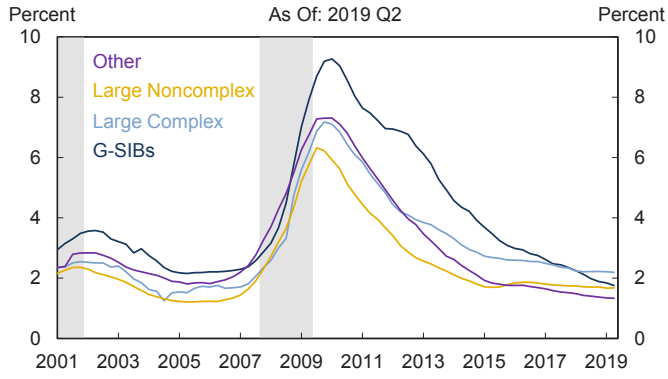
4.11.9 Effective Deposit Rates by BHC Category



Source: Call Report

Note: Quarterly, Annualized.

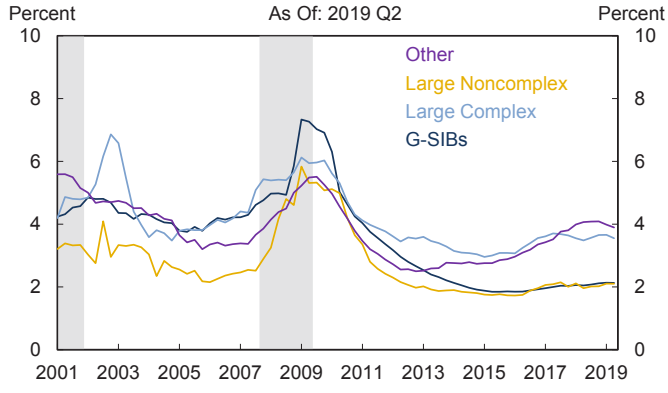
4.11.10 Delinquency Rates



Source: FR Y-9C

Note: Includes all loans in foreign and domestic offices. Delinquent loans are loans 30 days or more past due or in nonaccrual status. Gray bars signify NBER recessions.

4.11.11 Credit Card Delinquency Rates



Source: Call Report

Note: Delinquencies are determined using nonaccrual loans and loans that are past due 30 days or more. Gray bars signify NBER recessions.

Rates on interest-bearing deposits increased sluggishly following the Federal Reserve rate hikes since December 2015, the beginning of the post-crisis monetary policy normalization. Although the effective federal funds rate increased by more than 200 basis points from December 2015 to January 2019, the cumulative increase in effective deposit rates at the U.S. G-SIBs has been approximately 80 basis points. This slow pass-through of market rates into deposit rates has supported net interest rate margins at BHCs with large shares of core deposit funding **(Chart 4.11.9)**.

Asset Quality

Overall delinquency rates on all loans at U.S. G-SIBs and other BHCs continued to decline in the first half of 2019, reaching their lowest levels since 2001 **(Chart 4.11.10)**. However, disaggregated data show that delinquency rates on consumer loans continued the upward trend that started in 2014. In particular, delinquencies for credit card loans have increased notably at large noncomplex BHCs. Newer vintages of credit cards are showing higher loss rates. Delinquency rates on auto loans remained stable or recently declined at U.S. G-SIBs, while continuing to grow at a few large complex and large noncomplex BHCs **(Charts 4.11.11, 4.11.12)**.

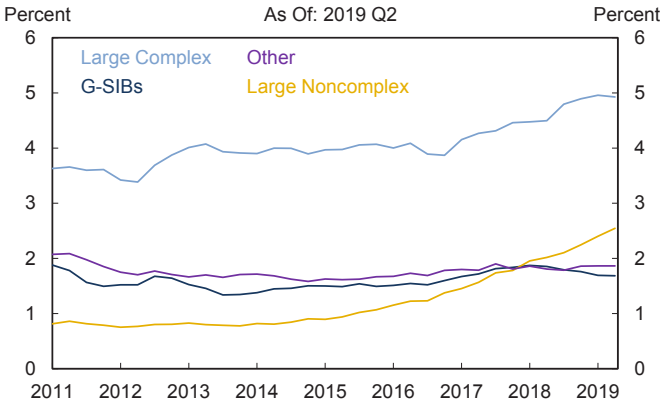
Since 2010, lending to nondepository financial institutions by U.S. G-SIBs has seen a notable increase, significantly outpacing the growth rates in commercial loans to nonfinancial firms. Loans to nondepository financial institutions at U.S. G-SIBs make up roughly 8.5 percent of their total loans as of the second quarter of 2019 **(Chart 4.11.13)**.

On a quarterly basis, the adequacy of loan loss reserves as measured by the ratio of loan loss reserves to delinquent loans has continued to improve to near its pre-crisis values. Alternatively, the ratio of reserves to net charge-offs has gradually declined since 2013 **(Chart 4.11.14)**.

The Current Expected Credit Loss (CECL) is an accounting standard issued in 2016 affecting the methods used to establish allowance for credit losses. While it is scheduled to be implemented on January 1, 2020, for SEC filers, excluding smaller reporting companies as defined by the SEC, the Financial Accounting Standards Board (FASB) proposed that the new effective date for all other calendar-year-end entities be delayed to January 1, 2023.

CECL replaces multiple impairment approaches in existing U.S. GAAP. In addition, CECL would apply to additional types of financial assets that are not covered under the incurred-loss methodology. For example, CECL applies to credit losses on held-to-maturity (HTM) debt securities. Because CECL could lead to reductions in regulatory capital, banks were given the option to phase in the regulatory capital effects of the updated accounting standard over a period of three years. In addition, the supervisory stress test modeling framework as it relates to CECL will not be revised for the 2020 and 2021 cycles.

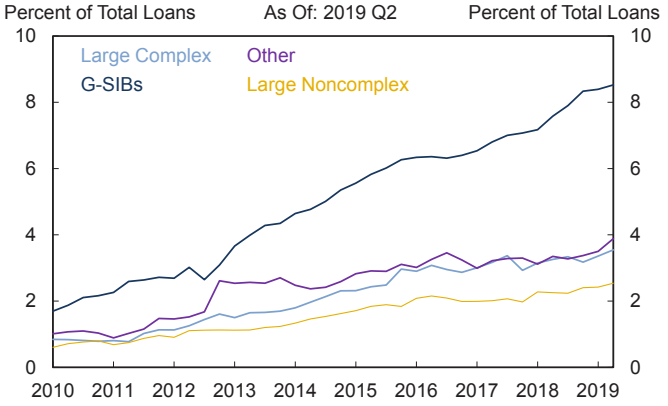
4.11.12 Auto Loan Delinquency Rates



Source: Call Report

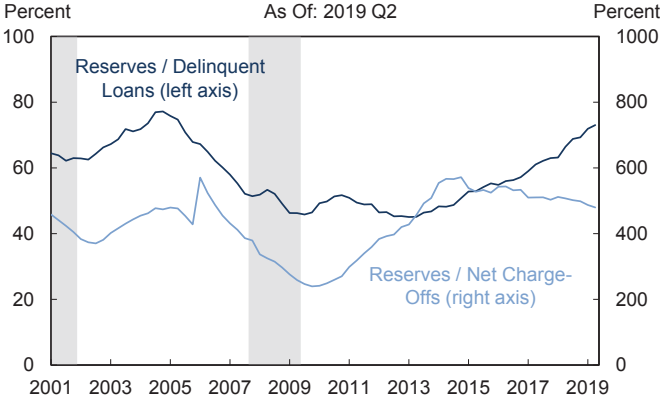
Note: Delinquencies are determined using nonaccrual loans and loans that are past due 30 days or more.

4.11.13 Loans to Nondepository Financial Institutions



Source: FR Y-9C

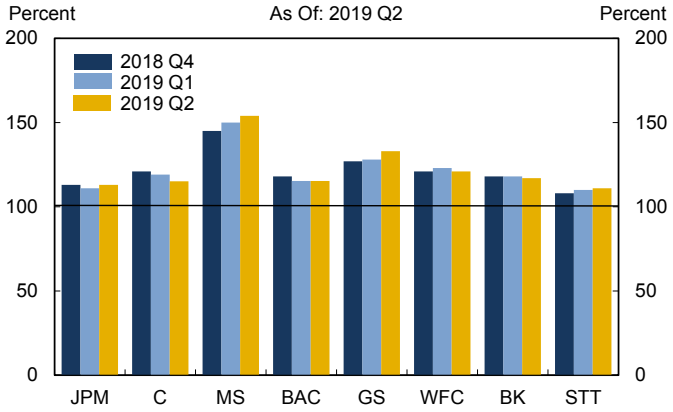
4.11.14 Loan-Loss Reserves



Source: FR Y-9C

Note: Gray bars signify NBER recessions.

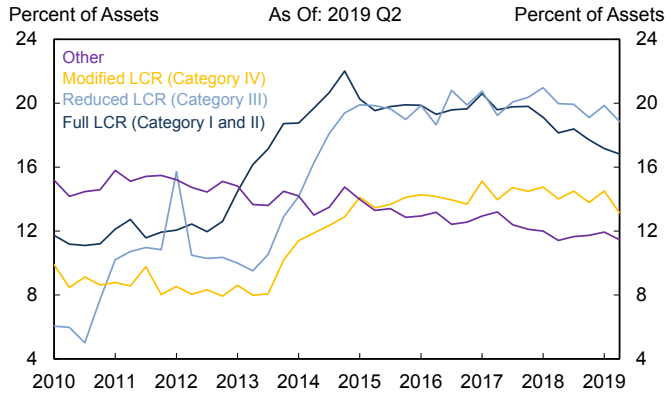
4.11.15 Liquidity Coverage Ratio



Source: LCR Disclosures from banks' websites

Note: The solid line represents the regulatory minimum.

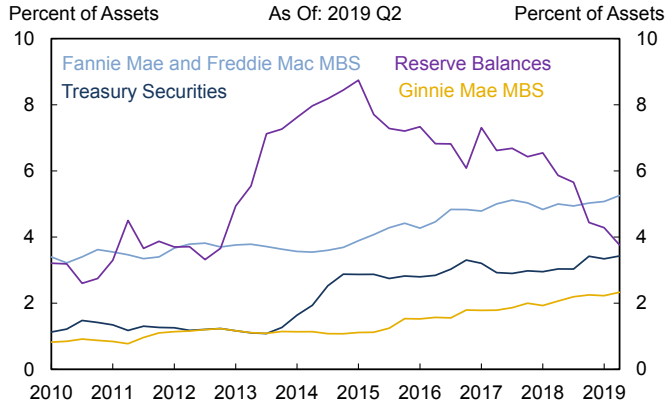
4.11.16 High-Quality Liquid Assets by BHC Type



Source: FR Y-9C, FR 2900

Note: HQLA is estimated by adding excess reserves to an estimate of securities that qualify for HQLA. Haircuts and level 2 asset limitations are incorporated into the estimate.

4.11.17 Selected Liquid Assets at All BHCs



Source: FR Y-9C, FR 2900

Liquidity Management

All U.S. G-SIBs were in compliance with the liquidity coverage ratio (LCR) as of the second quarter of 2019 **(Chart 4.11.15)**. Holdings of high-quality liquid assets (HQLA) at BHCs subject to the standard LCR remained relatively flat at around 20 percent of assets from the time the rule went into effect in 2015 until 2017, but have declined since 2017, reaching 17 percent of assets in the second quarter of 2019 **(Chart 4.11.16)**. Under the final tailoring rule, U.S. G-SIBs and Category II BHCs will continue to be subject to the full (standard) LCR. Category III BHCs will be subject to a reduced 85 percent LCR if their weighted short-term funding is below $75 billion and to the full LCR otherwise. Category IV BHCs will be exempted from the LCR if their weighted short-term wholesale funding is less than $50 billion and will face a reduced 70 percent LCR otherwise.

The declines in HQLA at the largest BHCs are primarily driven by declines in reserves that began to shrink before the start of the normalization of the Federal Reserve's balance sheet. BHCs have used the decrease in reserves to increase their holdings of Treasury securities, agency debt, and agency MBS **(Chart 4.11.17)**.

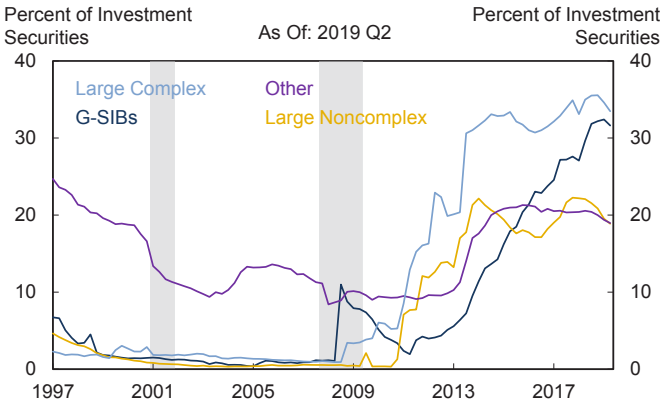
U.S. G-SIBs and large complex BHCs have increased the proportion of their investment securities that are categorized as HTM since 2011. This ratio now exceeds 30 percent of their investment securities portfolio. The accounting treatment of HTM securities allows BHCs to avoid the volatility associated with incorporating market gains and losses on securities for regulatory capital calculations **(Chart 4.11.18)**.

The estimated duration gap between the timing of cash inflows from assets and cash outflows from liabilities—a measure of interest rate risk at BHCs—has slightly declined at U.S. G-SIBs over the past two years but remains at the high end of its post-crisis distribution. Institutions with higher duration gaps, which derive a higher share of income from interest-earning assets and fund their operations with a larger share of wholesale short-term funding, are more susceptible to interest rate risk. Therefore, earnings and capital of those institutions are likely to be more sensitive to changes in the yield curve. The flattening of the yield curve and expectations for lower interest rates are likely to negatively impact profitability and capital at such firms **(Chart 4.11.19)**.

Market Perception of Value and Risk

After rapid appreciation in late 2016 and 2017, stock prices of U.S. G-SIBs erased much of their gains at the end of 2018. The stock prices of U.S. G-SIBs partially retraced 2017 gains by the third quarter of 2019 and remain well above early 2016 levels. The appreciation observed in late 2016 and 2017 was driven by market expectations of higher bank earnings and higher capital distributions resulting from the effects of the recently enacted tax reform and the reforms of supervisory and regulatory requirements by federal bank regulatory agencies. However, concerns about economic slowdown and lower interest rates weakened the BHC profit outlook at the end of 2018 **(Chart 4.11.20)**.

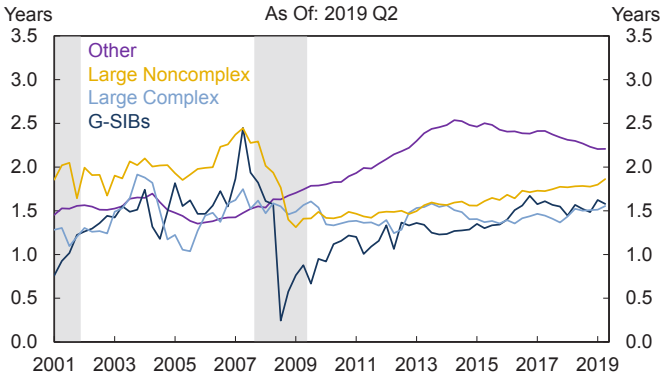
4.11.18 Held-to-Maturity Securities



Source: Call Report

Note: Investment securities are held-to-maturity securities plus available-for-sale securities. Gray bars signify NBER recessions.

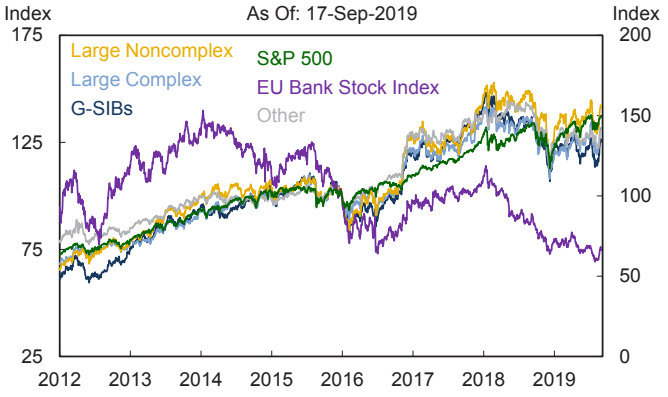
4.11.19 Duration Gap



Source: Call Report

Note: Duration gap is the approximate weighted-average time of cash inflows less the approximate weighted-average time of cash outflows. Gray bars signify NBER recessions.

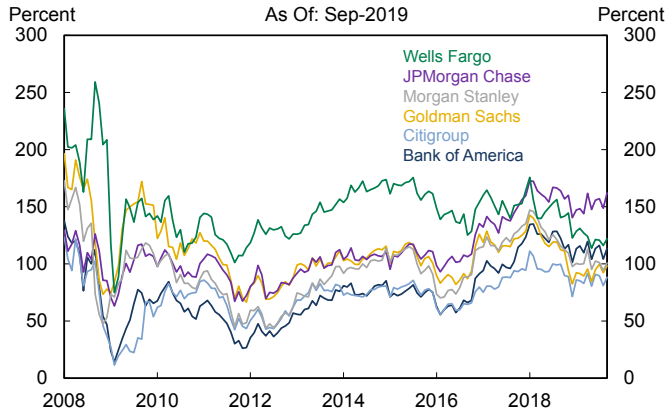
4.11.20 Bank Stock Performance



Source: Bloomberg, L.P.

Note: January 2, 2016 = 100. EU Bank Stock Index created from stock price information for the following banks: BCS, BNPQY, CS, ACA, DB, SAN, UBS. All indexes are created by equally weighting banks.

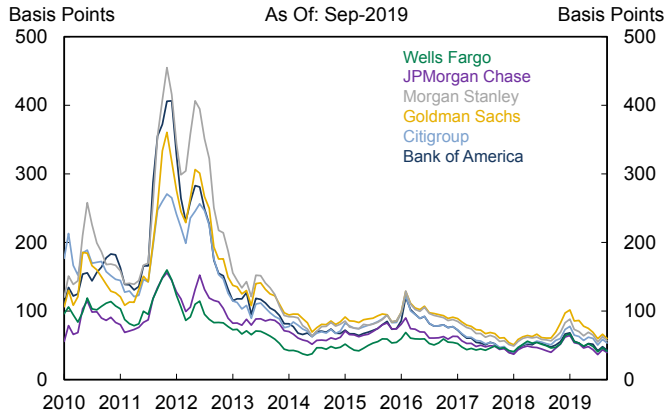
4.11.21 Price-to-Book



Source: SNL Financial

Note: Month-end values.

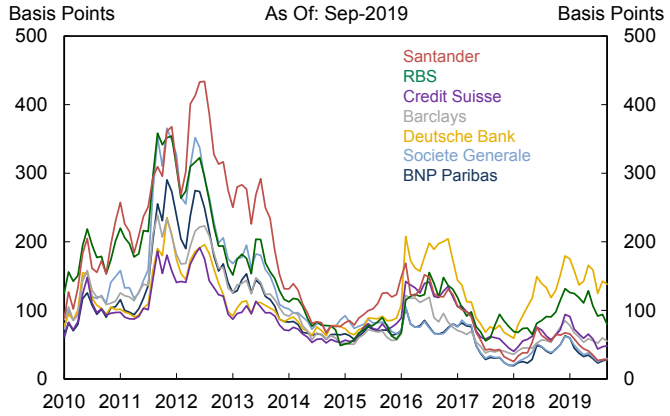
4.11.22 U.S. Banks 5-Year CDS Spreads



Source: Bloomberg, L.P.

Note: Monthly averages.

4.11.23 Foreign Banks 5-Year CDS Spreads



Source: Bloomberg, L.P.

Note: Monthly averages.

The stock prices of European banks continued to underperform relative to U.S institutions and in September 2019 the EU Bank Stock Index approached its July 2016 lows. The underperformance of Deutsche Bank's stock price weighed on the broader EU Bank Stock Index, and in May 2019 Deutsche Bank's stock price hit a record low following the breakdown of its merger talks with Commerzbank. In June 2019, the firm announced a major restructuring that includes a significant reduction in investment banking activities and major overhauls in its operations, including the creation of a so-called bad bank to hold up to €50 billion of poorly performing assets. In addition, Deutsche Bank announced the reorganization of its Treasury function in August 2019. As part of this reorganization, Deutsche Bank combined all treasury market and investment operations into a single unit to streamline liquidity management operations and help offset the impact of continued negative rates in Europe.

Price-to-book ratios for six of the U.S. G-SIBs followed similar patterns to their stock performance, trending higher in 2017 and decreasing in the second half of 2018 **(Chart 4.11.21)**. The market turmoil at the end of 2018 pushed the price-to-book ratios of Citigroup, Goldman Sachs, and Morgan Stanley below 100. While price-to-book ratios have begun to recover, most remain below the levels in the first half of 2018. As of September 2019, Bank of America, JPMorgan Chase, Morgan Stanley, and Wells Fargo had price-to-book ratios above 100 percent.

CDS spreads, which measure the cost of insurance against credit default risk, remained at very low levels in 2017 for six of the U.S. G-SIBs and select foreign banks. Such premiums moved up at the end of 2018 in response to episodes of equity market volatility but have reverted in 2019 to low levels by historical standards for U.S. G-SIBs. FBOs such as Deutsche Bank and Royal Bank of Scotland saw their credit spreads increase in 2018 and the spreads remain elevated **(Charts 4.11.22, 4.11.23)**.

Dodd-Frank Act Stress Tests and Comprehensive Capital Analysis and Review

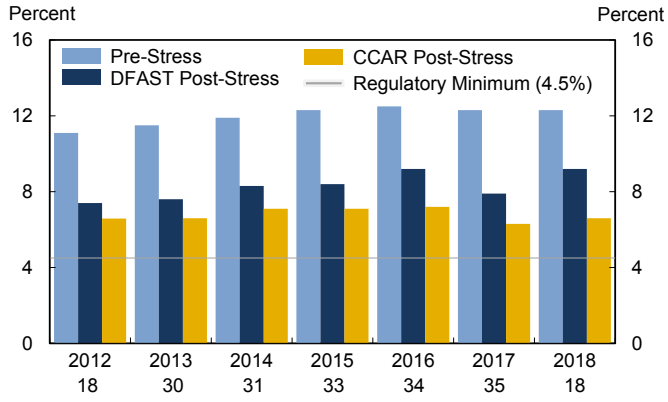
The Dodd-Frank Act Stress Tests (DFAST), a forward-looking exercise conducted by the Federal Reserve, evaluates whether participating BHCs and IHCs have sufficient capital to absorb losses over a nine-quarter period resulting from stressful economic and financial market conditions in hypothetical supervisory scenarios. As part of DFAST, firms must report their company-run stress test results to the Federal Reserve, their primary regulator, and the public.

In the 2019 stress test cycle, EGRRCPA exempted firms with less than $100 billion in total assets from enhanced prudential standards, including supervisory stress test requirements. Only BHCs and IHCs with total consolidated assets of $250 billion or more are subject to periodic company-run stress-testing requirements. EGRRCPA provides that banks with between $100 billion and $250 billion in total consolidated assets are automatically subject only to supervisory stress tests, while the Federal Reserve has discretion to apply other individual enhanced prudential provisions to these banks. The Federal Reserve proposed a two-year stress test cycle and did not apply individual enhanced prudential provisions to any firm with total consolidated assets between $100 billion and $250 billion. As a result, although 35 BHCs and IHCs continue to be subject to supervisory stress test requirements because they have over $100 billion in total consolidated assets, only 18 of these firms (those with total consolidated assets exceeding $250 billion) were subjected to both supervisory and company-run stress tests in 2019.

In March 2019, the Federal Reserve published an enhanced disclosure of the methodology behind its supervisory models and modified the use of "qualitative objection" in its Comprehensive Capital Analysis and Review (CCAR) exercise. The enhanced disclosure is designed to improve the public's understanding of stress test results and strengthen the credibility of the test. The use of the qualitative objection in the CCAR exercise was modified starting with the 2019 cycle. Specifically, firms must have participated in four CCAR exercises and successfully passed the qualitative evaluation in the fourth year to no longer be subject to a potential qualitative objection. While the qualitative objection no longer applies to certain firms, all BHCs and IHCs subject to the Federal Reserve's capital plan rule continue to be subject to a rigorous evaluation of their capital planning processes as part of CCAR.

In June 2019, the Federal Reserve released the results of DFAST and CCAR. The severely adverse scenario used in DFAST 2019 reflected conditions of a severe downturn in the U.S. economy with a large increase in unemployment; a severe recession in the euro area, the United Kingdom, and Japan; and a shallow recession in developing Asia.

4.11.24 Initial and Stressed Capital Ratios



Note: For DFAST, 2013-2015 bars show Tier 1 Common Capital Ratio and 2016-2018 bars show CET1 Ratio. The x-axis labels represent the number of banks tested within a given year.

Source: Federal Reserve

4.11.25 Federal Reserve's Actions in CCAR 2019

Non-Objection to Capital Plan	
Bank of America	Morgan Stanley
Bank of New York Mellon	Northern Trust
Barclays USA	PNC
Capital One Financial	State Street
Citigroup	TD Group U.S.
DB USA	UBS Americas
Goldman Sachs	US Bancorp
HSBC North America Holdings	Wells Fargo
JPMorgan Chase	

Conditional Non-Objection to Capital Plan
Credit Suisse Holdings (USA)

Source: Federal Reserve

In the DFAST 2019 severely adverse scenario, the aggregate projected CET1 ratio for the 18 BHCs fell from 12.3 percent to a minimum level of 9.2 percent, which was still well above the minimum requirement of 4.5 percent. The loss rates in DFAST 2019 were well in line with the loss rates in the 2015 to 2017 stress test exercises. Aggregate loan losses as a percent of average loan balances in the severely adverse scenario have declined since early stress test exercises largely as a result of improvements in firms' portfolio quality **(Chart 4.11.24)**.

In the qualitative assessment of BHCs through CCAR, the Federal Reserve evaluates the capital adequacy and the capital planning processes of the BHCs and IHCs, including the quality of the risk-management frameworks and the proposed capital actions such as dividend payments and stock repurchases.

The Federal Reserve issued a conditional non-objection to Credit Suisse based on identified weaknesses in its capital adequacy process that can be addressed in the near term. Specifically, the Federal Reserve identified weaknesses in the assumptions used by the firm to project stressed trading losses that raise concerns about the firm's capital adequacy and capital planning process **(Chart 4.11.25)**. Capital One and JPMorgan Chase had to revise their capital plans in order to maintain their post-stress regulatory capital ratios above minimum requirements in the severely adverse scenario. Under the proposed and revised capital distribution plans, the weighted-average CET1 ratio for the 18 firms fell from 12.3 percent to a minimum level of 6.6 percent under the severely adverse scenario.

4.11.2 Insured Commercial Banks and Savings Institutions

As of the second quarter of 2019, the banking industry included 5,303 FDIC-insured commercial banks and savings institutions with total assets of $18.3 trillion. There were 1,230 institutions with assets under $100 million and 792 institutions with assets over $1 billion.

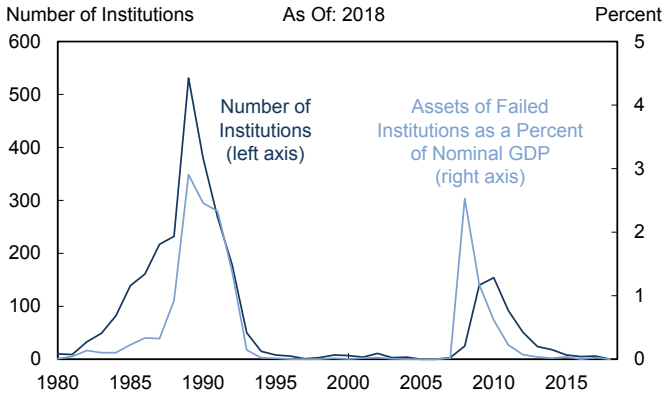
During 2018, 259 institutions were absorbed by mergers while eight new charters were added. Failures of insured depository institutions are down significantly since the financial crisis, and no institutions failed in 2018 **(Chart 4.11.26)**.

As of year-end 2018, the FDIC's "problem bank" list included 60 institutions—1.1 percent of all institutions—in comparison to 95 banks the prior year. Banks on this list have financial, operational, or managerial weaknesses that require corrective action in order to operate in a safe and sound manner.

The total assets of U.S. commercial banks and savings institutions increased by $852 billion between the fourth quarter of 2017 and the second quarter 2019. Loans and leases increased by $579 billion during that period. All major loan categories grew over this period, with C&I, CRE, 1-4 family residential mortgages, and consumer loans growing by 10.3 percent, 5.9 percent, 4.0 percent, and 4.2 percent, respectively. Banks increased their investment securities by $147 billion since year-end 2017, with MBS up by 7.0 percent and U.S. Treasury securities balances up by 15.0 percent.

Full-year 2018 net income for all U.S. commercial banks and savings institutions totaled $237 billion, representing a 44 percent increase from full-year 2017, driven by a rise in net interest income and lower income tax expenses and loan loss provisions **(Chart 4.11.27)**. Net interest income rose by 8.5 percent in 2018 due to interest income outpacing interest expense. Interest-earning assets grew 3.1 percent in 2018.

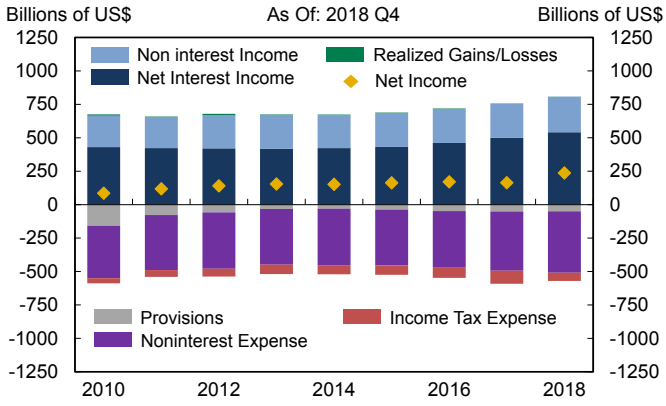
4.11.26 FDIC-Insured Failed Institutions



Source: BEA, FDIC, Haver Analytics

Note: No FDIC-insured institutions failed during 2005, 2006, and 2018.

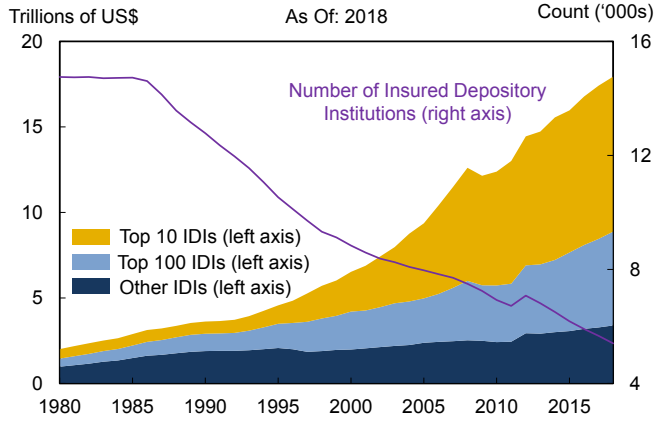
4.11.27 Commercial Bank and Thrift Net Income



Source: FDIC

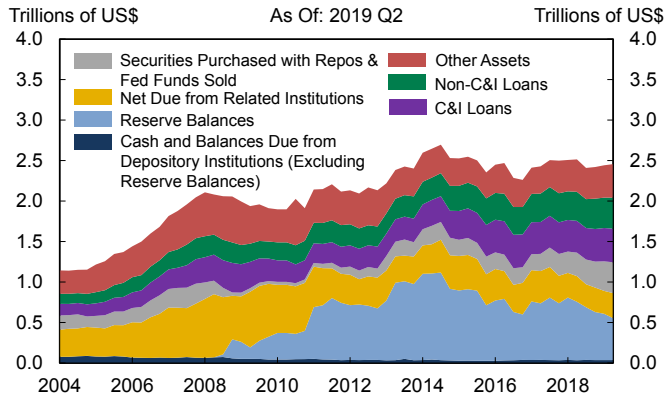
Note: Includes all FDIC-insured commercial banks and thrifts.

4.11.28 Total Assets of Largest Insured Depository Institutions



Source: FFIEC Call Report

4.11.29 U.S. Branches and Agencies of Foreign Banks: Assets



Source: Federal Reserve, Haver Analytics

Note: Other assets includes government securities, asset-backed securities, and other trading assets.

Nearly 80 percent of commercial banks and savings institutions reported higher earnings in 2018. Credit quality continues to improve. The noncurrent ratio declined to below 1 percent (0.99 percent) of total loans. Loan loss provisions declined 2.2 percent from year-end 2017.

The long-term trend of banking industry consolidation continued in 2018, as the 10 largest institutions continued to hold over 50 percent of total industry assets **(Chart 4.11.28)**. The 100 largest institutions hold over 81 percent of total industry assets, which is an historical high. In 2018, the total number of banks and savings associations decreased to 5,406, which was a historical low.

4.11.3 U.S. Branches and Agencies of Foreign Banks

As of June 30, 2019, assets of U.S. branches and agencies of foreign banks totaled $2.5 trillion, unchanged from June 30, 2018, and roughly 14 percent of total U.S. banking assets **(Chart 4.11.29)**. Reserve balances for U.S. branches and agencies of foreign banks totaled 21 percent of total assets as of June 30, 2019, a decrease of 28 percent from the prior year. Recent declines in reserve balances were associated with increases in the federal funds rate as compared to the interest rate on excess reserves (IOER rate). This change in spread made it less attractive for FBOs to maintain excess reserves. The changing composition of liquidity buffers, from reserves to securities holdings, also impacted reserve balances at U.S. branches and agencies of foreign banks.

Securities purchased under agreement to resell (reverse repos) at U.S. branches and agencies of foreign banks increased by 32 percent from June 30, 2018 to June 30, 2019. Reverse repos represented 16 percent of total assets at U.S. branches and agencies of foreign banks as of June 30, 2019, compared to 12 percent of total assets one year prior. Increases in reverse repos were linked to declines in reserve balances, as U.S. branches and agencies of foreign banks generally shifted excess liquidity from reserves

to reverse repos to take advantage of higher yields in the repo market.

As of June 30, 2019, total loan balances accounted for approximately 33 percent of total assets at U.S. branches and agencies of foreign banks. C&I lending remained a significant portion of overall lending by U.S. branches and agencies of foreign banks, with a ratio of C&I loans to total loans of approximately 52 percent as of June 30, 2019. C&I loan levels rose 6 percent between June 30, 2018 and June 30, 2019.

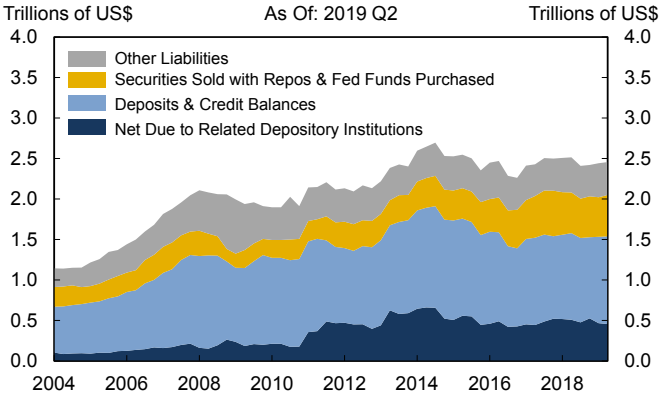
Deposits and credit balances represented 44 percent of total liabilities for U.S. branches and agencies of foreign banks as of June 30, 2019 **(Chart 4.11.30)**. Federal funds purchased totaled 0.9 percent of total liabilities for U.S. branches and agencies of foreign banks as of June 30, 2019, and declined 35 percent year-over-year. U.S. branches and agencies of foreign banks generally reduced reliance on federal funds purchased as the cost of this funding source escalated from June 30, 2018 to June 30, 2019. Securities sold under agreement to repurchase for U.S. branches and agencies of foreign banks amounted to 20 percent of total liabilities as of June 30, 2019, and increased 4 percent year-over-year.

4.11.4 Credit Unions

Credit unions are member-owned, not-for-profit, depository institutions. As of the second quarter of 2019, there were 5,308 federally insured credit unions with aggregate assets of just over $1.5 trillion. Over 70 percent of credit unions had assets under $100 million, with 26 percent having less than $10 million in assets. Twenty four percent of credit unions had assets between $100 million and $1 billion, and 6 percent had assets over $1 billion.

Consistent with long-running trends among depository institutions, consolidation in the credit union industry continued this year, particularly among smaller institutions. The number of credit unions with less than $50 million in assets fell to 3,040 in the second quarter of 2019, bringing the cumulative

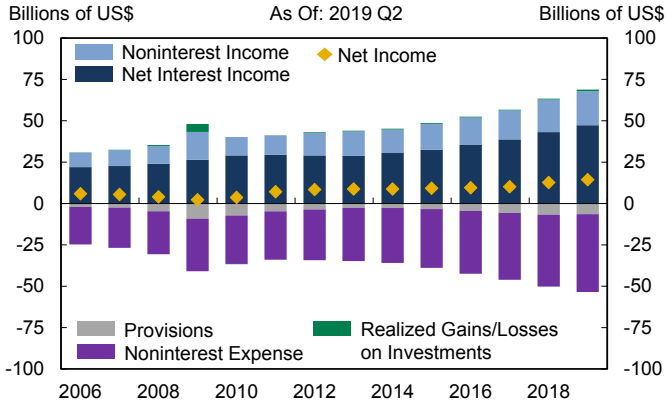
4.11.30 U.S. Branches and Agencies of Foreign Banks: Liabilities



Source: Federal Reserve, Haver Analytics

Note: Other liabilities includes transaction accounts, non-transaction accounts, and other borrowed money.

4.11.31 Credit Union Income



Source: NCUA

Note: Federally-insured credit unions. Values are annualized.

decline over the past five years to 27 percent. At the same time, total industry assets grew at an annual average rate of 6.6 percent over the five years ending in the second quarter of 2019. Membership in federally insured credit unions grew 21 percent over the past five years, reaching over 118 million members as of the second quarter of 2019.

Financial performance at credit unions was solid in the first half of 2019, at least partially reflecting the continued resilience of the economy and moderate, though slowing, growth in loan demand, according to NCUA data. Net income at consumer credit unions increased to $14 billion on an annualized basis in the second quarter of 2019, an increase of 13 percent from the second quarter of 2018 **(Chart 4.11.31)**. The amount of outstanding loans at credit unions increased by 6.4 percent in the second quarter of 2019, representing a notable slowdown from the nearly 10 percent pace registered during the same period a year earlier. NCUA reported moderating loan growth over the past two years, generally reflecting slower growth in mortgage and auto lending, with the latter being a function of shrinking sales for new vehicles. Credit union real estate loans, roughly half of all credit union lending, grew 6.9 percent over the year ending in the second quarter of 2019, down from 9.6 percent during the same period a year earlier. Auto loans, just over one-third of the credit union loan portfolio, grew 5.2 percent in the second quarter of 2019, a downshift from the 11 percent pace registered over the same period in 2018.

Overall loan performance remained healthy in early 2019, aided by low unemployment and reasonably strong income growth. The system-wide delinquency rate edged lower over the year ended June 30, 2019, to 63 basis points. However, the delinquency rate on credit cards, 6 percent of total credit union loans, remained elevated at 122 basis points.

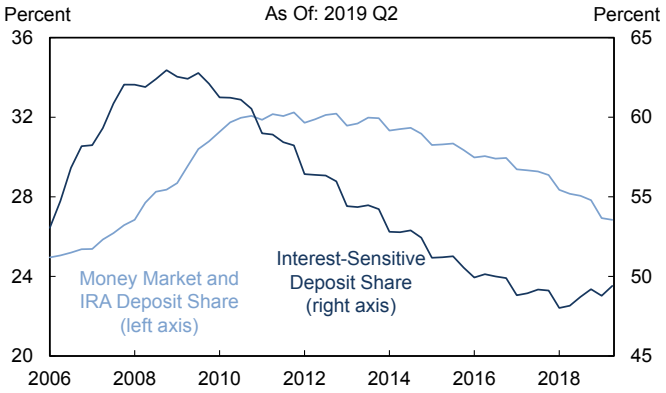
The credit union system experienced a return on average assets (ROAA) of 97 basis points at an annual rate in the second quarter of 2019, up from 90 basis points one year prior. Interest income jumped from its year-earlier level, noninterest income edged up modestly, and the NIM among all credit unions increased to 318 basis points from 307 basis points.

While credit union financial performance has been relatively strong overall, smaller credit unions have not performed as well as larger credit unions, based on a number of standard measures. Smaller institutions account for the bulk of institutions but a very modest, and shrinking, share of assets and members. For example, credit unions with less than $100 million in assets account for 70 percent of the number of institutions but only 6.4 percent of assets, while credit unions with more than $1 billion in assets account for 67 percent of system-wide assets and 61 percent of credit union members. ROAA at the smaller institutions averaged 53 basis points on an annualized basis in the second quarter of 2019, while ROAA at credit unions with more than $1 billion in assets was twice as much at 108 basis points. At the same time, the loan delinquency rate for smaller credit unions was 117 basis points in the second quarter of 2019, compared with 61 basis points at the $1 billion-plus institutions.

Credit unions continue to contend with interest rate risk and this year's flattening and inversion of the yield curve. Interest-sensitive deposits as a share of total liabilities have fallen below pre-crisis levels, and the share of money market accounts and individual retirement account (IRA) deposits has also been trending lower **(Chart 4.11.32)**.

A measure of long-term assets—fixed-rate first mortgages and investments with a term longer than three years—has been relatively steady at roughly 27 percent of total assets in recent years. That share remains elevated compared to the pre-crisis period **(Chart 4.11.33)**.

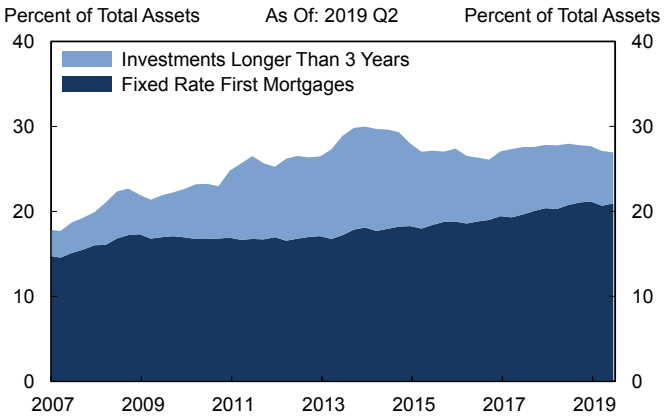
4.11.32 Credit Union Deposits



Note: Federally-insured credit unions. Interest-sensitive deposit share includes money market and IRA deposit share, share certificates, and certain other deposits.

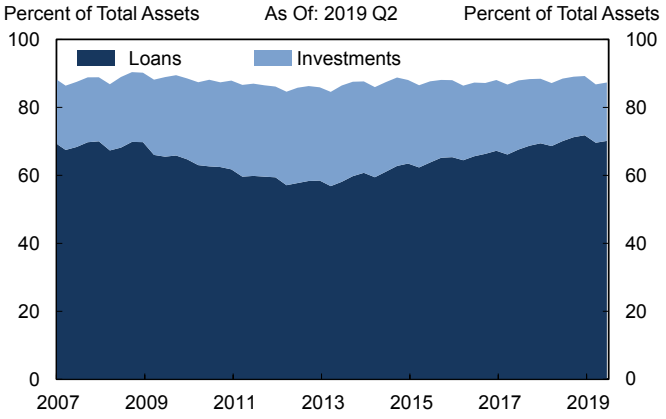
Source: NCUA

4.11.33 Credit Union Net Long-Term Assets



Source: NCUA

4.11.34 Credit Union Composition of Assets



Source: NCUA

The overall investment share of the asset side of credit union balance sheets has decreased in recent years, while the loan share has increased. Over the past five years, the share of investments has declined from 26 percent of total assets to 17 percent. Over the same period, the share of assets in loans rose nearly 10 percentage points to 70 percent **(Chart 4.11.34)**. Likewise, the loan-to-deposit ratio at credit unions was 83 percent in the second quarter of 2019, which is high by historical standards. The elevated loan share has helped support credit union profitability.

The credit union industry remains well capitalized. Over the most recent four quarters, the industrywide net worth ratio has averaged over 11.2 percent, marking the most robust level of capitalization since before the financial crisis. Under statutory guidelines, a credit union is considered "well capitalized" if it holds a net worth ratio at or above 7 percent. Currently, over 98 percent of federally insured credit unions fall within this category.

Last year, the NCUA liquidated three credit unions that were experiencing significant losses as a result of particularly high concentrations of taxi medallion loans. The failure of these credit unions contributed to a $765 million loss at the National Credit Union Share Insurance Fund. As the liquidating agent, the NCUA is modifying these loans, when possible, consistent with its statutory obligation to minimize losses to the National Credit Union Share Insurance Fund.

4.12 Nonbank Financial Companies

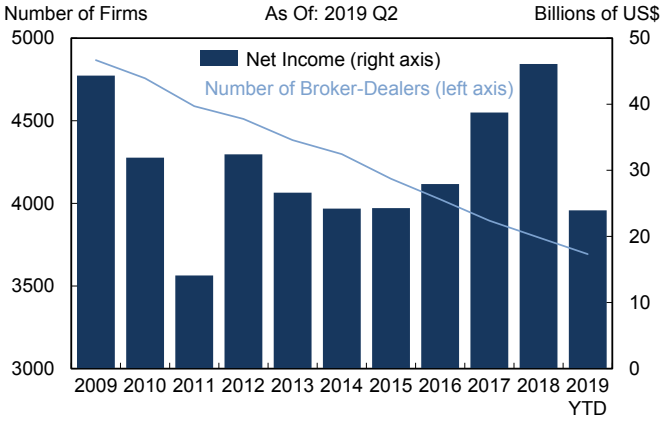
4.12.1 Securities Broker-Dealers

As of June 2019, there were approximately 3,700 securities broker-dealers registered with the SEC, a decline of 3.2 percent from year-end 2017. The number of broker-dealers registered with the SEC has declined steadily since 2009. Aggregate net income in the sector increased by approximately 19 percent in 2018 on increasing revenues relative to 2017 **(Charts 4.12.1, 4.12.2)**.

The U.S. broker-dealer sector remains relatively concentrated. Approximately 56 percent of industry assets were held by the 10 largest broker-dealers as of June 2019, largely unchanged from previous years. The 10 largest broker-dealers account for approximately one-third of industry total revenues and one-fourth of industry net income.

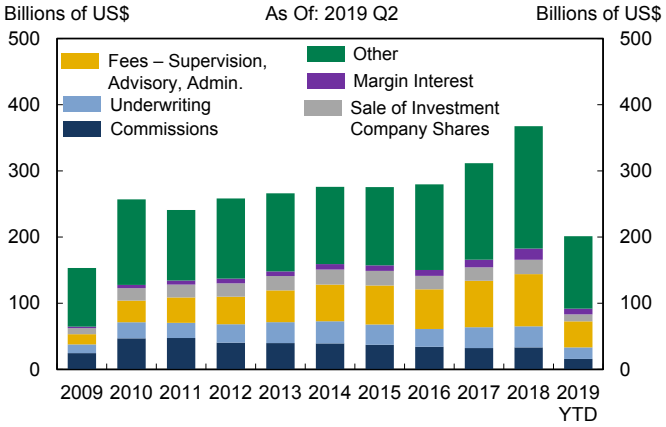
Total assets in the U.S. broker-dealer industry increased to $4.5 trillion as of June 2019, but were well below the peak of $6.8 trillion in 2007 **(Chart 4.12.3)**. Broker-dealers typically obtain leverage through the use of secured lending arrangements such as repos and securities lending transactions. Broker-dealer leverage, measured in various ways, has declined markedly since 2007. For example, leverage measured as total assets over regulatory capital (defined as ownership equity qualified for net capital and allowable subordinated liabilities) increased slightly to 11.2 percent in aggregate as of June 2019, up from 10.9 percent as of year-end 2017, but still remains well below the pre-crisis peak of 21 percent in 2006.

4.12.1 Number of Broker-Dealers and Industry Net Income



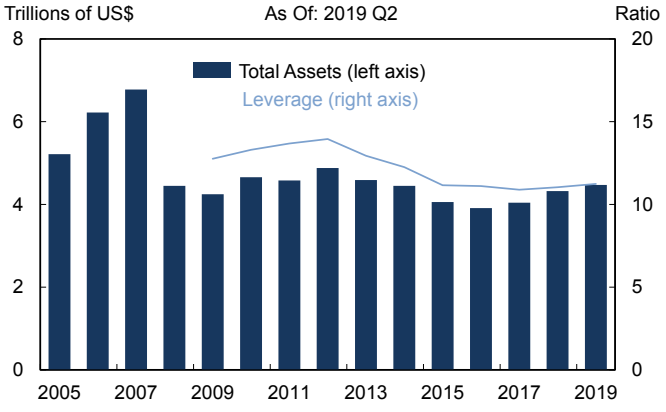
Source: FINRA

4.12.2 Broker-Dealer Revenues



Source: FINRA

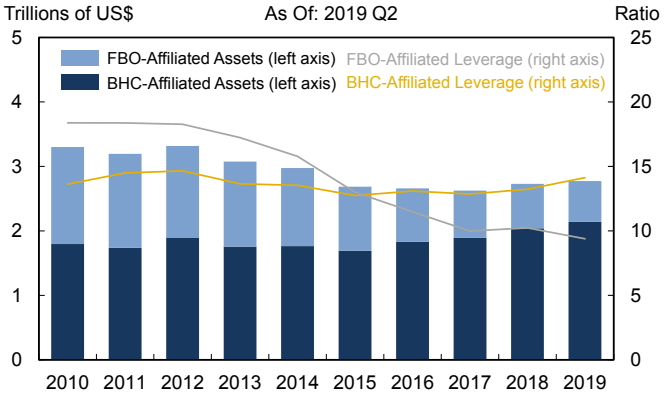
4.12.3 Broker-Dealer Assets and Leverage



Source: FINRA

Note: Leverage is the ratio of total assets to total regulatory capital.

4.12.4 Large Broker-Dealer Assets and Leverage by Affiliation



Source: FINRA

Note: Covers bank holding company (BHC) and foreign banking organization (FBO) affiliated broker-dealers that are among the 25 largest broker-dealers by assets as of Q2 2019.

Most large U.S. broker-dealers are affiliated with U.S. BHCs or FBOs. Among this group of broker-dealers, aggregate assets for BHC-affiliated broker-dealers have increased steadily since 2015. Aggregate assets for broker-dealers affiliated with FBOs have continued to decrease significantly since 2010. BHC-affiliated broker-dealers had an aggregate leverage ratio of 14.1 as of June 2019, while FBO-affiliated broker-dealers had an aggregate leverage ratio of 9.4 **(Chart 4.12.4)**.

4.12.2 Insurance Companies

The U.S. insurance industry is divided between a life and health ("life") sector and a property and casualty ("P&C") sector. The risk profiles of the life and P&C insurance companies differ substantially. Life and P&C insurers are subject to different licensing, regulatory, and financial reporting requirements.

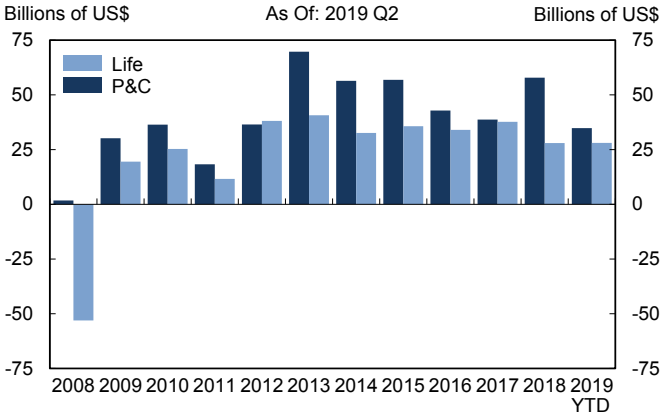
Life insurer portfolios are divided into general and separate account assets. General account assets typically back contracts with a payout that is not linked to investment returns. The general account assets of domestic life insurance companies totaled $4.4 trillion at year-end 2018. This total increased by 2.8 percent to $4.5 trillion by the end of the second quarter of 2019. Separate account assets are assets for which policyholders typically bear most or all of the investment risk. The separate account assets of life insurers totaled $2.5 trillion at year-end 2018. Separate account assets increased to $2.7 trillion by the end of the second quarter of 2019. The 7.6 percent increase in separate account assets was largely due to increases in stock prices during the first half of 2019.

The life insurance sector reported $400 billion in equity, reported as "capital and surplus", at year-end 2018. Capital and surplus increased to $419 billion in the first half of 2019. Net investment income increased by 2.0 percent to $180 billion in 2018 versus $177 billion in 2017. Net investment income was $96 billion in the first half of 2019. Although revenue increased in 2018, net income decreased by 26 percent to $28 billion, driven by higher expenses in surrender benefits and withdrawals for life contracts and aggregate reserves for life and accident and health contracts. Overall, the life sector has managed to consistently operate with positive profits and growth in equity for each of the past 10 years.

U.S. P&C insurance companies remained relatively stable at year-end 2018, reporting $1.9 trillion in assets. Capital and surplus was $780 billion, an increase of 2.8 percent from the year before. The industry increased its net written premiums in 2018 by 11 percent to $621 billion. That resulted in the highest degree of leverage, measured as net written premium over capital, in over ten years. Net income from the P&C insurance sector has been consistently positive though somewhat variable since 2008. This has been attributed to the consistent growth in the capitalization of P&C insurers over the past decade **(Charts 4.12.5, 4.12.6)**.

Insurance companies are significant holders of corporate bonds, commercial mortgages, agency securities, and municipal bonds. Insurance companies are the largest investors among U.S. financial institutions in corporate bonds, and are just behind banks and mutual funds in amounts invested in municipal bonds. Insurers are the second largest holder of commercial mortgages, exceeding that of real estate investment trusts (REITs) or asset-backed securities (ABS) issuers. Through life insurers' separate accounts, they are the largest investors in mutual funds after households and private pension funds.

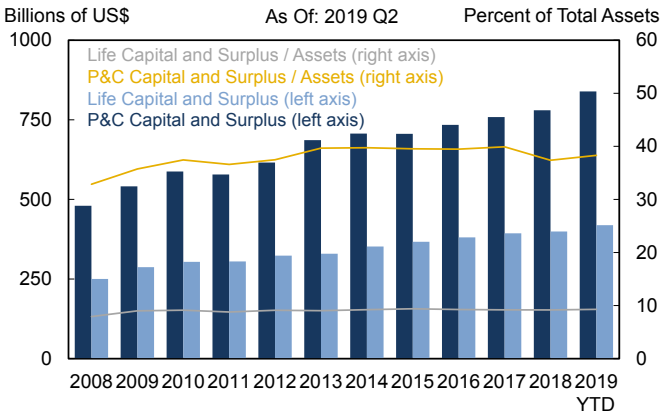
4.12.5 Insurance Industry Net Income



Source: NAIC

Note: Life includes accident and health.

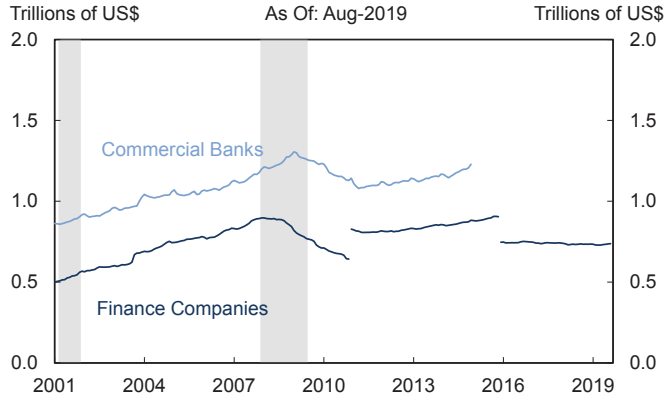
4.12.6 Insurance Industry Capital and Surplus



Source: NAIC

Note: Total assets includes net admitted assets less net admitted separate account assets. Life includes accident and health.

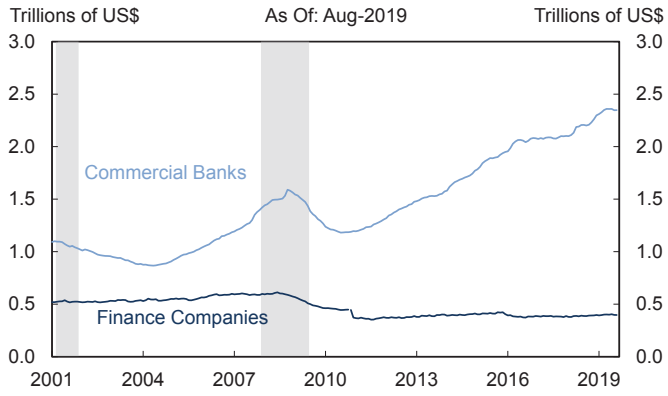
4.12.7 Consumer Loans and Leases Outstanding



Source: Federal Reserve, Haver Analytics

Note: Loans and leases owned and securitized. Series breaks in December 2010 and December 2015 due to change in data collection methodology. Gray bars signify NBER recessions.

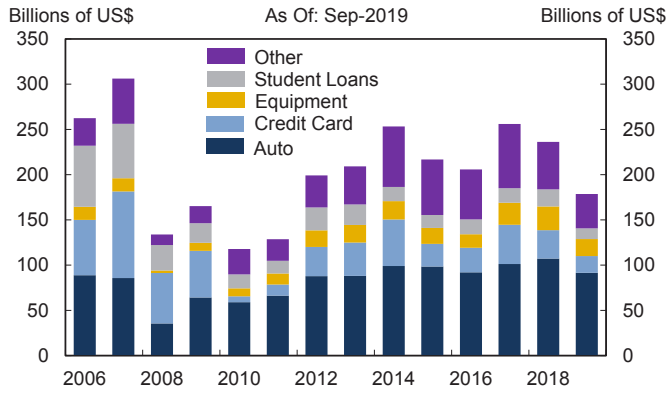
4.12.8 Business Loans and Leases Outstanding



Source: Federal Reserve, Haver Analytics

Note: Loans and leases owned and securitized. Series break in December 2010 due to change in data collection methodology. Gray bars signify NBER recessions.

4.12.9 ABS Issuance



Source: Thomson Reuters, SIFMA

Note: Figures are as of year end through 2018. 2019 figures are through September.

4.12.3 Specialty Finance

Specialty finance companies are non-depository institutions that provide loans to consumers and businesses. The amount of financing activity by specialty finance companies was little changed over the past year. Specialty finance companies held approximately $738 billion of consumer loans and leases and $400 billion of business loans and leases as of August 2019 **(Charts 4.12.7, 4.12.8)**. Specialty finance companies' ownership of real estate loans and leases remained relatively stable from year-end 2018 to August 2019 at approximately $115 billion and is more than 80 percent below its pre-crisis peak.

While specialty finance companies trail commercial banks in overall consumer lending volume, constituting 13 percent of overall consumer lending, these firms do maintain an outsized market share in certain types of activity. For example, finance companies held 27 percent of consumer auto loans in July 2019. As opposed to banks, which generally have more stable sources of funding such as deposits, specialty finance companies are more reliant on wholesale funding and the securitization market.

Asset-Backed Securities

Total issuance of ABS, excluding CDOs and CLOs, totaled $179 billion through September 2019 **(Chart 4.12.9)**. Issuance in this period of 2019 was 7.5 percent lower than during the same period in 2018. Issuance of most ABS products have declined relative to the same period in 2018. This decline was partially offset by continued strong auto loan and lease ABS issuance. Student loan ABS issuance declined 27 percent to $12 billion and credit card ABS issuance declined 35 percent to $19 billion. Auto ABS issuance, on the other hand, increased 12 percent to $92 billion.

Compared to the pre-crisis period, the use of securitization has declined for both credit cards and student loans. Credit card issuers, primarily banks, have cheaper and more stable sources of funding. The balance of loans originated in the legacy Federal Family Education Loans

Program continues to decline and most of the student loans originated today are originated and funded by the Department of Education. In addition, private student loans remain a small share of the overall student loan origination volume. However, specialty finance companies originating auto loans and leases actively issue ABS to fund their loan origination activities.

Amid the market volatility in late 2018 and early 2019, spreads for most ABS products gradually widened since the first quarter of 2018 **(Chart 4.12.10)**. However, spreads remain tighter than in the first quarter of 2016.

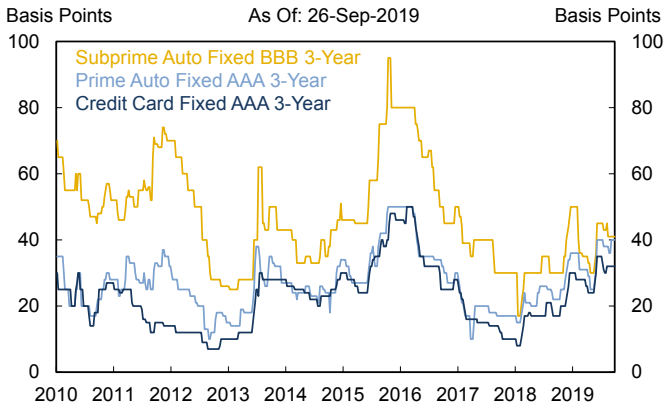
4.12.4 Agency REITs

Total assets of agency REITs increased from $279 billion in the second quarter of 2018 to $365 billion in the second quarter of 2019, the fastest growth since 2012 **(Chart 4.12.11)**. This marked a continuation of the upward trend that began in 2017, which reversed five years of steady declines. The market remains highly concentrated, with two REITs accounting for a 65 percent share of total assets. Leverage, as measured by total assets to total equity, increased from 7.2 to 8.5 between June 2018 and June 2019, but remains below pre-crisis levels of 10 to 12. Leverage ratios among individual agency REITs continue to vary widely, with a range of 3.9 to 12.5 in the second quarter of 2019.

Share prices of agency REITs continued to recover in the second quarter of 2019, but still trail levels seen in mid-2017. The aggregate price-to-book (P/B) ratio for agency REITs continues to be around 1.0 **(Chart 4.12.12)**. Prior to 2017, the sector had an aggregate P/B ratio below 1.0 for 16 consecutive quarters dating back to mid-2013.

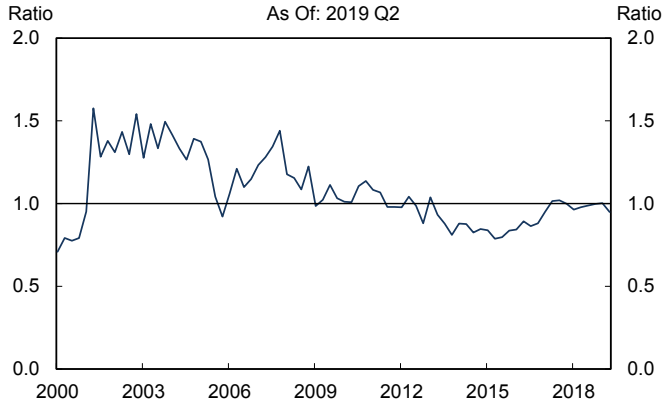
Despite these developments, a flattening or inverted yield curve could present challenges for agency REITs. Agency REITs use short-term debt in the form of repos to fund the purchase of agency MBS. They then earn the difference between the yield on the underlying MBS and the cost of financing. Consequently, near-term

4.12.10 Select ABS Spreads



Source: J.P. Morgan

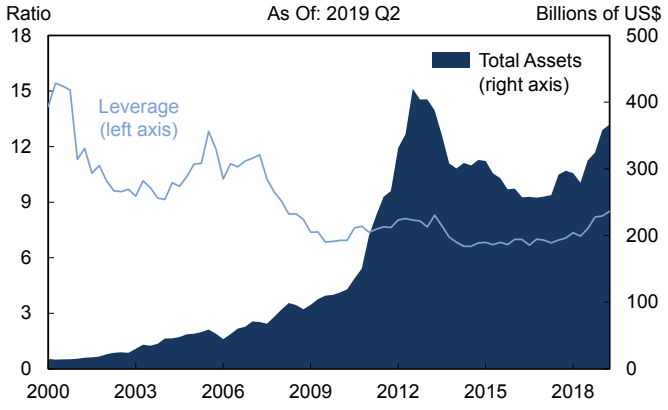
4.12.11 Agency REIT Assets and Leverage



Source: Bloomberg, L.P.

Note: P/B ratio is weighted by market capitalization. Not all agency REITs existed in all time periods in the figure.

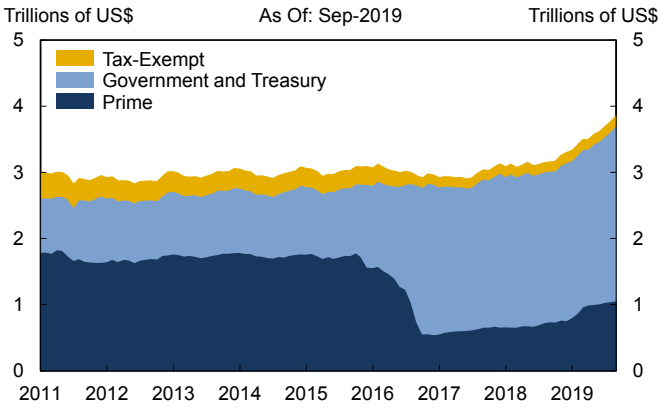
4.12.12 Agency REIT Price-to-Book Ratio



Source: Bloomberg, L.P.

Note: Leverage is the ratio of total assets to equity. Not all agency REITs existed in all time periods in the figure.

4.13.1 MMF Assets by Fund Type



Source: SEC

returns on assets for agency REITs are linked to the slope of the yield curve; agency REITs typically generate larger profits when the yield curve steepens and face losses when the yield curve flattens or inverts. Their use of repos makes agency REITs particularly vulnerable to disruptions in the repo market, which could pose a risk to refinancing activities.

4.13 Investment Funds

4.13.1 Money Market Mutual Funds

According to the SEC's Money Market Fund Statistics, MMF assets totaled $3.8 trillion in September 2019, a 22 percent increase year-over-year. Over the twelve months ended September 2019, prime fund assets increased by $317 billion, or 42 percent, while assets at government MMFs increased by $373 billion, or 16 percent. In contrast, total assets at tax-exempt MMFs have remained stable at around $140 billion. Prime funds' share of total assets increased to 28 percent in September 2019, up from the 24 percent in September 2018. Government MMFs' share of total assets fell to 69 percent in September 2019 versus 72 percent in September 2018 **(Chart 4.13.1)**.

The long-term trend since 2016 towards consolidation in the MMF sector has slowed down in 2019. As of September 2019, there were 369 MMFs, down from 502 funds at year-end 2015, but almost unchanged since 2018. Over the past several years, concentration in the MMF industry has gradually increased. As of September 2019, the five largest MMF complexes managed nearly 55 percent of total assets, up from approximately 45 percent at year-end 2015.

Since SEC money market fund reforms in October 2016, prime institutional and tax exempt institutional MMFs have been required to price their shares at market, known as Floating Net Asset Value (FNAV), rather than at amortized cost, known as Constant Net Asset Value. The portion of MMFs with FNAVs has grown to 17 percent in September 2019, from 13

percent in December 2018, and from 10 percent in December 2016.

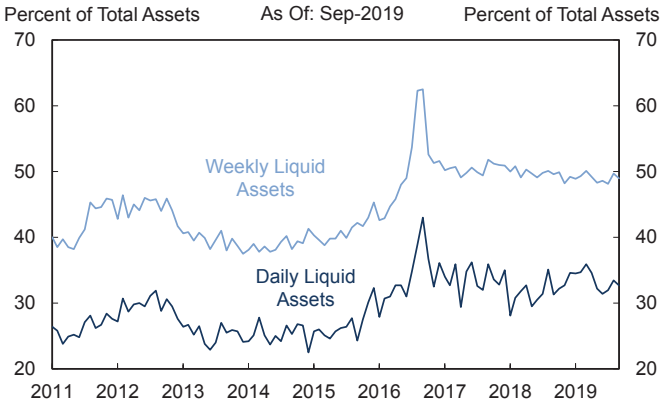
Yields on MMFs declined after the Federal Reserve cut its benchmark rate twice in the third quarter of 2019. The average gross 7-day yield on prime MMFs dropped slightly to 2.15 percent in September 2019 from 2.60 percent at the end of 2018. The average gross 7-day yield on government MMFs was 2.03 percent in September 2019, down from 2.45 percent in December 2018. Average gross 7-day yields for tax-exempt MMFs were 1.56 percent in September 2019 and 1.76 percent in December 2018.

Prime MMFs' daily liquidity—the share of assets convertible to cash within one business day—averaged 33 percent of assets through September 2019, which is somewhat higher than the average of 32 percent during 2018. This exceeds the 10 percent required by SEC rules. Weekly liquid assets (the share of assets convertible to cash within five business days) for prime funds averaged 49 percent through September 2019, little changed from 2018 and well above the 30 percent minimum required under SEC rules **(Chart 4.13.2)**.

The WAM of fund assets provides an indication of the sensitivity of fund returns to changes in market interest rates. MMF managers tend to maintain a lower WAM during periods of rising rates and extend their WAMs in anticipation of falling rates. Prime MMF WAM averaged 29 days in 2018, when interest rates were expected to rise. Managers extended their average WAM to 35 days in September 2019, when rates were expected to fall. These averages were well below the 60-day maximum permitted under SEC rules **(Chart 4.13.3)**.

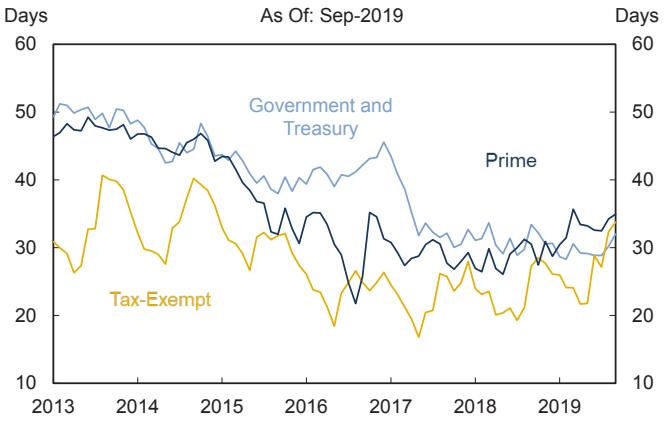
The Federal Reserve's overnight reverse repurchase agreement (ON RRP) facility is a supplementary policy tool that the Federal Reserve uses to help keep the federal funds rate in the target range set by the FOMC. Eligible MMFs have loaned cash to the FRBNY through the facility since regular testing began

4.13.2 Liquid Asset Shares of Prime MMFs



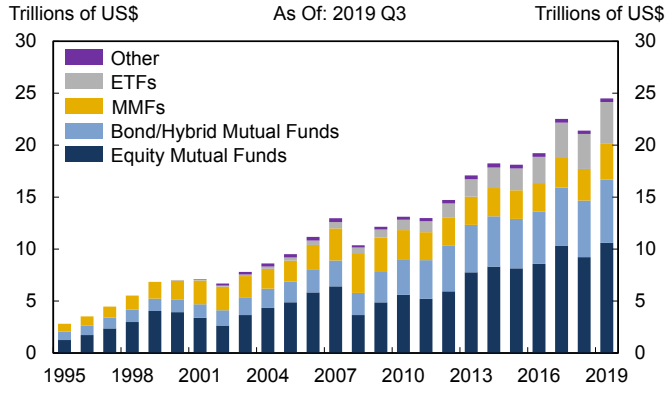
Source: SEC

4.13.3 Weighted Average Maturity by Fund Type



Source: SEC

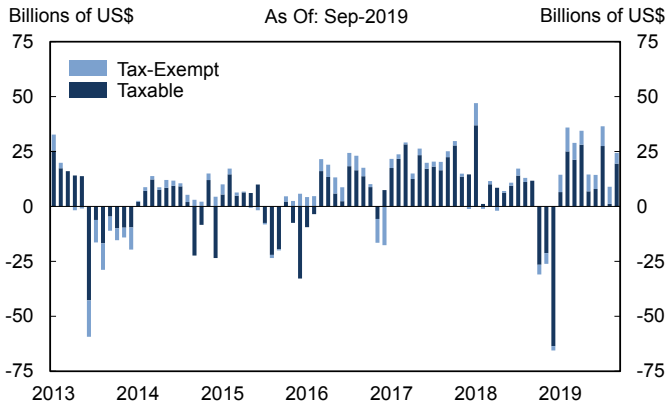
4.13.4 Net Assets of the Investment Company Industry



Note: Other is composed of unit investment trusts and closed-end funds. Q3 2019 figures include 2018 UIT data, which is reported annually.

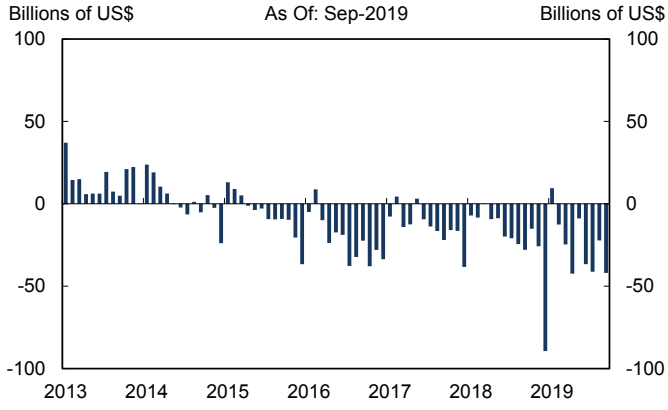
Source: ICI, Haver Analytics

4.13.5 Monthly Bond Mutual Fund Flows



Source: ICI, Haver Analytics

4.13.6 Monthly Equity Mutual Fund Flows



Source: ICI, Haver Analytics

in September 2013. Over the past several years, ON RRP investments have been an important part of MMF portfolio holdings, especially in periods when traditional repo counterparties did not offer attractive opportunities. However, as opportunities improved elsewhere, MMFs reduced their use of the ON RRP. MMFs averaged $8.5 billion in lending through the ON RRP facility through September 2019, down from an average of $28 billion during all of 2018 and $226 billion in 2017. Around the same time, Fixed Income Clearing Corporation (FICC) expanded its sponsored repo service, which permitted banks to sponsor qualified institutional buyers onto its cleared repo platform. MMF exposures to FICC have increased significantly—from less than $1 billion in early 2017 to approximately $200 billion in mid-2019—and the clearinghouse is now the largest counterparty to MMFs in Treasury repos.

4.13.2 Mutual Funds

The aggregate net asset value of U.S. mutual funds increased 14 percent in the first nine months of 2019 after decreasing 8 percent in 2018. Industry assets totaled $16.7 trillion in September 2019. Mutual fund assets constituted approximately 68 percent of total U.S. investment company assets **(Chart 4.13.4)**. In recent years, the vast majority of mutual fund growth has been due to capital appreciation rather than investor inflows.

Mutual fund flow trends continued for most of 2018 and 2019, with bond funds experiencing net inflows for 18 of the last 21 months and equity funds recording net outflows for 19 of the last 21 months. Both equity and bond funds experienced unusually large outflows in December 2018, totaling a combined $155 billion. In the first nine months of 2019, bond funds experienced $212 billion in net inflows while equity funds had $221 billion in net outflows **(Charts 4.13.5, 4.13.6)**.

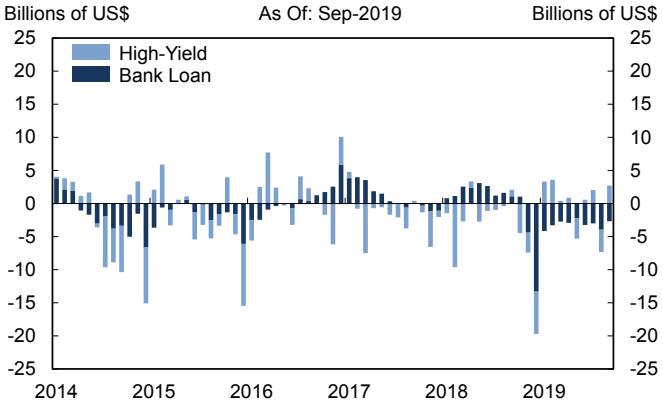
In December 2018, bank loan mutual funds experienced record net outflows amidst significant market turmoil **(Chart 4.13.7)**. These funds offer investors daily redemptions and hold assets with lengthy settlement periods and may during times of significant market stress take longer to sell and settle than the redemption period offered. Selling by mutual funds may have contributed to price declines in the secondary leveraged loan market in December 2018. Cumulative bank loan fund outflows continued through 2019, as floating rate notes became less attractive relative to high-yield bonds, given the anticipation for stable or falling interest rates. Between November 2018 and September 2019, cumulative outflows from bank loan mutual funds totaled $46 billion, or 33 percent of assets under management (AUM). Over the same period, high-yield bond funds had outflows of $2.4 billion, or 1.0 percent of AUM.

Investors continued to gravitate away from actively-managed equity mutual funds and towards lower-cost, index-based equity funds. As of September 2019, index-based mutual funds and ETFs represented 51 percent of U.S. equity fund assets, up from 26 percent in 2009. In the twelve months ended September 2019, inflows to index-based U.S. and international equity funds totaled $312 billion, while their actively managed counterparts saw outflows of $301 billion **(Chart 4.13.8)**. In fixed-income mutual funds, both actively-managed and index-based funds have continued to experience inflows.

4.13.3 Exchange-Traded Products

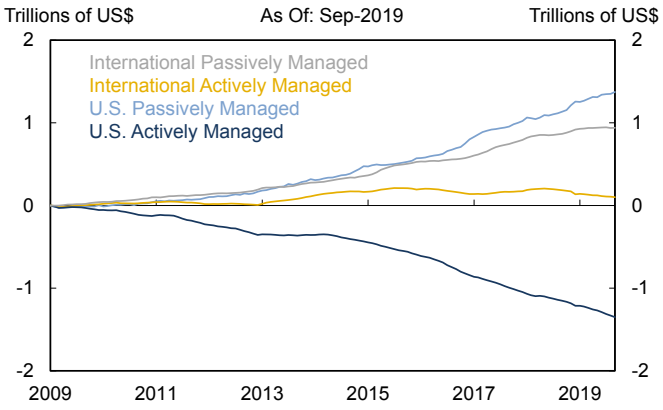
Exchange-traded products (ETPs) include 1940 Act registered ETFs, non-1940 Act registered ETPs (such as those that primarily hold commodities or physical metals), and exchange-traded notes. ETFs registered under the 1940 Act, which account for approximately 90 percent of listed ETPs, continue to grow at a faster pace than mutual funds and other SEC-registered investment vehicles. By June 2019, these funds accounted for 16 percent of U.S. investment company assets, up from 12 percent in 2015 and 7.6 percent in 2010.

4.13.7 Monthly Bank Loan and High-Yield Fund Flows



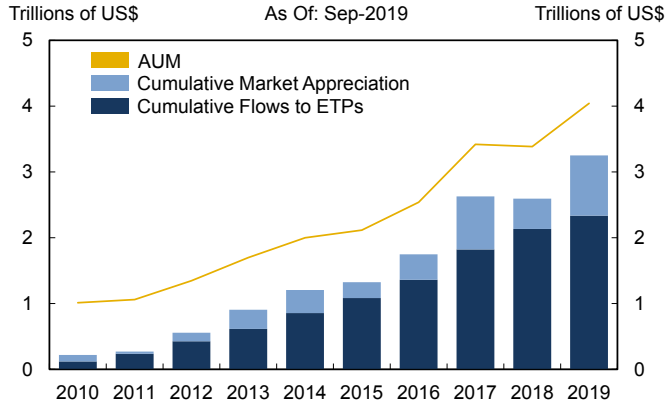
Source: Morningstar, Inc.

4.13.8 Cumulative Equity Fund Flows



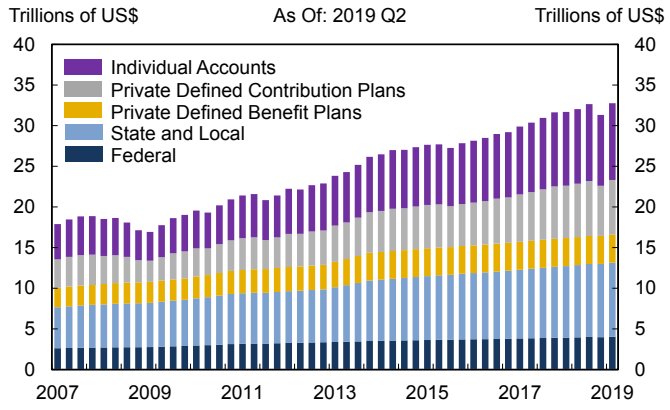
Source: Morningstar, Inc. Note: Includes ETFs and mutual funds.

4.13.9 U.S.-Listed ETP AUM



Source: Morningstar, Inc.

4.13.10 Retirement Fund Assets by Plan Type



Source: Federal Reserve, Haver Analytics

Note: Individual accounts as of 2019 Q1.

In 2018, ETP assets fell by 1.1 percent; however, net inflows partially offset market losses. ETP assets increased 19 percent over the first nine months of 2019, reaching a record $4.1 trillion in September. Recent years' asset growth has been driven primarily by inflows, which totaled $2.3 trillion since 2010 **(Chart 4.13.9)**.

A large source of ETP inflows continues to be taxable bond and domestic equity ETPs. In the first nine months of 2019, taxable bond and domestic equity ETPs accounted for nearly all net inflows, while international equity funds recorded modest net outflows. In 2018, inflows into ETPs largely offset market losses, with taxable bond and domestic equity ETPs, respectively, accounting for 29 percent and 46 percent of total ETP inflows.

The industry remains concentrated, as the three largest managers account for 81 percent of ETP assets and the top ten managers account for 95 percent. Over the first nine months of 2019, the number of available ETPs increased 3.8 percent in addition to the 7.6 percent increase in 2018.

4.13.4 Pension Funds

Pension funds are significant holders of financial assets. As of the second quarter of 2019, the total assets of U.S. private and public pensions were $24 trillion, 3.4 percent higher than one year earlier. Including estimated IRAs, retirement fund assets totaled $33 trillion **(Chart 4.13.10)**. Risk taking by pension funds is difficult to assess given data limitations, including lack of uniformity, timeliness, and granularity of reporting on plan assets, liabilities, and return assumptions. Declines in the value of pension assets may impact economic activity. Sponsors of underfunded plans may be required to increase contributions, which could necessitate reductions in other types of expenditures or investments. Sponsors of underfunded plans may also opt to assume greater levels of investment risk to increase the likelihood of meeting longer-term funding targets; however, these strategies often entail greater downside risks.

Corporate Plans

The funded status of single employer corporate defined benefit pension plans improved in 2018. The funded percentage of a plan is plan assets relative to the estimated value of plan liabilities. According to the Milliman Corporate Pension Funding Study, the 100 largest corporate defined benefit pension plans in the United States had an aggregate funded status of 87 percent at year-end 2018, slightly up from 86 percent at year-end 2017 **(Chart 4.13.11)**.

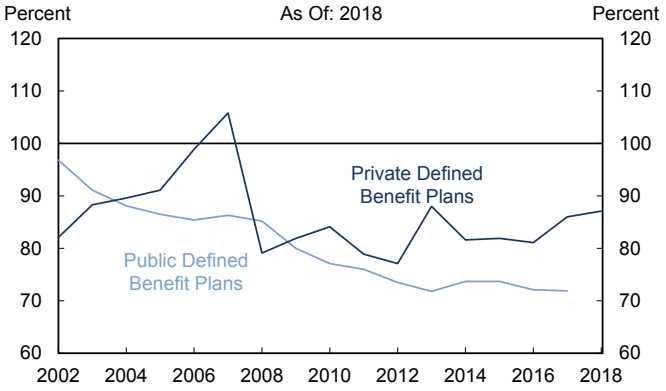
Multiemployer Plans

Milliman estimates that the aggregated funded percentage of multiemployer plans as of year-end 2018 was 74 percent, down from 81 percent at year-end 2017. While the Pension Benefit Guaranty Corporation (PBGC) projects the majority of multiemployer plans will remain solvent, a core group of plans appears unable to raise contributions sufficiently to avoid insolvency. According to the PBGC 2018 projections report, 125 plans—representing more than 1.4 million participants—have declared that they will likely face insolvency over the next 20 years.

The PBGC projects that its Multiemployer Insurance Program will have insufficient funds to cover the projected future demands from multiemployer plans requiring financial assistance, and that there is a very high likelihood that the program will become insolvent by 2025. If so, the PBGC will be unable to provide financial assistance to pay the full level of guaranteed benefits in insolvent multiemployer plans.

The Kline-Miller Multiemployer Pension Reform Act allows multiemployer plans projected to become insolvent in less than 20 years (15 years in some cases) to apply to Treasury for permission to reduce pension benefits. They may apply if reducing benefits would allow the plan to remain solvent over the long-term and continue to provide benefits at least 10 percent higher than the level of the PBGC guarantee, with further protections for the aged and disabled. As of October 2019, 27 plans have filed

4.13.11 Public and Private Pension Funding Levels



Source: NASRA Public Fund Survey, Milliman 2018 Corporate Pension Funding Study

38 applications with Treasury. Of these applications, 14 have been approved, five have been denied, and 15 have been withdrawn. The four remaining applications are in the process of being evaluated.

Public Plans

In 2017, the aggregate funded status of U.S. public pension plans was 72 percent, in line with the prior year. Also of note, public pension funds generally use a different set of accounting rules than private pension funds. These rules enable public plan sponsors to assume investment returns based on their own long-run expectations, which are significantly higher than average post-crisis returns, and thus could overstate funded status. Several large public plans have revised long-term investment return expectations downward. Underfunded public plans are a significant source of fiscal pressure on several U.S. states and the territories of Puerto Rico and the U.S. Virgin Islands, as well as municipalities such as Dallas and Chicago.

4.13.5 Alternative Funds

Hedge Funds

The aggregate net asset value of hedge funds in the United States was $3.8 trillion in the fourth quarter of 2018, a 2.3 percent decrease from the prior year. The gross asset value (GAV) of hedge funds—which reflects the effect of leverage obtained through cash and securities borrowing—totaled $7.6 trillion, a 4.8 percent increase year-over-year. These figures cover the approximately 9,200 hedge funds and 1,700 hedge fund advisers that file the SEC's Form PF. The data in this section is from the SEC's Private Funds Statistics for the fourth quarter of 2018 unless otherwise noted.

Various measures of leverage at the largest hedge funds, including measures of off-balance sheet exposures, show increasing leverage. GAV divided by NAV, one balance sheet leverage measure, showed aggregate hedge fund leverage of 2.0 for the fourth quarter of 2018, slightly higher than in 2017. Gross notional exposure divided by NAV, a measure including notional derivatives, showed aggregate hedge fund leverage ranging from 6.4 to 7.1 during 2018, somewhat higher than in 2017, which averaged over 6. Removing interest rate derivatives from gross notional exposure yields ratios of between 4.6 and 5.2 times during 2018, also somewhat higher than in 2017. The largest hedge funds are notably more leveraged than the industry aggregate; the most highly leveraged funds also increased their ratios since 2017.

The hedge fund industry remains concentrated. The top 5 percent of funds filing Form PF, sorted by GAV, account for about 68 percent of all filers' GAV and 92 percent of all filers' gross notional exposure. These figures were little changed from 2017 to 2018.

According to Hedge Fund Research data (which does not cover the entire universe of hedge funds reported in Form PF), the hedge fund industry experienced modest net outflows of $34 billion in 2018 and outflows of $22 billion in the first half of 2019. Outflows have been concentrated in equity hedge funds, which recorded nearly $40 billion in outflows during 2018 and the first half of 2019. In contrast, event-driven funds have been drawing investor capital, which reported $10 billion of net inflows over the same period.

While hedge funds recorded losses in the fourth quarter of 2018, they managed to outperform equity indices; over this period, the HFRX Global Hedge Fund Index was down 5.6 percent, while the S&P 500 was down 14 percent. Since then, hedge funds have underperformed equity indices, and, as of September 30, 2019, the HFRX Global Hedge Fund Index was up 5.9 percent year-to-date, far below the 19 percent increase for the S&P 500 stock index.

Private Equity

The GAV of private equity funds in the United States totaled $3.2 trillion in the fourth quarter of 2018, a 16 percent increase from the fourth quarter of 2017. The funds' NAV totaled $2.8 trillion, a 15 percent increase. These figures cover approximately 12,700 private equity funds, for which approximately 1,200 private equity advisers filed information on Form PF. Data from Preqin, which covers less of the industry but provides a longer time series for comparison, show a similar growth rate in 2018 **(Chart 4.13.12)**.

The private equity industry remains concentrated. Large private equity advisers filing Form PF—those with $2 billion or more in AUM—made up 25 percent of all private equity advisers filing Form PF in the fourth quarter of 2018, and managed 73 percent of gross assets.

For funds managed by large private equity advisers, pension funds remain the largest beneficial owners, accounting for 30 percent of net assets; other private funds account for 19 percent, foreign official sector investors account for 11 percent, and insurance companies account for 6 percent.

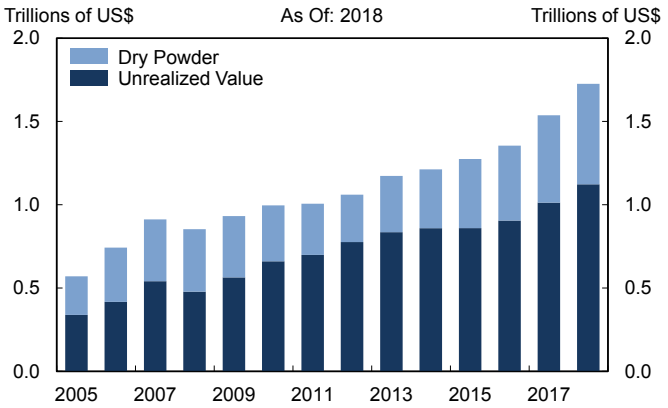
Acquisition-related activity backed by private equity continued to trend upwards and total merger and acquisition (M&A) loan volume hit a record $230 billion in 2018 **(Chart 4.13.13)**. M&A activity slowed, but remained robust in 2019, with issuances totaling $126 billion through September 30, 2019.

The private equity industry continues to attract investor inflows, in part because the sector is viewed as an attractive alternative to hedge funds. According to Preqin survey data, 90 percent of investors felt private equity investment met or exceeded their expectations in 2018, with nearly half planning to increase their allocation to private equity over the long-run. By allocating to private equity funds, investors are thus opting for less liquidity in that portion of their portfolios. Private equity funds outperformed the public market in 2018, with the Preqin Private Equity Index finishing 2018 up 10.9 percent and the S&P 500 Total Return Index finishing 2018 down 4.4 percent. This relative outperformance was concentrated in the fourth quarter of 2018, when private equity outperformed the S&P by over 13 percent.

Private Debt

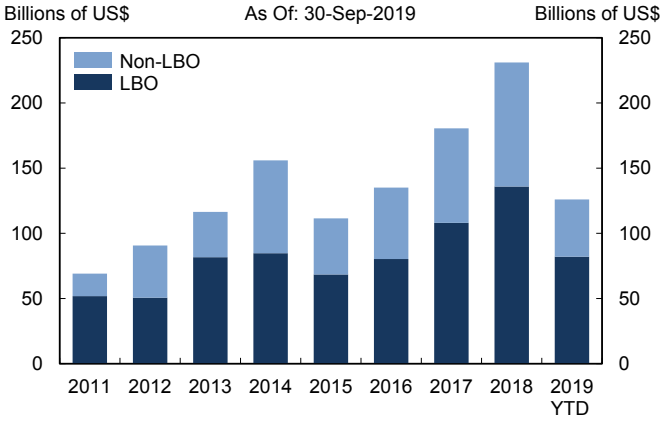
According to Preqin data, North American private debt fund AUM totaled $560 billion as of March 2019, a 62 percent increase since 2014. Dry powder, or uncalled committed capital, at private debt funds increased by 68 percent since

4.13.12 North American Private Equity AUM



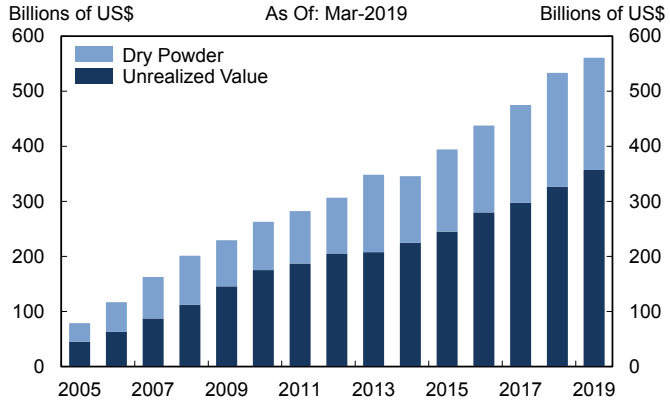
Source: Preqin

4.13.13 M&A Loan Volume for Private Equity-Backed Issuers



Source: S&P LCD

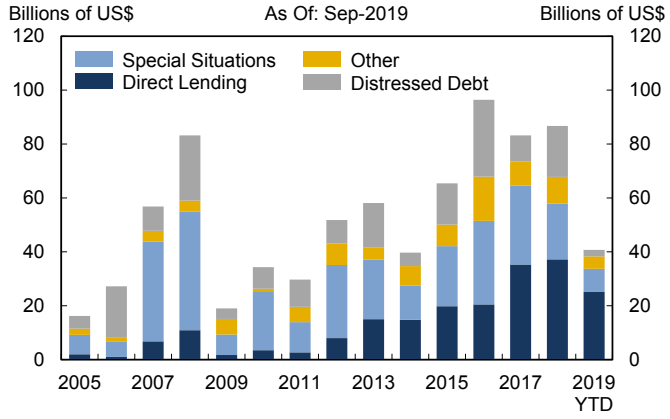
4.13.14 North American Private Debt AUM



Source: Preqin

Note: 2005-2018 figures as of year-end. Includes all North American private debt funds (excluding funds of funds).

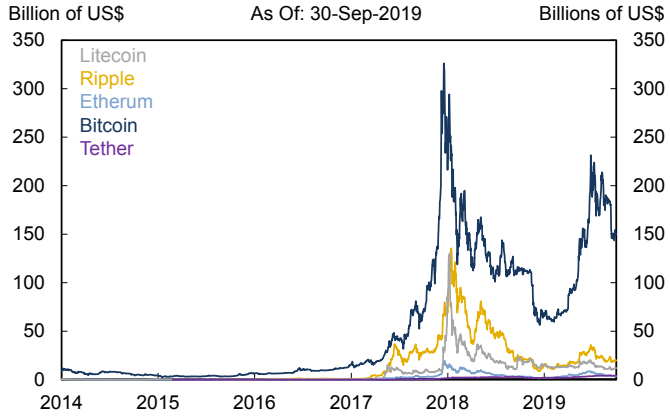
4.13.15 North American Private Debt Fundraising



Source: Preqin

Note: Includes all North American private debt funds (excluding funds of funds).

4.14.1 Market Capitalization of Blockchain-Based Digital Assets



Source: Coinmarketcap.com, Office of Financial Research

2014, while unrealized value increased by 59 percent during the same period **(Chart 4.13.14)**. Since 2017, direct lending has been the most popular strategy among private debt investors, attracting $98 billion or nearly 50 percent of all capital over this period **(Chart 4.13.15)**.

4.14 New Financial Products and Services

4.14.1 Digital Assets and Distributed Ledger Technology

The market capitalization of digital assets, such as Bitcoin, Ethereum, XRP, and Litecoin, has increased in recent years and has been highly volatile **(Chart 4.14.1)**. Digital assets trading data is sparse and may be unreliable. CoinMarketCap estimated that after reaching $800 billion in early 2018, the market capitalization of digital assets declined to $209 billion by the end of September 2019. Stablecoins—digital assets designed to maintain a stable value relative to another asset (typically a unit of currency or commodity) or a basket of assets—grew in market capitalization in 2019.

Many digital assets are enabled by blockchains or other distributed ledger technologies. Such systems share data across a network, creating identical copies of their ledger that are then often stored at and synchronized across multiple locations. Distributed ledger technology may have applications that extend well beyond the simple transfer of value. In recent years, an increasing number of financial institutions have initiated proof of concept projects to evaluate the potential for applications of distributed ledger technology in areas such as interbank and intrabank settlement, derivatives processing, repo clearing, and trade finance. The ultimate success of the technology, including applications in the financial sector, is not yet certain. Some early efforts have not resulted in the anticipated efficiency gains and other promised benefits, and as a result, have been scaled back, refocused, or abandoned.

4.14.2 Peer-to-Peer Payments

Consumers continue to embrace peer-to-peer payment services. Peer-to-peer transfers allow consumers to make payments to other consumers, usually through a mobile device app. The apps are typically linked to debit or credit card accounts or bank accounts, thereby allowing the funding transfers to proceed through bank-maintained payment networks. Although some service providers are relatively new companies, banks and other financial service providers are also entering the market and have reported significant consumer participation and transaction volume as well. In addition, partnerships between peer-to-peer payment systems and vendors are becoming increasingly popular.

4.14.3 Marketplace Lending

Marketplace lending is the provision of loans through online, electronic platforms. Initially, marketplace lending focused on retail investors providing funding to individual borrowers, and was called peer-to-peer lending. This model has evolved to one that uses significant capital from institutional investors to finance primarily consumer and small business loans. Some of the largest marketplace lenders in the consumer finance area concentrate on providing debt consolidation loans and refinancing existing student loans. Banks and credit unions, in some cases, participate in marketplace lending in partnership with other firms. This may provide for increases in efficiencies and effectiveness, but there is also potential for risks to consumers.

4.14.4 Large Technology Firms in Financial Services

Large technology and e-commerce firms continue to enter, or explore entering, financial services markets. These firms offer financial products or services such as providing loans to small businesses or individuals. Such services are often offered to customers that already have relationships with the firm. Some of these technology and e-commerce companies have assets that could allow them to grow quickly in the financial services space, including large customer networks, broad name recognition, and client data. Additionally, while these firms are still subject to regulations that may limit the activities in which they can engage, they may not be subject to the full set of regulations and oversight applicable to other financial institutions. These technology firms can promote the development of new products and services, but could also increase risks. For example, new technology and systems to evaluate and determine the creditworthiness of potential borrowers may add complexity, limit transparency, and create potential harm to consumers.

4.14.5 Reliance of Financial Institutions on Third-Party Service Providers

Financial institutions have become increasingly reliant on third-party service providers to perform important business functions. Relationships with external providers often allow an institution to take advantage of advanced or proprietary technologies including recent fintech innovations. Due to economies of scale or access to lower cost labor, external providers are often able to perform services at a lower cost than institutions can perform them in-house. In addition, as specialists, external providers may be able to perform functions for a financial institution more efficiently, more accurately, or at higher quality than if they were performed internally.

While outsourcing can have advantages, reliance on third-party service providers also has risks. For instance, many institutions have increased their use of cloud computing services to supplement their existing data storage capacity, to provide redundancy, and to gain access to additional computational capacity. While cloud providers may offer superior cost or technological solutions, there have also been recent instances of unauthorized access to client data at cloud providers. The reliance of many institutions on a single vendor to provide a critical service creates concentration risk. A service interruption or cyber event at a critical vendor with a large number of clients could result in widespread disruption in access to financial data and could impair the flow of financial transactions.

5 Regulatory Developments and Council Activities

5.1 Safety and Soundness

5.1.1 Enhanced Capital and Prudential Standards and Supervision

On December 17, 2018, the Federal Reserve, FDIC, and OCC issued a notice of proposed rulemaking (NPRM) inviting comment on a proposal that would implement a new approach for calculating the exposure amount of derivative contracts under the agencies' regulatory capital rule. The proposed approach, called the standardized approach for counterparty credit risk (SA-CCR), would replace the current exposure methodology (CEM) as an additional methodology for calculating advanced approaches total risk-weighted assets (RWAs) under the capital rule. An advanced approaches banking organization also would be required to use SA-CCR to calculate its standardized total RWAs; a non-advanced approaches banking organization could elect to use either CEM or SA-CCR for calculating its standardized total RWAs. In addition, the proposal would modify other aspects of the capital rule to account for the proposed implementation of SA-CCR. Specifically, the proposal asked about the potential treatment of the customer initial margin for the purpose of supplementary leverage ratio calculation. The proposal also would incorporate SA-CCR into the cleared transactions framework and would make other amendments, generally with respect to centrally cleared transactions. The proposed introduction of SA-CCR would indirectly affect the Federal Reserve's single counterparty credit limit rule, along with other rules.

On December 28, 2018, the OCC, Federal Reserve, and FDIC adopted interim final rules, previously issued on August 29, 2018, as final without change. The interim final rules were issued to implement section 210 of EGRRCPA, which amended Section 10(d) of the Federal Deposit Insurance Act (FDI Act) to permit the agencies to examine qualifying insured depository institutions (IDIs) with under $3 billion in total assets not less than once during each 18-month period. The final rules increase, from $1 billion to $3 billion, the total asset threshold under which an agency may apply an 18-month on-site examination cycle for qualified IDIs that have an "outstanding" composite rating. The agencies also exercised their discretionary authority under section 10(d)(10) of the FDI Act to extend eligibility for an 18-month examination cycle, by regulation, to qualifying IDIs with an "outstanding" or "good" composite rating with total assets under $3 billion. In addition, the final rules adopt as final the parallel changes to the agencies' regulations governing the on-site examination cycle for U.S. branches and agencies of foreign banks, consistent with the International Banking Act of 1978.

On January 1, 2019, the Federal Reserve's finalized requirements for the minimum total loss absorbing capacity (TLAC) for U.S. G-SIB holding companies and IHCs of foreign G-SIBs became effective. Those entities are required to maintain a minimum level of TLAC and to fund a percentage of the TLAC requirement with long-term debt (LTD). TLAC depends on the size, systemic importance and related characteristics of an institution, and is designed to improve both the resiliency and resolvability of covered entities.

On April 8, 2019, the OCC, Federal Reserve, and FDIC issued an NPRM inviting comment on a proposed rule that would address an advanced approaches banking organization's regulatory capital treatment of an investment in unsecured debt instruments issued by foreign or U.S. G-SIBs for the purposes of meeting minimum TLAC and, where applicable, LTD requirements, or unsecured debt instruments issued by G-SIBs that are pari passu or subordinated to such debt instruments. Under the proposal, investments by an advanced approaches banking organization in such unsecured debt instruments generally would be subject to deduction from the advanced approaches banking organization's own regulatory capital. The proposal would provide a significant incentive for large banking organizations to reduce both

interconnectedness within the financial system and systemic risk. The Federal Reserve proposal includes changes to regulatory reporting requirements concerning these investments. The Federal Reserve also proposed to require that banking organizations subject to minimum TLAC and LTD requirements under Federal Reserve regulations publicly disclose their TLAC and LTD issuances in a manner described in this proposal.

On April 30, 2019, the OCC, Federal Reserve, and FDIC issued a joint NPRM inviting comment on a proposal to implement Section 402 of EGRRCPA. Section 402 directs these agencies to amend the supplementary leverage ratio of the regulatory capital rule to exclude certain funds of banking organizations deposited with central banks if the banking organization is predominantly engaged in custody, safekeeping, and asset servicing activities.

On May 15, 2019, the Federal Reserve issued an NPRM inviting comment on a proposal that would revise the framework for applying the enhanced prudential standards applicable to FBOs under section 165 of the Dodd-Frank Act, as amended by EGRRCPA. The proposal would establish categories that would be used to tailor the stringency of enhanced prudential standards based on the risk profile of a FBO's U.S. operations. The proposal also would amend certain enhanced prudential standards, including standards relating to liquidity, risk management, stress testing, and single-counterparty credit limits, and would make corresponding changes to reporting forms. The proposal would make clarifying revisions and technical changes to the Federal Reserve's October 31, 2018 proposal for large U.S. BHCs and certain savings and loan holding companies relating to the Federal Reserve's internal liquidity stress testing requirements and G-SIB surcharge rule.

On May 24, 2019, the OCC issued a final rule to implement a new section of the Home Owners' Loan Act (HOLA). EGRRCPA amended HOLA by adding a new section that allows a federal savings association with total consolidated assets equal to or less than $20 billion, as of December 31, 2017, to elect to operate as a covered savings association. A covered savings association has the same rights and privileges as a national bank and is subject to the same duties, restrictions, penalties, liabilities, conditions, and limitations as a national bank. A covered savings association retains its federal savings association charter and existing governance framework. The new section of HOLA requires the OCC to issue rules that, among other things, establish streamlined standards and procedures for elections to operate as covered savings associations and clarify requirements for the treatment of covered savings associations.

On June 5, 2019, the OCC, Federal Reserve, and FDIC jointly adopted as a final rule, without change, the August 31, 2018, interim final rule, which amended the agencies' LCR rule to treat liquid and readily-marketable, investment grade municipal obligations as HQLA. This treatment was required by Section 403 of EGRRCPA.

On June 21, 2019, the OCC, Federal Reserve, and FDIC issued a final rule to implement Section 205 of EGRRCPA by expanding the eligibility to file the agencies' most streamlined report of condition, the Federal Financial Institutions Examination Council (FFIEC) 051 Call Report, to include certain IDIs with less than $5 billion in total consolidated assets that meet other criteria, and establishing reduced reporting requirements for the FFIEC 051 Call Report filings for the first and third quarters of a year. The OCC and Federal Reserve also finalized similar reduced reporting for certain uninsured institutions that they supervise with less than $5 billion in total consolidated assets that otherwise meet the same criteria.

On July 22, 2019, the OCC, Federal Reserve, and FDIC issued a final rule that simplified several requirements in the agencies' regulatory capital rules. The simplifications apply only to banking organizations that do not use the advanced approaches capital framework, which are generally firms with less than $250 billion in total consolidated assets and with less than $10 billion in total foreign exposure. Specifically, the final rule simplifies the capital treatment for mortgage servicing assets, certain deferred tax assets, investments in the capital instruments of unconsolidated financial institutions, and minority

interests. The final rule also allows BHCs and savings and loan holding companies to redeem common stock without prior approval unless otherwise required. The final rule is consistent with the changes proposed in the Economic Growth and Regulatory Paperwork Reduction Act report issued by the agencies in 2017. In that report, the agencies committed to meaningfully reducing regulatory burden, especially on community banking organizations, while at the same time maintaining safety and soundness and the quality and quantity of regulatory capital in the banking system. The final rule amendments that simplify capital rules will be effective as of January 1, 2020, based on a subsequent rulemaking modifying the effective date. Revisions to the pre-approval requirements for the redemption of common stock and other technical amendments became effective on October 1, 2019.

On July 23, 2019, the OCC, Federal Reserve, and FDIC issued an NPRM inviting public comment on a proposal to clarify the treatment of land development loans under the agencies' capital rules. This proposal expands on the agencies' September 2018 proposal to revise the definition of high volatility commercial real estate (HVCRE) as required by EGRRCPA. The land development proposal would clarify that loans that solely finance the development of land for residential properties would meet the revised definition of HVCRE, unless the loan qualifies for another exemption. The land development proposal would apply to all banking organizations subject to the agencies' capital rules.

On September 17, 2019, the FDIC adopted a final rule that amends its deposit insurance assessment regulations to apply the community bank leverage ratio (CBLR) framework, discussed below, to the deposit insurance assessment system. The final rule does not make any changes to the FDIC's assessment methodology, but could affect which pricing model is used, resulting in a change to assessments for a very limited subset of banks, including one institution as of March 31, 2019. Assessments will remain unchanged for all other institutions that adopt the CBLR framework.

On October 29, 2019, the OCC, Federal Reserve, and FDIC adopted a final rule that provides for a simple measure of capital adequacy for certain community banking organizations, consistent with Section 201 of EGRRCPA. Under the final rule, depository institutions and depository institution holding companies that have less than $10 billion in total consolidated assets and meet other qualifying criteria, including a leverage ratio (equal to tier 1 capital divided by average total consolidated assets) of greater than 9 percent, will be eligible to opt into the CBLR framework (qualifying community banking organizations). Qualifying community banking organizations that elect to use the CBLR framework and that maintain a leverage ratio of greater than 9 percent will be considered to have satisfied the generally applicable risk-based and leverage capital requirements in the agencies' capital rules and, if applicable, will be considered to have met the well-capitalized ratio requirements for purposes of Section 38 of the FDI Act.

On November 1, 2019, the OCC, Federal Reserve, and FDIC issued a final rule to revise the criteria for determining the applicability of regulatory capital and liquidity requirements for large U.S. banking organizations and the U.S. IHCs of certain FBOs. The final rule establishes four risk-based categories for determining the applicability of requirements under the agencies' regulatory capital rule and LCR rule. Under the final rule, such requirements increase in stringency based on measures of size, cross-jurisdictional activity, weighted short-term wholesale funding, nonbank assets, and off-balance sheet exposure. The final rule applies tailored regulatory capital and liquidity requirements to depository institution holding companies and U.S. IHCs with $100 billion or more in total consolidated assets, as well as to certain depository institutions.

5.1.2 Dodd-Frank Act Stress Tests and Comprehensive Capital Analysis and Review

Section 165(i)(2) of the Dodd-Frank Act requires certain financial companies to conduct annual stress tests.

On February 5, 2019, the OCC released economic and financial market scenarios for use in upcoming stress tests for covered institutions. The supervisory scenarios include baseline, adverse, and severely adverse scenarios, as described in the OCC's final

rule that implements stress test requirements of the Dodd-Frank Act. The OCC's stress test rule states that the OCC will provide scenarios to covered institutions by February 15 of each year. Covered institutions are required to use the scenarios to conduct annual stress tests. The results of the company-run stress tests will assist the agency in assessing the company's risk profile and capital adequacy.

On March 13, 2019, the Federal Reserve issued a final rule amending the capital plan rule to limit the scope of potential objections to a firm's capital plan on the basis of qualitative deficiencies in the firm's capital planning process (qualitative objection). The Federal Reserve announced that, as of the publication date, it would no longer issue a qualitative objection under the capital plan rule to a firm if the firm has been subject to a potential qualitative objection for four consecutive years, and the firm does not receive a qualitative objection in the fourth year of that period. In addition, except for certain firms that have received a qualitative objection in the immediately prior year, the Federal Reserve will no longer issue a qualitative objection to any firm effective January 1, 2021.

On October 2, 2019, October 10, 2019, and October 15, 2019, respectively, the OCC, Federal Reserve and FDIC adopted parallel final rules that, consistent with EGRRCPA, revise the minimum asset threshold for firms to conduct stress tests, revise the frequency by which firms would be required to conduct stress tests, and remove the adverse scenario from the list of required scenarios in the stress test rules. The Federal Reserve's final rule also makes conforming changes to the Federal Reserve's Policy Statement on the Scenario Design Framework for Stress Testing.

5.1.3 Resolution Planning and Orderly Liquidation

Under the framework of the Dodd-Frank Act, resolution under the U.S. Bankruptcy Code is the statutory first option in the event of the failure of a financial company. Section 165(d) of the Dodd-Frank Act requires nonbank financial companies designated by the Council for supervision by the Federal Reserve and certain BHCs—including certain FBOs with U.S. operations—to periodically submit plans to the Federal Reserve, the FDIC, and the Council for their rapid and orderly resolution under the U.S. Bankruptcy Code in the event of material financial distress or failure. These reports are also referred to as living wills. The Federal Reserve and FDIC review each plan and may jointly determine that a plan is not credible or would not facilitate an orderly resolution of the company under the U.S. Bankruptcy Code. Since the resolution planning requirements took effect in 2012, U.S. G-SIBs and certain other firms have improved their resolution strategies and governance, refined their estimates of liquidity and capital needs in resolution, and simplified their legal structures. These changes have made these firms more resilient and resolvable.

On February 4, 2019, the Federal Reserve and FDIC published final guidance for U.S. G-SIBs regarding their 2019 resolution plan submissions and subsequent plan submissions. The final guidance, which is largely based on prior guidance issued to these firms, describes the agencies' expectations regarding a number of key vulnerabilities in plans for an orderly resolution under the U.S. Bankruptcy Code, including capital; liquidity; governance mechanisms; operational; legal entity rationalization and separability; and derivatives and trading activities. The final guidance also updates certain aspects of prior guidance based on the agencies' review of these firms' most recent resolution plan submissions, including areas of the guidance regarding payment, clearing, and settlement services as well as derivatives and trading activities.

On July 1, 2019, the U.S. G-SIBs submitted public and confidential sections of their resolution plans to the Federal Reserve and FDIC. On July 23, 2019, the Federal Reserve and FDIC released the public sections of these firms' resolution plans on the agencies' respective websites. The agencies will review both the confidential and public portions of the resolution plans to consider the credibility of such plans, as discussed above.

There were several other important developments related to the orderly resolution of large banking organizations occurring at the end of 2018 and in 2019. In December 2018, the Federal Reserve and FDIC jointly announced that their review of the

2018 resolution plans of four foreign firms found no "deficiencies" in these plans. Deficiencies are weaknesses severe enough to trigger a resubmission process that could result in more stringent requirements. However, the agencies announced that the firms' resolution plans had "shortcomings," which are less-severe weaknesses that require additional work in the firms' next plans. In March 2019, the Federal Reserve and FDIC jointly announced that their review of the 2017 resolution plans of 14 domestic banking organizations found no shortcomings or deficiencies.

In July 2019, the Federal Reserve and FDIC jointly announced they completed their evaluations of the 2018 resolution plans for 82 foreign firms and did not identify shortcomings or deficiencies in the plans. The agencies also announced that they extended the deadline for the next resolution plans from those firms, as well as 15 domestic firms and four other foreign firms. These four foreign firms remain required to submit limited plans by July 1, 2020, describing how they have addressed the shortcomings identified in December 2018 and providing updates concerning certain resolution projects.

On November 1, 2019, the Federal Reserve and FDIC issued a final rule that modifies their resolution plan requirements for large firms. The rule retains resolution plan elements in place for the largest firms while reducing requirements for smaller firms that pose less risk to the financial system. The final rule uses the separate framework developed by the federal banking agencies for application of prudential requirements, and establishes resolution planning requirements tailored to the level of risk a firm poses to the financial system. Consistent with EGRRCPA, the final rule would affect domestic and foreign firms with more than $100 billion in total consolidated assets.

In addition, in 2019, the Federal Reserve and FDIC hosted Crisis Management Group (CMG) meetings for U.S. G-SIBs to discuss home and host resolvability assessments for the firms to facilitate cross-border resolution planning.

5.1.4 Volcker Rule

On July 22, 2019, the OCC, Federal Reserve, FDIC, SEC, and CFTC issued final rules to amend the regulations implementing the Bank Holding Company Act's prohibitions and restrictions on proprietary trading and certain interests in, and relationships with, hedge funds and private equity funds (commonly known as the Volcker Rule) in a manner consistent with EGRRCPA. EGRRCPA amendments and the final rules exclude from these prohibitions and restrictions certain firms that have total consolidated assets equal to $10 billion or less and total trading assets and liabilities equal to 5 percent or less of total consolidated assets. EGRRCPA and the final rules also revise the restrictions applicable to the naming of a hedge fund or private equity fund to permit an investment adviser that is a banking entity to share a name with the fund under certain circumstances.

In addition, the Volcker rule-writing agencies approved a final rule in 2019 that tailors and simplifies the regulations implementing the Volcker Rule. The final rule incorporates a risk-based approach that relies on a set of clearly articulated standards for both prohibited and permitted activities and investments. Among other changes, the final rule revises the definition of "trading account," streamlines the requirements of certain permitted activities, and revises the compliance program requirements associated with the Volcker Rule.

5.1.5 Insurance

Covered Agreements

In anticipation of Brexit, the United States entered into a covered agreement with the United Kingdom on December 18, 2018. Pursuant to the Federal Insurance Office Act of 2010 (FIO Act), a covered agreement is a written bilateral or multilateral agreement regarding prudential measures with respect to the business of insurance or reinsurance. The terms and scope of this covered agreement are substantially the same as those of the covered agreement currently in force with the EU. Consistent with its approach with the U.S.-EU covered agreement, the United States also released a policy statement to provide additional clarity for the domestic insurance sector on certain terms of the agreement and address how the United

States intends to implement the agreement. The agreement "affirms the United States system of insurance regulation, including the role of state insurance regulators as the primary supervisors of the business of insurance" in the United States and recognizes the key implementation role that state insurance regulators will play in meeting U.S. obligations under the agreement.

In June 2019, in response to the covered agreements with the EU and the United Kingdom, the National Association of Insurance Commissioners (NAIC) adopted changes to the Credit for Reinsurance Model Law and Credit for Reinsurance Model Regulation intended to provide states with a model law and regulation aligning state law with the U.S. obligations under the agreements. The NAIC has also included provisions in the models that are intended to provide similar treatment to insurers and reinsurers from jurisdictions not party to a covered agreement (provided that such jurisdictions comply with similar conditions as those under the covered agreements). In the event that a state does not conform its laws to the terms of the covered agreements, the FIO Director has the ability, subject to the timing provisions in the agreements and the procedures set forth in the FIO Act, to preempt inconsistent state insurance measures.

NAIC Initiatives

The NAIC's Macroprudential Initiative is focused on liquidity, recovery and resolution, capital stress testing, and exposure concentrations. As part of this initiative, state insurance regulators, through the NAIC, implemented changes to life insurer reporting to allow regulators to identify potential liquidity risks more quickly and easily. The formal requirement goes into effect for the 2019 annual statements, which are filed in March 2020.

The NAIC continues to develop its group capital calculation, which is an analytical tool designed to give regulators information relating to the capital across an insurance group. Field testing of the group capital calculation began in May 2019, with completed templates submitted in August, and review and analysis completed by the 15 lead states and NAIC staff by October. The NAIC anticipates that it will adopt the calculation during 2020, with state adoption to follow. In addition, earlier this year, the NAIC implemented changes in determining the reported credit risk assessment for certain instruments, including CLOs, to capture their risk more accurately.

The state insurance regulators, through the NAIC, continue to make progress in implementing principle-based reserving, which became effective in 2017 with an optional three-year transition period before mandatory implementation in 2020. In 2019, the NAIC formed a Long-Term Care Insurance (EX) Task Force that is charged with: (1) developing a consistent national approach for reviewing long-term care insurance rates that results in actuarially appropriate increases being granted by the states in a timely manner; and (2) identifying appropriate options that afford consumers choices regarding modifications to their long-term care insurance benefits, where policies are no longer affordable due to rate increases.

Cybersecurity

States have begun to adopt the NAIC's Insurance Data Security Model Law, which updates state insurance regulatory requirements relating to data security, the investigation of a cyber event, and the notification to state insurance commissioners of cybersecurity events at regulated entities. As of November 2019, eight states had adopted the model or comparable legislation. In August 2019, the NAIC adopted insurance data security pre-breach and post-breach checklists, based on the model law, for its Market Regulation Handbook to provide guidance for market conduct examinations. Further, state insurance regulators and the NAIC collaborate with Treasury to facilitate tabletop exercises with insurers to explore cybersecurity incident response and recovery across the insurance sector.

Other

On September 6, 2019, the Federal Reserve approved an NPRM proposing risk-based capital requirements for depository institution holding companies that are significantly engaged in insurance activities. The proposed methodology, termed the Building Block Approach (BBA), would adjust and aggregate existing legal entity capital requirements to determine an enterprise-wide

capital requirement. This NPRM follows a 2016 advance notice of proposed rulemaking (ANPR) that conceptually described the BBA and invited comment on key aspects. The Federal Reserve is also conducting a quantitative impact study of this proposal.

In mid-November 2019, the International Association of Insurance Supervisors (IAIS) holistic framework for the assessment and mitigation of systemic risk in the insurance sector ("holistic framework") was adopted at the IAIS Annual General Meeting and implementation is expected to begin in 2020. The holistic framework is intended to move away from policy measures applied to a relatively small group of insurers to an approach that addresses activities and exposures across a broader portion of the insurance sector.

The IAIS is currently working on an International Insurance Capital Standard for insurance firms. A number of questions have been raised regarding its compatibility with the business model and regulation of U.S. insurance firms and the potential impact on certain retirement products offered in the United States.

5.2 Financial Infrastructure, Markets, and Oversight

5.2.1 Derivatives, Swap Data Repositories, Regulated Trading Platforms, and Central Counterparties

On March 19, 2019, the OCC, Federal Reserve, FDIC, FCA, and FHFA adopted and invited comment on an interim final rule in anticipation of the possibility of a disorderly Brexit. The rule amends the agencies' regulations that require SDs and security-based swap (SBS) dealers under the agencies' respective jurisdictions to exchange margin with their counterparties for swaps that are not centrally cleared (Swap Margin Rule). The Swap Margin Rule takes effect under a phased compliance schedule stretching from 2016 through 2020, and the dealers covered by the rule continue to hold swaps in their portfolios that were entered into before the effective dates of the rule. Those swaps are grandfathered from the Swap Margin Rule's requirements until they expire according to their terms. Certain financial services firms located within the United Kingdom conduct swap dealing activities subject to the Swap Margin Rule. In the event of a disorderly Brexit, these UK entities may not be authorized to provide full-scope financial services to swap counterparties located in the EU. The agencies' policy objective in developing the interim final rule is to address one aspect of the scenario likely to ensue, whereby entities located in the United Kingdom might transfer their existing swap portfolios that face counterparties located in the EU over to an affiliate or other related establishment located within the United States or the EU. The agencies seek to address industry concerns about the status of grandfathered swaps in this scenario so the industry can focus on making preparations for swap transfers. These transfers, if carried out in accordance with the conditions of the interim final rule, will not trigger the application of the Swap Margin Rule to grandfathered swaps that were entered into before the compliance dates of the Swap Margin Rule.

On October 28, 2019, the OCC, Federal Reserve, FDIC, FCA, and FHFA announced an NPRM proposing amendments to the Swap Margin Rule. The NPRM would permit swaps entered into prior to an applicable compliance date (legacy swaps) to retain their legacy status in the event that they are amended to replace an interbank offered rate or other discontinued rate, repeal the interaffiliate initial margin provisions, introduce an additional compliance date for initial margin requirements, clarify the time at which trading documentation must be in place, and permit legacy swaps to retain their legacy status in the event that they are amended due to technical amendments, notional reductions, or portfolio compression exercises, among other changes.

On April 1, 2019, the CFTC issued a final rule amending the de minimis exception within the SD definition in the CFTC's regulations. The final rule established as a factor in the de minimis threshold determination whether a given swap has specified characteristics of swaps entered into by IDIs in connection with loans to customers. Under the final rule, IDIs could exclude certain swaps entered into with customers in connection with originating

loans to those customers from the IDIs' de minimis calculation.

On April 1, 2019, the CFTC adopted and invited comments on an interim final rule intended to prepare for the possibility of a disorderly Brexit. To the extent there is a disorderly Brexit, affected SDs and major swap participants (MSPs) may need to effect legal transfers of uncleared swaps that were entered into before the relevant compliance dates under the CFTC Margin Rule or Prudential Margin Rule and that are not now subject to such rules, in whole or in part. The interim final rule amended the CFTC Margin Rule, which sets forth the CFTC's margin requirements for uncleared swaps for SDs and MSPs for which there is no prudential regulator. As a result of the amendments, the date used for purposes of determining whether an uncleared swap was entered into prior to an applicable compliance date will not change under the CFTC Margin Rule if the swap is transferred, and thereby amended, in accordance with the terms of the interim final rule in respect of any such transfer, including that the transfer be made solely in connection with a party to the swap's planning for or response to a disorderly Brexit. The interim final rule is designed to allow an uncleared swap to retain its legacy status under the CFTC Margin Rule or Prudential Margin Rule when so transferred.

On May 13, 2019, the CFTC issued an NPRM proposing amendments to Parts 23, 43, 45, and 49 of the CFTC's regulations to improve the accuracy of data reported to, and maintained by, swap data repositories (SDRs). Among other changes, the proposed amendments would update requirements for SDRs to verify the accuracy of swap data with reporting counterparties. The proposed amendments would also update requirements to correct errors and omissions in swap data for SDRs, reporting counterparties, and other market participants.

In June 2019, the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) issued a consultative "Discussion Paper on Central Counterparty Default Management Auctions." The purpose of the discussion paper is to facilitate the sharing of existing practices and views on default management auctions and to advance industry efforts and foster dialogue on the key concepts, processes and operational aspects used by CCPs in planning and executing default management auctions. The paper presents a number of questions and invites comments on the benefits and challenges of various approaches, as well as potential ways to overcome such challenges. The discussion in the paper reflects the current practices at one or more CCPs and identifies the types of factors that one or more CCPs take into account when planning and conducting default management auctions. Additionally, the discussion paper identifies certain considerations that may be useful for CCPs to take into account when planning for auctions.

In October 2019 the European Council finalized adoption of amendments to the European Market Infrastructure Regulation, with publication in the Official Journal forthcoming. Referred to as "EMIR 2.2," the amendments set out a revised framework for the supervision of CCPs domiciled outside of the EU (third-country CCPs), particularly responding to Brexit. EMIR 2.2 distinguishes, among third-country CCPs, between those that are systemically important or likely to become so (Tier 2 CCPs), and those that are not (Tier 1 CCPs). Depending on how this regulation is implemented, EMIR 2.2 could result in one or more U.S. CCPs being designated by the EU as systemically important to the EU financial system, which would subject the U.S. CCP to the supervision of the European Securities and Markets Authority. Supervision of U.S. CCPs by multiple regulators has the potential to introduce inconsistent or incompatible regulation or supervision. U.S. regulators and market participants have raised concerns about potential negative consequences associated with inconsistent regulation or supervision, citing examples such as liquidity risk management and default management.

CMGs continued to coordinate resolution planning for two U.S. CCPs that are considered systemically important in more than one jurisdiction, consistent with international standards. Processes for cooperation and sharing information, both during

a crisis and for purposes of resolution planning, are set forth in cooperation arrangements that are specific to the CMG for each CCP. Work remains in finalizing the cooperation arrangements.

5.2.2 Securities and Asset Management

On February 6, 2019, the SEC issued a final rule to implement Section 955 of the Dodd-Frank Act. The rule requires a company to describe any practices or policies it has adopted regarding the ability of its employees (including officers) or directors to purchase financial instruments, or otherwise engage in transactions, that hedge or offset, or are designed to hedge or offset, any decrease in the market value of equity securities granted as compensation, or held directly or indirectly by the employee or director. The rule requires a company to describe the practices or policies and the categories of persons they affect. If a company does not have any such practices or policies, the company must disclose that fact or state that hedging transactions are generally permitted.

On February 15, 2019, the SEC issued an NPRM proposing rules that would require the application of specific risk mitigation techniques to portfolios of security-based swaps not submitted for clearing. In particular, the proposal would establish requirements for each registered SBS dealer and each registered major SBS participant with respect to, among other things, reconciling outstanding SBSs with applicable counterparties on a periodic basis; engaging in certain forms of portfolio compression exercises, as appropriate; and executing written SBS trading relationship documentation with each of its counterparties prior to, or contemporaneously with, executing an SBS transaction. In addition, the SEC proposed an interpretation to address the application of the portfolio reconciliation, portfolio compression, and trading relationship documentation requirements to cross-border SBS activities and proposed to amend Rule 3a71-6 to address the potential availability of substituted compliance in connection with those requirements. Moreover, the proposed rules would make corresponding changes to the recordkeeping, reporting, and notification requirements applicable to SBS dealers and major SBS participants.

On June 21, 2019, in accordance with the Dodd-Frank Act, the SEC issued a final rule pursuant to the Exchange Act, adopting: (1) capital and margin requirements for SBS dealers and major SBS participants; (2) segregation requirements for SBS dealers; and (3) notification requirements with respect to segregation for SBS dealers and major SBS participants. The SEC also increased the minimum net capital requirements for broker-dealers authorized to use internal models to compute net capital, and prescribed certain capital and segregation requirements for broker-dealers that are not registered as SBS dealers, to the extent they trade these instruments and SBSs. The SEC also made substituted compliance available with respect to capital and margin requirements under Section 15F of the Exchange Act and the rules thereunder and adopted a rule that specifies when a foreign SBS dealer or foreign major SBS participant need not comply with the segregation requirements of Section 3E of the Exchange Act and the rules thereunder.

On July 5, 2019, the SEC issued a final rule adopting amendments to its auditor independence rules to refocus the analysis that must be conducted to determine whether an auditor is independent when the auditor has a lending relationship with certain shareholders of an audit client at any time during an audit or professional engagement period. The amendments: focus the analysis on beneficial ownership rather than on both record and beneficial ownership; replace the existing 10 percent bright-line shareholder ownership test with a "significant influence" test; add a "known through reasonable inquiry" standard with respect to identifying beneficial owners of the audit client's equity securities; and, for a fund under audit, exclude from the definition of "audit client" any other funds that otherwise would be considered affiliates of the audit client under the rules for certain lending relationships. The amendments are intended to more effectively identify debtor-creditor relationships that could impair an auditor's objectivity and impartiality.

On July 12, 2019, the SEC issued a final rule adopting a new rule under the Exchange Act, establishing a standard of conduct for broker-dealers

and natural persons who are associated persons of a broker-dealer when they make a recommendation to a retail customer of any securities transaction or investment strategy involving securities (Regulation Best Interest). Regulation Best Interest requires broker-dealers, among other things, to act in the best interest of the retail customer at the time the recommendation is made, without placing the financial or other interest of the broker-dealer ahead of the interests of the retail customer. Additionally, the final rule requires broker-dealers to address conflicts of interest by establishing, maintaining, and enforcing policies and procedures reasonably designed to identify and fully and fairly disclose material facts about conflicts of interest. In instances where the SEC has determined that disclosure is insufficient to reasonably address the conflict, the final rule requires broker-dealers to mitigate or, in certain instances, eliminate the conflict. The standard of conduct established by Regulation Best Interest cannot be satisfied through disclosure alone. The standard of conduct draws from key principles underlying fiduciary obligations, including those that apply to investment advisers under the Investment Advisers Act of 1940. Regardless of whether a retail investor chooses a broker-dealer or an investment adviser (or both), the retail investor will be entitled to a recommendation (from a broker-dealer) or advice (from an investment adviser) that is in the best interest of the retail investor and that does not place the interests of the firm or the financial professional ahead of the interests of the retail investor.

On September 26, 2019 the SEC adopted a new rule and form amendments designed to modernize the regulatory framework for ETFs. The new rule will permit ETFs that satisfy certain conditions to operate within the scope of the Investment Company Act of 1940, and come directly to market without the cost and delay of obtaining an exemptive order. This is intended to facilitate greater competition and innovation in the ETF marketplace by lowering barriers to entry. The new rule also will replace hundreds of individualized exemptive orders with a single rule. The rule's standardized conditions are designed to level the playing field among most ETFs and protect ETF investors, while disclosure amendments adopted by the SEC will provide investors who purchase and sell ETF shares on the secondary market with new information. In addition, the SEC issued an exemptive order that further harmonizes related relief from certain provisions of the Securities Exchange Act of 1934. On May 20, 2019, the SEC approved an order for exemptive relief that will allow for the active management of an ETF without the daily portfolio transparency requirement that until now has facilitated ETF arbitrage. The ETF would sell and redeem shares to authorized participants only through an agent that will know, but keep confidential, the ETF's portfolio holdings. The ETF would invest only in certain securities that trade on a U.S. exchange contemporaneously with the ETF's shares, and would disseminate a verified intraday indicative value, reflecting the value of the ETF's holdings, that would be updated every second.

5.2.3 Operational Risks for Technological Systems and Cybersecurity

In June 2019, IOSCO's Cyber Task Force issued a final report that compiles information from IOSCO member jurisdictions regarding their existing frameworks for cyber regulation. It is intended to serve as a resource for financial market regulators and firms to raise awareness of existing international cyber guidance, and to encourage the adoption of good practices among the IOSCO community. The report examines how IOSCO member jurisdictions are using three prominent and internationally recognized cyber frameworks: (1) National Institute of Standards and Technology Cybersecurity Framework; (2) CPMI-IOSCO Guidance on Cyber Resilience for Financial Market Infrastructures (CPMI-IOSCO Guidance); and (3) International Organization for Standardization (ISO) and International Electrotechnical Commission Information Security Management System standards. The report focuses on these existing cyber frameworks instead of proposing a new framework. The report also indicates how such existing cyber frameworks could help address any gaps identified in members' current regimes. Lastly, the report provides a set of core questions that firms and regulators may use to promote awareness of cyber good practices or enhance their existing practices.

5.2.4 Accounting Standards

In June 2019, the FASB proposed accounting relief for companies and organizations required to modify contracts as a result of transition to global reference rates. The FASB tentatively decided that for certain contracts, changes due to the contract's reference interest rate would be accounted for as a continuation of that contract rather than the creation of a new contract. Under normal circumstances, modifications made to loan, debt, and lease contracts would require assessments regarding whether the modification would qualify as an extinguishment or a troubled debt restructuring. This proposal follows the decision by the FASB, in late 2018, to add the SOFR as a permissible benchmark rate for hedge accounting purposes. On September 5, 2019, the FASB issued a proposed Accounting Standards Update (ASU), entitled Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting.

In October 2019, the FASB also approved targeted transition relief to delay effective dates for certain companies for accounting for leases, credit losses, hedging, and long-duration insurance contracts. Under the FASB's decision, the effective date for implementation of ASU 2016-13, Financial Instruments-Credit Losses (Topic 326); Measurement of Credit Losses on Financial Instruments, commonly referred to as the CECL methodology, for calendar-year-end SEC filers, excluding smaller companies as defined by SEC, will remain January 1, 2020, but the new effective date for all other calendar-year-end entities will be January 1, 2023.

Under CECL, when estimating credit losses for the contractual life of the loan, collection expectations are updated at each reporting period such that the net amount recognized on the balance sheet represents the amount expected to be collected. The standard also requires consideration of a broader range of supportable information to determine credit loss estimates, including relevant information about past events, historical experience, current conditions, and reasonable and supportable forecasts with expectations for how future conditions might affect losses. CECL does not change the ultimate cash flows or a borrower's ability to repay, and does not change when to charge off a loan. It changes only the timing of when loss provisions are recognized in net income. The scope includes financial asset instruments carried at amortized costs, such as loans, HTM debt securities, reinsurance receivables, and commitments to extend credit. The guidance allows an institution to apply methods that reasonably reflect its expectations of the credit loss estimate. An institution is permitted to revert to historical loss information that is reflective of the contractual term (considering the effect of prepayments) for periods that are beyond the timeframe for which the entity is able to develop reasonable and supportable forecasts of loss. In other words, the allowance model considers events that have not occurred but can be expected in the future. A cumulative-effect adjustment for the changes in the allowance for credit losses will be recorded to retained earnings when an institution transitions from the current incurred loss methodology to CECL. A banking organization's implementation of CECL will likely affect its retained earnings, deferred tax assets, and allowances and, as a result, its regulatory capital ratios.

5.2.5 Bank Secrecy Act/Anti-Money Laundering Regulatory Reform

The FDIC, Federal Reserve, NCUA and OCC ("Federal Banking Agencies") have joined with the Treasury and its Financial Crimes Enforcement Network (FinCEN) in an executive-level working group to improve the effectiveness and the efficiency of bank compliance with the Bank Secrecy Act (BSA). Since October 2018, the working group has clarified the legal requirements and supervisory expectations in the BSA area relating to resource sharing, the application of innovative technology solutions and the risk-focused approach to BSA/Anti-Money Laundering (AML) supervision through the publication of joint statements. In addition, the Federal Banking Agencies and FinCEN granted an exemption to the Customer Identification Program rule for loans extended by banks (and their subsidiaries) subject to the Federal Banking Agencies' jurisdiction to commercial customers to facilitate purchases of property and casualty insurance policies, thus reducing regulatory burden.

In June 2019, the Financial Action Task Force (FATF), an international intergovernmental organization that developed international standards for combating money laundering and the financing of terrorism and proliferation of weapons of mass destruction, revised its international standards to cover "virtual assets" and "virtual asset service providers." Over two hundred countries around the world, including the United States, have committed to comply with the FATF standards. The new standards require countries to: (1) assess and mitigate their risks associated with "virtual asset" financial activities and providers; (2) license or register providers; (3) subject providers to supervision or monitoring by competent national authorities (not a self-regulatory body); (4) implement sanctions and other enforcement measures, when providers fail to comply with their AML/Countering the Financing of Terrorism (CFT) obligations, in addition to international cooperation measures; and (5) work to ensure that providers in this space also assess and mitigate their money laundering and terrorist financing risks and implement the full range of AML/CFT preventive measures.

5.3 Mortgages and Consumer Protection

5.3.1 Mortgages and Housing Finance

On February 20, 2019, the FHFA issued a final rule to adopt as its own portions of the regulations of the Federal Housing Finance Board (Finance Board) pertaining to the capital requirements for the FHLBs. The final rule carries over most of the existing Finance Board regulations without material change, but substantively revises the credit risk component of the risk-based capital requirement, as well as the limitations on extensions of unsecured credit. The principal revisions to those provisions remove requirements that the FHLBs calculate credit risk capital charges and unsecured credit limits based on ratings issued by a nationally recognized statistical rating organization, and instead require that the FHLBs use their own internal rating methodology. The final rule also revises the percentages used in the tables to calculate the credit risk capital charges for advances and non-mortgage assets. The FHFA retains the percentages used in the existing table to calculate the capital charges for mortgage-related assets but revises the approach to identify the appropriate percentage within the table.

On March 5, 2019, the FHFA issued a final rule to improve the liquidity of the Enterprises' To Be Announced (TBA)-eligible MBS by requiring the Enterprises to maintain policies that promote aligned investor cash flows both for current TBA-eligible MBS and, upon its implementation, for the Uniform Mortgage-Backed Security (UMBS)—a common, fungible MBS that will be eligible for trading in the TBA market for fixed-rate mortgage loans backed by one-to-four unit (single-family) properties. The final rule codifies alignment requirements that the FHFA implemented under the Fannie Mae and Freddie Mac conservatorships. The rule is integral to the transition to and ongoing fungibility of the UMBS. The Enterprises began issuing UMBS in place of their current TBA-eligible securities on June 3, 2019.

In September 2019, Treasury and the FHFA agreed to modifications to the PSPAs that will permit Fannie Mae and Freddie Mac to retain additional earnings in excess of the $3 billion capital reserves previously permitted by their PSPAs. Under these modifications, Fannie Mae and Freddie Mac will be permitted to maintain capital reserves of $25 billion and $20 billion, respectively. Treasury and each of Fannie Mae and Freddie Mac also agreed to negotiate an additional amendment to the PSPAs adopting covenants that are intended to further enhance taxpayer protections.

5.3.2 Consumer Protection

In 2017, the CFPB issued a payday, vehicle title, and certain high-cost installment loans rule to establish consumer protections for short-term, small-dollar and other loans. On February 14, 2019, the CFPB issued an NPRM proposing to rescind the Mandatory Underwriting Provisions of that rule. On June 17, 2019, the CFPB also issued a final rule delaying the compliance date for these provisions from August 19, 2019 to November 19, 2020.

On July 31, 2019, the CFPB issued an ANPR to request information about possible revisions to Regulation Z. With certain exceptions, Regulation Z requires creditors to make a reasonable, good

faith determination of a consumer's ability to repay any residential mortgage loan, and loans that meet Regulation Z's requirements for "qualified mortgages" (QMs) obtain certain protections from liability. One category of QMs is loans that are eligible for purchase or guarantee by either Fannie Mae or Freddie Mac. Under Regulation Z, this category of QMs is scheduled to expire no later than January 10, 2021. The CFPB currently plans to allow this QM loan category to expire in January 2021 or after a short extension, if necessary, to facilitate a smooth and orderly transition.

5.4 Data Scope, Quality, and Accessibility

5.4.1 Data Scope

Repo Data Collection and Alternative Reference Rate Activities

The repo market is the largest short-term wholesale funding market in the United States. This market facilitates low-risk cash investment, monetization of assets, transformation of collateral, and hedging.

The OFR finalized rules in February 2019 for a collection of data on centrally cleared repo transactions comprising approximately one-quarter of all U.S. repo market transactions. The OFR collection, which began in October 2019, has two primary purposes: (1) to identify and monitor financial stability risks; and (2) to support the calculation of reference rates, including SOFR. SOFR relies on data relating to repo transactions backed by Treasury securities in the U.S. repo market. Data on certain of these transactions will be collected under the OFR rule. The OFR collection will provide a reliable source of data inputs for the computation of alternative rates.

The Federal Reserve Bank of New York, in cooperation with the OFR, began publishing SOFR in April 2018. Centrally cleared futures and swaps referencing SOFR were launched in May and July 2018, respectively; the first SOFR-linked debt was issued in July 2018 and the first preferred stock issuance referencing SOFR was reported in July 2019.

5.4.2 Data Quality

Legal Entity Identifier

During the past year, global adoption of the LEI continued to expand. Further, starting in 2020, all EU repo collateral financing will also require an LEI. The LEI enables unique and transparent identification of legal entities. As of August 2, 2019, more than 1.45 million LEIs had been issued by 33 approved operational issuers. Approximately 36 percent of these were issued in the United States, and approximately 13 percent were issued to U.S.-based entities. The total number of LEIs issued represents a 9 percent increase from year-end 2018, which follows a 37 percent increase in 2018. This expansion continues to be driven primarily by the LEI's use in regulation, particularly in the EU, where, beginning in January 2018, regulations under the revised Markets in Financial Instruments Directive and Regulation required entities involved in securities and OTC derivatives transactions to have an LEI and to use that LEI in these transactions.

Reporting of Standardized Derivatives Data

During 2019, the CFTC, OFR, SEC, and Federal Reserve continued to lead and participate in the development of international standards for the reporting of OTC derivatives transaction data to SDRs. The agencies engaged in this work as members of the Working Group on Unique Transaction Identifier (UTI) and Unique Product Identifier (UPI) Governance (GUUG) of the Financial Stability Board (FSB) and the Working Group for the Harmonisation of Key OTC Derivatives Data Elements (Harmonisation Group) of the CPMI and IOSCO.

In 2019, several U.S. regulators provided input and support for the FSB GUUG decision to approve the transfer of further UTI development as a standard to the ISO. The UTI (ISO 23897) standard is expected to be available for use in 2020.

In addition, the FSB designated the Association of National Numbering Agencies (ANNA) Derivative Service Bureau (DSB) as the sole service provider for the UPI. In this role, the ANNA DSB will issue UPI codes and manage and provide access to the UPI reference data library. It is anticipated that the UPI will also become an ISO standard.

In 2019, several Council member agencies continued to participate in the work of the CPMI-IOSCO Data

Harmonisation Group's Critical Data Elements workstream, completing the analysis of governance arrangements for the standards for the more than 100 data elements (other than the UTI and UPI) identified as critical for reporting derivatives transactions. In October 2019, the Harmonisation Group published its final report, recommending that these data elements be incorporated into the ISO 20022 standard.

5.5 Council Activities

5.5.1 Risk Monitoring and Regulatory Coordination

The Dodd-Frank Act charges the Council with responsibility to identify risks to U.S. financial stability, promote market discipline, and respond to emerging threats to the stability of the U.S. financial system. The Council also has a duty to facilitate information sharing and coordination among member agencies and other federal and state agencies regarding financial services policy and other developments. The Council regularly examines significant market developments and structural issues within the financial system. This risk monitoring process is facilitated by the Council's Systemic Risk Committee (SRC), whose participants are primarily member agency staff in supervisory, monitoring, examination, and policy roles. The SRC serves as a forum for member agency staff to identify and analyze potential risks, which may extend beyond the jurisdiction of any one agency. The Council's Regulation and Resolution Committee (RRC) also supports the Council in its duties to identify potential gaps in regulation that could pose risks to U.S. financial stability.

In late 2017, the Council established a digital asset and distributed ledger technology working group. The working group brings together federal financial regulators whose jurisdictions are relevant to the oversight of digital assets and their underlying technologies. The group seeks to enable the agencies to collaborate regarding these issues, including to promote consistent regulatory approaches and to identify, assess, and address potential risks. The working group has also conducted outreach to state regulators, law enforcement authorities, and market participants. The working group continues to review potential risks associated with digital assets to evaluate whether these instruments, if widely adopted, could potentially transmit risks to the economy.

5.5.2 Determinations Regarding Nonbank Financial Companies

One of the Council's statutory authorities is to subject a nonbank financial company to supervision by the Federal Reserve and enhanced prudential standards if the company's material financial distress—or the nature, scope, size, scale, concentration, interconnectedness, or mix of its activities—could pose a threat to U.S. financial stability. The Dodd-Frank Act sets forth the standard for the Council's determinations regarding nonbank financial companies and requires the Council to take into account 10 specific considerations and any other risk-related factors that the Council deems appropriate when evaluating those companies.

Under Section 113 of the Dodd-Frank Act, the Council is required at least annually to reevaluate each previous determination and rescind any determination if the company no longer meets the statutory standards. The Council's rule and interpretive guidance and its supplemental procedures with respect to nonbank financial company determinations provide the public with additional information regarding the process for the Council's determinations and annual reevaluations.

As of the date of this report, no nonbank financial companies are subject to a final determination by the Council under Section 113 of the Dodd-Frank Act. Since 2010, the Council has voted to advance a total of four companies to Stage 3 of the Council's process for evaluating nonbank financial companies and voted not to advance five nonbank financial companies to Stage 3. Since the Council's last annual report, the Council has not advanced any nonbank financial companies to Stage 3 or made a proposed or final determination regarding any nonbank financial company.

On March 13, 2019, the Council issued for public comment proposed interpretive guidance that would replace the Council's existing interpretive guidance on nonbank financial company determinations, which was issued in 2012. The proposed interpretive

guidance describes the activities-based approach the Council intends to take in prioritizing its work to identify and address potential risks to U.S. financial stability. The proposed guidance would also help ensure that the Council's analyses of nonbank financial companies for potential designation are clear, transparent, and analytically rigorous.

5.5.3 Operations of the Council

The Dodd-Frank Act requires the Council to convene no less than quarterly. The Council held five meetings in 2019, including at least one each quarter. The meetings bring Council members together to discuss and analyze market developments, potential threats to financial stability, and financial regulatory issues. Although the Council's work frequently involves confidential supervisory and sensitive information, the Council is committed to conducting its business as openly and transparently as practicable. Consistent with the Council's transparency policy, the Council opens its meetings to the public whenever possible. The Council held a public session at two of its meetings in 2019. Approximately every two weeks, the Council's Deputies Committee, which is composed of senior representatives of Council members, convenes to discuss the Council's agenda and to coordinate and oversee the work of the Council's five other committees. The other committees are the Data Committee; the Financial Market Utilities and Payment, Clearing, and Settlement Activities Committee; the Nonbank Financial Companies Designations Committee; the RRC; and the SRC. The Council adopted its tenth budget in 2019.

6 Potential Emerging Threats and Vulnerabilities

6.1 Cybersecurity: Vulnerabilities to Attacks on Financial Services

Financial institutions continue to invest in and expand their reliance on information technology to increase efficiency. Greater reliance on technology, particularly across a broader array of interconnected platforms, increases the risk that a cybersecurity event will have severe consequences for financial institutions.

Cyber vulnerabilities in the financial system include vulnerabilities to malware attacks, ransomware attacks, denial of service attacks, data breaches, and other events. Such incidents have the potential to impact tens or even hundreds of millions of Americans and result in financial losses of billions of dollars due to disruption of operations, theft, and recovery costs.

The Council recognizes that the potential for a destabilizing cybersecurity failure is a key financial stability vulnerability. A cybersecurity event could threaten the stability of the U.S. financial system through at least three channels:

- The event could disrupt a key financial service or utility for which there is little or no substitute; this could include attacks on central banks; sovereign and sub-sovereign creditors, including U.S. state and local governments; custodian banks; payment, clearing, and settlement systems; or other firms or services that lack substitutes or are sole service providers.

- The event could cause a loss of confidence among a broad set of customers or market participants. If the event causes customers or participants to question the safety of their assets or transactions, and leads to significant withdrawal of assets or activity, the effects could be destabilizing to the broader financial system.

- The event could compromise the integrity of critical data. Accurate and usable information is critical to the stable functioning of financial firms and the system; if such data is corrupted on a sufficiently large scale, it could disrupt the functioning of the system. The loss of such data also has privacy implications for consumers and could lead to identity theft and fraud.

6.2 Ongoing Structural Vulnerabilities

6.2.1 Large, Complex, Interconnected Financial Institutions

Large BHCs play a central role in the U.S. economy through the provision of credit to commercial and retail borrowers. Losses on bank loan portfolios and other types of negative shocks to bank capital or liquidity can result in a reduction in the availability of credit in the economy and, in turn, a reduction in investment and real economic activity.

Banks also have a central role in the retail and wholesale payment systems. Operational failures affecting retail or interbank payment systems could disrupt commercial activity throughout the economy and, in an extreme case, could cause failures among financial institutions that suddenly find themselves short on liquidity.

BHCs have an important role in derivatives markets. The derivatives activities of large BHCs enable financial and nonfinancial firms to hedge their risk exposures. However, these transactions also expose counterparties to the risk of loss should a large, complex BHC default.

Finally, large BHCs are also providers of specialized types of financial services. The provision of several critical types of services, such as tri-party repo and custody services for asset managers, are concentrated in a few large BHCs. The smooth functioning of the financial system depends on the

ability of these institutions to continue to provide these services under stressful conditions.

During the financial crisis, the failure or near-failure of several large banks and investment banks had a destabilizing effect on the financial system. Following the crisis, Congress enacted and agencies implemented measures intended to enhance the safety and soundness of large BHCs. Large BHCs are now better capitalized and hold more high-quality liquid assets than before the financial crisis **(see Section 4.11.1)**. Moreover, because of regulatory and accounting changes, capital held by BHCs today is of higher quality than before the crisis. The largest BHCs that operate in the United States are subject to both company-run and supervisory stress testing requirements and periodically submit resolution plans to the Federal Reserve and FDIC **(see Sections 5.1.2 and 5.1.3)**. Market-based measures currently indicate low risk of distress or failure among the largest U.S. BHCs **(see Section 4.11.1)**. The financial performance of large BHCs has steadily improved over the past ten years, with ROAs now around pre-crisis levels and ROEs at the highest levels since the crisis.

Nonetheless, the Council continues to examine and assess potential threats that large, complex, and interconnected institutions may pose to financial stability.

6.2.2 Central Counterparties

The potential benefits of CCPs to financial stability include improved transparency, the promotion of enhanced risk management practices among clearing members, the application of standardized margin methodologies by clearing members, expanded multilateral netting, and strict procedures for the orderly management of counterparty credit losses. However, while CCPs provide significant benefits, they can potentially be a source of risk to financial stability due to the large volume of transactions they process and the interconnectedness of CCPs with large financial institutions. The inability of a CCP to perform could cause its members to face losses, and interdependencies raise the potential for disruptions to spread across multiple markets. Consequently, CCPs must be robust and resilient.

Supervisory stress tests of CCPs can be an important tool in the assessment of systemic risk. Supervisory stress tests can, for example, help shed light on the risks and vulnerabilities related to potential failures of the largest clearing members of a CCP, including, in particular, exposures posed by such firms across multiple CCPs. Such tests analyze the extent to which one or more failures could have an adverse impact across markets and institutions. In May 2019, the CFTC published its third supervisory stress test of CCPs, examining the ability of CCPs under its jurisdiction, both U.S. and foreign, to absorb severe shocks to the system. In addition to supervisory stress tests, some authorities regularly monitor risk exposures at CCPs pursuant to their regulatory regime. Both the CFTC and SEC maintain active risk surveillance programs of CCPs' risk management and receive daily or weekly reports of positions, risk measures, margins, collateral, and default resources.

As noted in **Sections 3.2.2 and 5.2.1**, CCPs can improve financial stability by reducing counterparty risk and increasing transparency. Since the introduction of the CPMI-IOSCO Principles for Financial Market Infrastructures (PFMI), which sets forth 24 standards related to CCPs and other types of financial market infrastructures, CCPs have made progress in the development and implementation of more robust risk management practices. In particular, pursuant to jurisdictions' implementation of the PFMI, CCPs have enhanced governance frameworks, introduced more robust stress testing and margin models, and increased financial resources available to cover one or more clearing member defaults.

The implementation of the PFMI has helped raise risk management standards and encouraged market participants to continue to have confidence in the CCPs. However, jurisdictional variations in implementing the PFMI can pose challenges if conflicting expectations are applicable simultaneously to a single CCP. At times, inconsistencies among jurisdictions' implementation of the PFMI may be reconcilable by authorities, but some jurisdiction-to-jurisdiction inconsistencies could increase financial stability risk.

There have also been advances in the development of plans for CCP recovery and resolution. With respect to those CCPs designated as systemically important FMUs by the Council, the CFTC has reviewed and provided guidance on recovery plans of the CCPs it supervises, and the SEC recently approved recovery and orderly wind-down plans for the CCPs it supervises. The CFTC and FDIC have jointly established CMGs for two U.S. CCPs that are considered systemically important in more than one jurisdiction, consistent with international standards **(see Section 5.2.1)**. In 2019, the FDIC and CFTC hosted CMG meetings for both of these CCPs.

Ongoing developments in the swaps market may reduce complexity in that market and the financial system as a whole. Specifically, swaps trade compression, access to swaps data, increased clearing volumes for various products, enhanced operational and liquidity policies and procedures, and publicly reported monthly cleared margin information **(see Sections 4.10.4 and 5.2.1)** should help reduce risk and increase transparency.

6.2.3 Short-Term Wholesale Funding

Repo Markets

Progress has been made in recent years in reducing counterparty risk exposure in repo markets. However, the risk of fire sales of collateral by creditors of a defaulted repo counterparty remains.

Concentration risk has increased in the tri-party repo market as just one institution is now responsible for all clearing in that important market segment. This increases the financial stability risks that would be associated with distress at that institution. Even a temporary service disruption, such as an operational failure, could impair the market, as participants may not have ready access to an alternative platform to clear and settle transactions.

A better understanding of the interdependencies among firms and market participants in the repo market is needed. The unexpected volatility in repo markets in September 2019 underscores the need for more research and analysis in this area. Additional information would help regulators and supervisors better assess potential risks and vulnerabilities. To this end, in October 2019 the OFR began the collection of data on centrally cleared repo transactions **(see Section 5.4.1)**. This data collection will facilitate the monitoring of an important segment of the centrally cleared repo market.

Money Market Mutual Funds and Other Cash Management Vehicles

Money market mutual funds and other cash management vehicles that offer a stable NAV can be subject to runs. Runs on these funds could disrupt short-term funding markets more broadly and have other adverse effects on related markets and firms. The MMF reforms implemented by the SEC in October 2016 were an important development in minimizing this risk. While the adoption of a floating NAV minimized first-mover advantage incentives in MMFs, likely reducing the risk of runs and related disruptions in short-term lending markets, the extent of that reduction is not clear.

Other types of cash management vehicles also invest in private assets and offer a stable NAV but are not regulated by the SEC and are not subject to the SEC's reforms. This includes certain short-term investment funds, local government investment pools, and private liquidity funds that attempt to maintain a stable NAV. Even at their current size, runs on these vehicles in stressed economic conditions might amplify or transmit stresses to the broader financial system.

In the current market and regulatory environment, some firms that offer short-term funds with stable NAVs may attempt to distinguish themselves by using new strategies that could increase credit, interest rate, or liquidity risks. More generally, regulations may have unintended consequences, and market participants and regulators should be alert to the emergence of new, unanticipated risks.

6.2.4 Investment Funds

The asset management industry is an important component of the U.S. financial system **(see Section 4.13)**. The sector is diverse and includes investment funds with a wide variety of sizes, strategies, and investment objectives. The Council has focused on potential vulnerabilities in the areas of liquidity and redemption risk that may arise in certain types

of investment funds, and the use of leverage by investment funds.

Vulnerabilities relating to liquidity and redemption can arise in mutual funds that offer daily redemption and hold mostly assets that may become less liquid in stressed markets. In a period of significant financial stress, mutual funds that have not effectively managed their liquidity risk and that face significant redemptions may be forced to sell less-liquid assets in unfavorable circumstances to meet redemption requests. If widespread, those sales could contribute to negative price pressure on correlated investments and the potential transmission of stress to other market participants.

The SEC has taken several steps to address these potential vulnerabilities in investment funds. In October 2016, the SEC adopted rules intended to enhance liquidity risk management by mutual funds and ETFs and to allow mutual funds to adopt swing pricing to pass on transaction costs to entering and exiting investors. These rules require, for example, open-end funds to adopt a liquidity risk management program, invest no more than 15 percent of their assets in illiquid investments, maintain a minimum percentage of highly liquid investments, and disclose information about their liquidity risk management programs in reports to shareholders. In addition, the SEC adopted rules to increase the transparency of registered investment company portfolio holdings; large registered investment companies began reporting to the SEC under these rules on April 1, 2019. In June 2018, the SEC amended Form N-PORT to enhance the portfolio liquidity information that the funds report to the SEC. These disclosures will provide the SEC with better visibility into the liquidity levels and portfolio holdings of registered investment companies, as well as the use of leverage by these funds. This information will be important in monitoring, for example, potential liquidity risk in open-end funds that invest primarily in leveraged loans **(see Section 4.13.2)**.

Leverage can be a useful component of an investment strategy and can allow investment funds to hedge risk or increase exposures, depending on the activities and strategies of the fund. However, leverage introduces counterparty risk, and in a period of stress, if leveraged investment funds are forced to sell assets on a significant scale, it could contribute to negative asset price movements.

The use of leverage is most widespread among hedge funds, but varies significantly among hedge funds of different sizes and investment strategies **(see Section 4.13.5)**. The SEC uses data collected on Form PF about certain hedge funds, private equity funds, and other private funds to support its monitoring of private funds and private fund advisers. These data include certain elements that can be used to provide insight into the amount and nature of hedge funds' use of leverage. Research and analysis of data on the use of leverage by hedge funds is ongoing. In addition, the SEC has re-proposed a new rule designed to enhance the regulation of the use of derivatives by registered investment companies.

6.2.5 Financial Market Structure

Advances in information and communications technologies, as well as regulatory developments, have altered the structure of financial markets. The Council and member agencies are closely monitoring how changes in market structure have affected the robustness and efficiency of capital markets and the stability of the financial system. Five developments of particular interest to the Council are: 1) the increasingly important role of non-traditional participants; 2) an increased concentration of liquidity providers; 3) the growing fragmentation of execution venues; 4) the importance and availability of data across markets; and 5) interdependencies among different segments of the markets.

1. *Role of non-traditional market participants:* Non-traditional market participants, including principal trading firms, play an increasingly important role in securities and other markets. These firms may improve liquidity and improve investor outcomes under normal circumstances, but they may also introduce new potential risks. For instance, the trading strategies that non-traditional market participants employ and the incentives and constraints

that they operate under may not be as well understood, leading to uncertainty concerning how these firms might behave during periods of market stress.

2. *Concentration of liquidity providers:* The high cost of maintaining the most advanced information technology and concentrated ownership of market data has changed the nature of competition in some markets by raising entry costs and increasing economies of scale. These, and other factors, have led to increased concentration among liquidity providers so that a small number of firms now carry out a significant proportion of trades. While economies of scale may allow the largest providers to reduce transaction costs, a limited number of liquidity providers heightens the risk of a sudden withdrawal of liquidity (due to, for example, operational disruptions) which has the potential to result in sudden, large price movements.

3. *Fragmentation of execution venues:* Technological advances, regulatory structures, and competition have resulted in a proliferation of execution venues in many markets. The multiplicity of venues is particularly notable in equity and equity options markets, where there currently are 23 national securities exchanges, 31 national market system stock alternative trading systems, and other market centers. There are benefits to having many different execution venues, including enhanced competition and innovation, greater choice in execution options, and enhanced resiliency to the system if, for example, trading can shift to other venues when one venue has systems problems. Fragmentation, however, can increase complexity, which could undermine resiliency during the spikes in transaction volume that often accompany stressed market conditions. Fragmentation may also impair or reduce efficiencies in the interaction of order flow.

4. *Importance and availability of data:* Technology has increased the importance and availability of financial data. Certain sophisticated market participants have used advances in the speed of data acquisition and processing and the availability of alternative data to enhance their algorithmic trading strategies. These participants also are developing businesses that rely on data to support advanced analytical tools, such as artificial intelligence and machine learning. The high fixed costs associated with accessing and processing data more quickly than competitors can contribute to increased concentration of liquidity providers and inhibit new entrants. The dominant role of data in modern markets can also lead to market inefficiencies. The cost to gain access to important data sources can lead to greater concentration and information asymmetries as some participants may be required to purchase access to data feeds and low-latency connectivity from a wide range of trading venues.

5. *Interdependence among financial markets:* Trading in one asset class can have spillover effects on pricing, liquidity, and volatility in other asset classes. For this reason, the Council and member agencies have a keen interest in understanding transmission channels between markets and across asset classes. The unusually high level of volatility in the U.S. Treasury market on October 15, 2014, led to the formation of the Treasury Market Practices Group's working group on clearance and settlement practices **(see Box D)**. Other recent events include the volatility on February 5, 2018, that impacted both futures and equities markets, and more recently, in September 2019, when volatility in the Treasury repo market contributed to a notable rise in the federal funds rate. There are benefits from interdependencies among markets, including enhanced price discovery and more options for hedging risks. At the same time, interdependencies create transmission risks from volatile or inaccurate pricing, which has the potential to amplify market shocks across different markets.

6.2.6 Data Gaps and Challenges

The financial crisis exposed several major gaps and deficiencies in the range and quality of data available to financial regulators to identify emerging risks in the financial system. These gaps and shortcomings included firm-level structure and ownership information; transaction data in certain important financial markets, including OTC derivatives and repo contracts; and limitations in financial statement reporting for certain types of institutions. The usefulness of data was often limited by institutional or jurisdictional differences in reporting requirements. These types of inconsistencies created challenges for data sharing and increased the reporting burden on market participants.

Council member agencies have been actively engaged with each other, regulators in other jurisdictions, and firms in the financial sector to develop standards and protocols and to execute on data collection initiatives. Staff of the OFR, CFTC, SEC, and Federal Reserve meet regularly with their international regulatory counterparts from the Financial Stability Board and CPMI-IOSCO to implement UTIs, UPIs, and CDE standards for OTC derivatives, and are now developing a governance structure for oversight. Member agencies have also been working to facilitate the adoption of LEIs and ULIs for mortgage loans.

6.3 Alternative Reference Rates

U.S. dollar LIBOR continues to be a widely used reference rate in a variety of financial instruments. With more than $200 trillion of LIBOR-based contracts outstanding, the transition from LIBOR, given its anticipated cessation or degradation, will require significant effort from market participants. The failure of market participants to adequately analyze their exposure to LIBOR and transition ahead of LIBOR's anticipated cessation or degradation could expose market participants to significant legal, operational, and economic risks that could adversely impact U.S. financial markets.

In 2014, the Federal Reserve Board and the Federal Reserve Bank of New York convened the ARRC to facilitate the transition from LIBOR and toward an alternative reference rate **(see Box C)**. The ARRC has made significant progress toward these objectives: analyzing and adopting an alternative rate (the Secured Overnight Financing Rate (SOFR)), creating robust contract fallback language for a variety of products, and building the infrastructure for the development of SOFR markets. Despite this progress, market participants with significant exposure to USD LIBOR remain vulnerable if they do not sufficiently prepare prior to the end of 2021.

Legacy cash products and new transactions without robust fallback language present a particular difficulty for transition. Contractual fallback provisions may not contemplate the need for an alternative rate or may include provisions that cannot be operationalized in the event of LIBOR's cessation, like the polling of LIBOR panel banks by the issuer. While many new floating rate note issuances include more robust contract fallback language, some new issuances still do not include these provisions, putting issuers and investors at risk. Securitized products are further complicated, as legacy contracts may require the consent of all parties and new issuance continues to use legacy language that may not be feasible to implement. Re-documenting these products will require significant effort and expense, and in most cases it may not be possible to contact and obtain the required consent from all parties involved; the slow uptake of more robust fallback language in these instruments therefore presents a particular vulnerability.

Consumer exposures to LIBOR, most commonly through adjustable rate mortgages, present a special set of considerations in addition to those discussed. Noteholders will need to take care in working to ensure that consumers are treated fairly and that the transition is explained in a clear and understandable way. The ARRC is working with consumer groups, lenders, investors, and regulators to achieve such an outcome.

The ARRC released a practical implementation checklist to help market participants in the transition away from LIBOR. Market participants must analyze their exposure to U.S. dollar

LIBOR, assess the impact of LIBOR's cessation or degradation on existing contracts, and remediate risk from existing contracts that do not have robust fallback arrangements to transition the contract to an alternate rate. Participation in the International Swaps and Derivatives Association's upcoming protocol will be especially important in remediating risks to existing derivatives contracts referencing LIBOR. Market participants who do not sufficiently prepare for this inevitable transition could face significant legal, operational, and economic risks. Market participants should not wait for future developments, such as the introduction of a possible forward-looking SOFR term rate, to begin the transition process and instead should begin their transition process immediately.

6.4 Managing Vulnerabilities amid Prolonged Credit Expansion

Asset prices have increased during the long economic expansion. Equity valuations relative to corporate earnings are above historical averages **(see Section 4.7)**. Credit spreads on corporate debt are near their post-crisis lows **(see Section 4.3)**. The value of residential and most types of commercial real estate has also increased significantly since the end of the financial crisis **(see Section 4.5)**. However, broad-based declines in asset prices could occur if there is a sharp decline in economic activity or significantly reduced expectations of future growth. Elevated valuations in U.S. equity, corporate bond, and certain residential and commercial real estate markets would make them susceptible to larger price declines should a major correction occur. A fall in asset values would weaken the balance sheets of financial and nonfinancial businesses and potentially make the financial system less stable. Lower valuations would reduce the collateral value of real and financial assets and thereby negatively impact liquidity, increase borrowing costs, and heighten rollover risk.

The use of borrowing and leverage by nonfinancial businesses has increased during the economic expansion **(see Section 4.3)**. Since 2011, the rate of growth in nonfinancial business borrowing has exceeded the growth in nominal GDP. The ratio of nonfinancial business debt to GDP is now at the upper end of its historical range. A large share of the increase in the use of debt has been by borrowers of relatively low credit quality **(see Box A)**.

The potential risk to financial stability from nonfinancial business borrowing depends on the ability of businesses to service their obligations, and the ability of the financial sector to absorb losses from defaults and downgrades. Currently, strong interest coverage and liquidity positions have allowed businesses to service their debts with low delinquency rates. Credit spreads and other market measures of default risk indicate that market participants do not expect a significant rise in defaults in the short- or medium-term **(see Section 4.3)**. Moreover, because capital and liquidity levels are significantly above pre-crisis levels **(see Section 4.11)**, commercial banks are better positioned to absorb losses from the extension of credit to nonfinancial businesses. However, if credit markets deteriorate, investors—including those invested in CLOs and certain investment vehicles holding most of their assets in leveraged loans—may face liquidity risks or shortfalls in loss-absorbing capacity **(see Box A)**.

6.5 Nonbank Mortgage Origination and Servicing

Nonbank mortgage companies have assumed a larger role in the origination and servicing of residential mortgages **(see Section 4.5 and Box B)**. The business models of nonbanks vary. However, most nonbanks rely heavily on short-term funding sources and generally have relatively limited resources to absorb financial shocks. Nonbanks are heavily involved in servicing mortgages held in Enterprise and Ginnie Mae mortgage-backed securities. Servicers of these mortgages often have the obligation to make payments to investors even if the borrower does not make mortgage payments.

If delinquency rates rise or nonbanks otherwise experience solvency or liquidity strains, their distress could transmit risk to the financial system **(see Box B)**. Many nonbanks specialize in the origination and servicing of mortgages to low-income and higher-risk borrowers and those mortgages that are insured by the FHA. Widespread defaults or

financial difficulties among nonbank mortgage companies could result in a decline in mortgage credit availability among these borrowers. Similarly, the Enterprises and Ginnie Mae may have difficulty transferring servicing from failed nonbank servicers to healthy servicers if multiple large nonbank servicers simultaneously face distress—which may be a risk given the similarities in their business models—and if other firms are unwilling or unable to assume the servicing responsibilities.

6.6 Financial Innovation

Financial innovation offers considerable benefits to consumers and providers of financial services by reducing the cost of certain financial services, increasing the convenience of payments, and potentially increasing the availability of credit. Innovation can also create new risks that are not well understood, and it can undermine oversight if it fosters financial activities in areas that are not subject to appropriate regulation.

As discussed in **Section 4.14.1**, the market value and adoption of digital assets have grown rapidly in recent years, including through innovations such as stablecoins, but their use for payments remains very limited. If a stablecoin became widely adopted as a means of payment or store of value, disruptions to the stablecoin system could affect the financial system and the wider economy, warranting greater regulatory scrutiny. A decline in the value of certain digital assets could result in the transmission of risk to the financial sector through financial institution exposures, risks to the payment system, wealth effects, and confidence effects. Consumers, investors, and businesses could also face losses if the market price of such assets is unstable. Risks to the payment system, if not properly managed, could present financial stability risks, given the importance of a well-functioning payments system in facilitating commercial activities.

Regulatory attention and coordination are critically important in light of the quickly evolving market for digital assets. Digital asset arrangements vary widely. The risks each poses depend, among other things, on the structure of the asset and its consensus mechanism, and the risk management practices of participants. Indeed, the potential risks presented by different stablecoin systems may vary according to the mechanism by which they are made stable and the governance policies of the administrator.

Digital asset networks can be international in scope and include a diverse set of participants, including nonfinancial institutions, heightening illicit financing and national security risks. The significant number of counterparties could introduce complexities in governance structures and incentives, as well as transfer risk to other components of the system. Digital asset networks may also be subject to operational risks, including disruptions to the technologies that underlie the platform and cybersecurity. These events could prove disruptive to users and, in an extreme case, undermine confidence in the system as a whole.

As discussed in **Section 4.14.4**, large technology and e-commerce companies providing financial services may increasingly seek to compete directly with incumbent financial service providers, and their market presence could grow significantly. These firms currently may not be subject to many types of financial services regulation with which incumbent financial service providers are required to comply.

Financial firms' rapid adoption of fintech innovations in recent years may increase operational risks associated with financial institutions' use of third-party service providers. Market concentration among third-party service providers may create financial stability risks, because operational failures or faults at a key service provider could disrupt the activities of multiple financial institutions or financial markets.

6.7 Global Economic and Financial Developments

Downside risks to global economic growth have increased since the Council's last annual report. Of particular concern is the slowdown in growth in export-driven economies. Rising trade tensions have increased business uncertainty and pose downside risks to global growth. A sustained slowdown in global trade could have spillover effects to the economy and financial markets. Macroeconomic

policymakers in many advanced economies have less unused capacity to stimulate economic growth than they did before the financial crisis. A modest slowdown in global economic growth is unlikely to materially affect U.S. financial stability. However, a severe downturn overseas could impact U.S. financial stability through direct financial exposures or effects on economic and financial confidence.

There continues to be a considerable amount of uncertainty regarding the United Kingdom's withdrawal from the European Union. Withdrawal was originally planned for March 29, 2019, but has been delayed to January 31, 2020. Regulators in Europe and the United States have taken steps to lessen potential disruptions to the financial system of a disorderly Brexit. The UK government and the European Commission have arrived at temporary or permanent arrangements that allow for continued access to UK and EU derivatives CCPs, addressed servicing of cross-border insurance contracts, and authorized asset management firms to continue to operate and market in each jurisdiction. U.S. regulators have issued interim final rules to lessen the impact of a disorderly Brexit on swap dealers and participants **(see Section 5.2.1)**. While these steps lessen risks to financial stability, a disorderly Brexit still has significant downside risk for UK and EU macroeconomic performance. For example, a disorderly Brexit could lead to disruptions in cross-border trade and certain financial activities, potential reductions in investor confidence in the UK economy, increased foreign exchange volatility, and a decline in UK asset values.

In addition to the challenges from a slowdown in economic growth, many euro area economies also face structural vulnerabilities. Public sector indebtedness and near-term refinancing requirements are high in many euro area economies. Moreover, in some EU member states, domestic financial institutions hold large amounts of sovereign debt. This leaves both fiscal agencies and the financial sector vulnerable to sudden shifts in investor sentiment. Low or negative policy rates limit the ability of policymakers to use monetary policy tools to stimulate economic activity. Though market measures do not indicate immediate solvency concerns among large euro area banks **(see Section 4.11)**, profitability continues to lag, raising questions regarding the business models of several large institutions. Banks in several euro area nations are still burdened by large amounts of non-performing loans and many have meaningful exposures to emerging markets.

After a rapid increase in debt and leverage following the global financial crisis, Chinese authorities began taking steps to encourage financial deleveraging in 2016. However, the recent slowdown in domestic economic growth has caused Chinese authorities to pull back on these measures somewhat. China has sufficient fiscal space to employ stimulus measures that could moderate a slowdown in economic growth. Economic stimulus by authorities may encourage a renewed expansion of private credit that may increase already high levels of household and business debt. Moreover, a loosening of lending standards could exacerbate moral hazard problems surrounding highly indebted state-owned enterprises and local governments, whose failure could raise solvency issues among Chinese financial institutions. Increased trade tensions could also further slow the Chinese economy and, in a severe case, negatively impact the Chinese financial system. Potential direct spillovers from a slowing Chinese economy to the U.S. financial system appear to be manageable, but indirect effects on global economic and market confidence could adversely impact U.S. economic performance.

Economic growth rates in EMEs have declined in part due to a slowing of the Chinese economy, a major market for EME exports. A slowdown in growth and a stronger dollar could increase refunding risk for EME corporates. Much of the debt issued by businesses in EMEs is short-term and due to be rolled over in the next three years **(see Section 4.2.2)**. The two economies of immediate concern are Argentina and Turkey. However, spillovers from stress in Argentine and Turkish markets to the U.S. financial system will likely be limited as U.S. financial institutions do not have significant direct or indirect exposures to these economies.

Box C: The Continued Transition to Alternative Reference Rates

Referenced in more than $200 trillion dollars of financial instruments, U.S. dollar LIBOR continues to be the most widely used interest rate benchmark in the world. Due to the decline of transactions in the wholesale, unsecured funding markets as financial institutions show greater reliance on secured funding, LIBOR panel banks must increasingly rely on expert judgement rather than on observable market transactions. For example, in 3-month LIBOR, the most commonly referenced tenor, a median of six daily transactions totaling about $700 million, underlies the rate. The lack of observable transactions creates fundamental concerns about LIBOR's construction and long-term viability.

While the exact timing and nature of LIBOR's cessation remains unclear, the UK FCA, the regulator of ICE Benchmark Administration, LIBOR's administrator, has stated that it has voluntary agreements with LIBOR panel banks to continue submissions through year-end 2021 and that the FCA expects at least some banks currently submitting to LIBOR to depart from LIBOR panels around that time. When banks leave the LIBOR panel, the FCA is required to assess whether the rate is representative of the underlying market. If the FCA finds LIBOR to be "unrepresentative" of the underlying market it is meant to measure, EU-supervised entities will no longer be able to utilize LIBOR in new debt and derivatives transactions. The FCA has urged market participants to be prepared for a scenario in which LIBOR is declared "unrepresentative," which would lead to EU regulatory restriction on the use of LIBOR for new contracts. Additionally, if enough banks leave the LIBOR panel, LIBOR may cease to be published. Industry participants should accordingly determine their most appropriate transition strategies based on their business requirements and other considerations.

In response to recommendations and objectives set forth by the Council and the Financial Stability Board, the Federal Reserve Board and FRBNY convened the ARRC to identify an alternative to U.S. dollar LIBOR and facilitate the voluntary acceptance and use of its recommended alternative. The ARRC has made significant progress to date in facilitating the transition from LIBOR. The ARRC analyzed options for alternate rates, adopted SOFR as its recommended alternative, and developed a paced transition plan that includes specific steps and timelines designed to encourage adoption of SOFR. SOFR is a near risk-free rate that reflects the cost of overnight borrowing in the repo market collateralized by Treasury securities. SOFR is fully based on transactions and incorporates more robust trading volumes than LIBOR, with transactions now regularly exceeding $1 trillion daily.

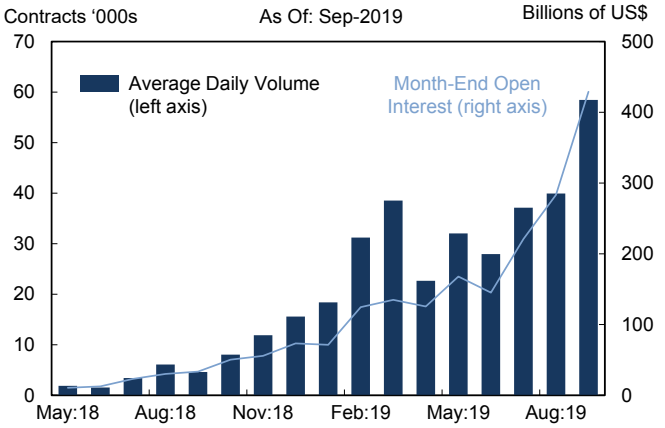
SOFR has been published by the FRBNY in cooperation with the OFR on a daily basis since April 3, 2018, and the ARRC helped coordinate the development of SOFR derivatives and bond markets. As shown in the chart below, activity in SOFR futures markets continues to grow, with daily trading volumes averaging nearly 60,000 contracts ($400 billion notional) in September 2019 **(Chart C.1)**. SOFR has been used by more than 30 issuers of floating-rate notes that exceed $280 billion in volume **(Charts C.2 and C.3)**.

Greater development of SOFR markets is anticipated as other market structure changes are implemented. In the derivatives markets, CME Group Inc. and LCH Ltd. have announced their intention to modify the methodology for price alignment interest and discounting from the current convention of the daily effective federal funds rate to SOFR. These central counterparties have tentatively proposed October 16, 2020, as the date on which

these modifications would take place. Changing price alignment interest and discounting to SOFR creates greater SOFR exposure, which in turn is expected to foster greater liquidity in SOFR derivatives. Further, the development and adoption of an International Swaps and Derivatives Association (ISDA) protocol for bilaterally uncleared derivatives that reference LIBOR will create a clear path to transition legacy LIBOR derivatives to SOFR in the event of LIBOR's cessation. Current fallbacks in derivatives contracts covered by ISDA documentation are not tenable, and derivatives users would face significant risks in the absence of this protocol.

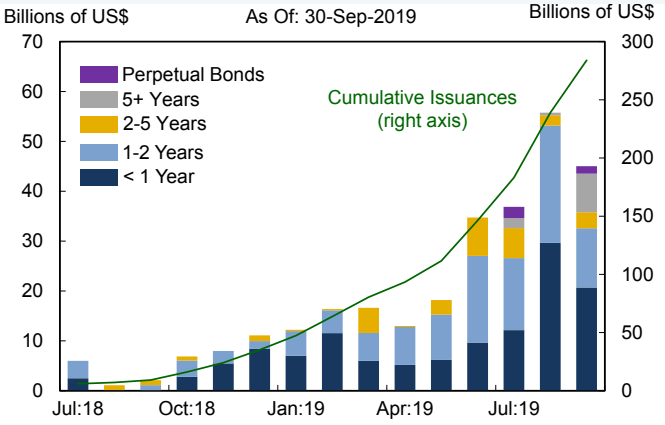
The ARRC has made progress in identifying best practices for robust contractual fallback language. The ARRC published recommended contractual fallback language for new issuance of business loans, floating rate notes, securitizations, and syndicated loans and has consulted on recommendations for new adjustable rate mortgages. Where adopted, the ARRC-recommended fallback language will provide marked improvements in contract robustness for new issuance. ARRC-recommended language has been adopted in securitizations and floating rate note issuances. As covered in **Section 6.3**, risk remains in both new and legacy issuance of cash products referencing LIBOR without robust contract fallback language. For example, debt and securitization terms are often longer dated and contain provisions that are difficult to operationalize, such as conducting a poll of banks. And, in most cases, these contracts would convert to fixed-rate instruments at the last published value of LIBOR. Although the unplanned conversion of these floating-rate instruments

C.1 SOFR Futures



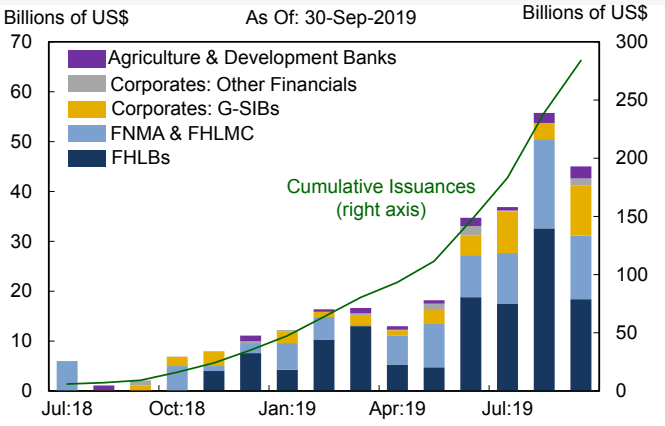
Source: CME

C.2 Issuance of SOFR Linked Notes by Tenor



Source: Bloomberg, L.P., Staff Calculations

C.3 Issuance of SOFR Linked Notes by Issuer



Source: Bloomberg, L.P., Staff Calculations

Box C: The Continued Transition to Alternative Reference Rates (continued)

to fixed-rate instruments would be disruptive, amendment of these legacy contracts requires the consent of all parties, which would require significant effort and expense and in most cases may not be possible.

The ARRC also developed and adopted a model for an adjustable rate mortgage (ARM) product based on SOFR. Fannie Mae and Freddie Mac have announced they are working to operationalize the securitization of SOFR ARMs. The ARRC is working with consumer groups and lenders to provide clear information to consumers about this transition.

While the ARRC has achieved significant progress in facilitating the transition from LIBOR, it must continue its work with market participants and regulators to address other known issues that could impede the transition. The ARRC plans to continue to assess risks for legacy contracts and request further regulatory relief, where appropriate, to support the transition. The ARRC plans to also undertake significant work to address operational issues related to the transition and the associated changes to market conventions. This includes analysis and adoption of an ARRC-endorsed spread adjustment or product-specific spread adjustments and monitoring SOFR derivatives markets for sufficient liquidity that would be needed to develop a forward-looking SOFR term rate.

Council member agencies have engaged on the issues relating to the transition, and certain member agencies have provided significant regulatory relief to remove hurdles that may otherwise impede the transition. Treasury has issued guidance to address potential income tax liability associated with modifying legacy instruments with an alternate rate. In September 2019, the prudential regulators issued a notice of proposed rulemaking to address the treatment of margin for legacy bilaterally uncleared swap transactions **(see Section 5.2.1)**. The CFTC is working closely with the ARRC to address issues related to Dodd-Frank swap requirements for margin, clearing, trading, and reporting. The SEC issued a staff statement encouraging market participants to actively manage their transition from LIBOR in several specific areas. The FHFA has encouraged the GSEs' participation in the ARRC and has supported floating-rate note issuance by Fannie Mae, Freddie Mac, and the FHLBs. The FHFA has also issued risk management guidance to the FHLBs limiting their use of new LIBOR-referencing financial assets, liabilities and derivatives.

Through this relief and other actions, Council member agencies have communicated that market participants should analyze their LIBOR exposure and seek to reduce that exposure by using alternate rates in new transactions, incorporating robust fallback provisions in new contracts that do reference LIBOR, and addressing LIBOR risk in their legacy contracts to the extent possible. As LIBOR's anticipated end nears, Council member agencies may consider additional regulatory and supervisory actions to encourage regulated entities' transition to alternate rates. Given the global nature of this issue, Council members will continue to closely coordinate with international counterparts.

Box D: The Treasury Market Practices Group – Clearing and Settlement Work

The Treasury Market Practices Group (TMPG) is a collection of market professionals sponsored by the Federal Reserve Bank of New York that focuses on market integrity and promotion of voluntary best practice guidelines it develops in the Treasury, agency debt and agency mortgage-backed securities (MBS) markets. Following the uncharacteristic and inexplicable price volatility on October 15, 2014, and subsequent Joint Staff Report on the U.S. Treasury Market (2015) and the Treasury's Request for Information (2016), the TMPG formed a working group to study and report on current clearing and settlement practices in the secondary market for U.S. Treasury securities. In July 2019, the TMPG issued recommendations and guidance for market participants summarized in *Best Practices for Treasury, Agency Debt, and Agency Mortgage-Backed Securities Markets*.

The structure of the U.S. Treasury securities market has undergone significant change since 2000 with the increased use of advanced technology, innovations in execution venues, and the wide use of automated execution strategies. There has been a marked increase in sophisticated and highly automated electronic trading across multiple execution venues that has significantly increased the speed of trade execution on some venues and likely improved overall liquidity through enhanced order flow and competition. New types of market participants—known as principal trading firms (PTFs)—have emerged, which have successfully developed and deployed high-speed and other algorithmic trading strategies. Traditional broker-dealers also engage in automated trading and consume pricing and liquidity offered by PTFs for themselves and their customers.

The TMPG found that market participants lack a common understanding of the implications of these structural changes for clearing and settlement processes in the Treasury market. This is important because, given the Treasury market's global importance and benchmark status, any disruption has the potential to create systemic risks that may be transmitted to other domestic and international capital markets. While the likelihood of such a disruption in the Treasury market is remote, the TMPG believes that discussions of the clearing and settlement processes and practices is prudent and could help improve the Treasury market's resiliency to stress events.

The TMPG working group identified several potential risk and resiliency issues for consideration, but, as an overarching risk, the group found that market participants may not be applying the same risk management rigor to the clearance and settlement of U.S. Treasury transactions as they do to other aspects of risk taking. This may be due in part to the risk-free nature of the underlying instrument and to the typically short settlement cycle.

In response to the risks identified by the working group, the TMPG strengthened certain existing best practice recommendations and added several new practice recommendations. The TMPG called on market participants in the Treasury, agency debt, and agency MBS markets to apply rigorous risk management to clearing and settlement practices for all products, including instruments with high credit quality or a short settlement cycle. For the full list of TMPG's findings and recommendations please see the TMPG's related white paper and updated best practice recommendations.

7 Abbreviations

ABS	Asset-Backed Security
AML	Anti-Money Laundering
ANNA DSB	Association of National Numbering Agencies, Derivatives Service Bureau
ANPR	Advance Notice of Proposed Rulemaking
ARM	Adjustable Rate Mortgage
ARRC	Alternative Reference Rates Committee
ASU	Accounting Standards Update
AUM	Assets Under Management
BBA	Building Block Approach
BHC	Bank Holding Company
BIS	Bank for International Settlements
BoE	Bank of England
BoJ	Bank of Japan
BSA	Bank Secrecy Act
C&I	Commercial and Industrial
CAPE	Cyclically Adjusted Price-to-Earnings Ratio
CBLR	Community Bank Leverage Ratio
CBO	Congressional Budget Office
CCAR	Comprehensive Capital Analysis and Review
CCP	Central Counterparty
CCyB	Countercyclical Capital Buffer
CD	Certificate of Deposit
CDE	Critical Data Element
CDO	Collateralized Debt Obligation
CDS	Credit Default Swap
CECL	Current Expected Credit Losses
CEM	Current Exposure Method
CET1	Common Equity Tier 1
CFPB	Consumer Financial Protection Bureau
CFT	Countering the Financing of Terrorism
CFTC	Commodity Futures Trading Commission
CLO	Collateralized Loan Obligation
CMBS	Commercial Mortgage-Backed Security
CMG	Crisis Management Group
Council	Financial Stability Oversight Council
CP	Commercial Paper
CPI	Consumer Price Index
CPMI	Committee on Payments and Market Infrastructures
CRE	Commercial Real Estate
CSBS	Conference of State Bank Supervisors
Desk	Open Market Trading Desk
DFAST	Dodd-Frank Act Stress Tests
DHS	Department of Homeland Security

Dodd-Frank Act
: Dodd-Frank Wall Street Reform and Consumer Protection Act

EBITDA
: Earnings Before Interest, Taxes, Depreciation, and Amortization

ECB
: European Central Bank

EDP
: Excessive Debt Procedure

EGRRCPA
: Economic Growth, Regulatory Relief, and Consumer Protection Act

EME
: Emerging Market Economy

Enterprises
: Fannie Mae and Freddie Mac

ETF
: Exchange-Traded Fund

ETN
: Exchange-Traded Note

ETP
: Exchange-Traded Product

EU
: European Union

FASB
: Financial Accounting Standards Board

FATF
: Financial Action Task Force

FBIIC
: Financial and Banking Information Infrastructure Committee

FBO
: Foreign Banking Organization

FCA
: Financial Conduct Authority

FCM
: Futures Commission Merchant

FDI Act
: Federal Deposit Insurance Act

FDIC
: Federal Deposit Insurance Corporation

Federal Reserve
: Board of Governors of the Federal Reserve System

FFIEC
: Federal Financial Institutions Examination Council

FHA
: Federal Housing Administration

FHC
: Financial Holding Company

FHFA
: Federal Housing Finance Agency

FHLB
: Federal Home Loan Bank

FICC
: Fixed Income Clearing Corporation

FICO
: Fair Isaac Corporation

FinCEN
: Financial Crimes Enforcement Network

FIO
: Federal Insurance Office

FMI
: Financial Market Infrastructure

FMU
: Financial Market Utility

FOMC
: Federal Open Market Committee

FNAV
: Floating Net Asset

FRBNY
: Federal Reserve Bank of New York

FSB
: Financial Stability Board

FS-ISAC
: Financial Services Information Sharing and Analysis Center

FSOC
: Financial Stability Oversight Council

FSSCC
: Financial Services Sector Coordinating Council

FX
: Foreign Exchange

G-SIB
: Global Systemically Important Bank

GAV
: Gross Asset Value

GDP
: Gross Domestic Product

Gilt
: UK Government Bond

GSE
: Government-Sponsored Enterprise

GUUG
: FSB's Working Group on UTI and UPI Governance

Harmonisation Group
CPMI-IOSCO Working Group for the Harmonisation of Key OTC Derivatives Data Elements

HOLA Home Owners' Loan Act

HQLA High-Quality Liquid Asset

HTM Held-to-Maturity

HVCRE High Volatility Commercial Real Estate

IAIS International Association of Insurance Supervisors

ICI Investment Company Institute

IDI Insured Depository Institution

IHC Intermediate Holding Company

IMF International Monetary Fund

IOER Interest on Excess Reserves

IOSCO International Organization of Securities Commissions

IRA Individual Retirement Account

IRS Interest Rate Swap

ISDA International Swaps and Derivatives Association

ISO International Organization for Standardization

JGB Japanese Government Bond

LBO Leveraged Buyout

LCR Liquidity Coverage Ratio

LTD Long-Term Debt

LEI Legal Entity Identifier

M&A Merger and Acquisition

MBS Mortgage-Backed Security

MMF Money Market Mutual Fund

MOVE Merrill Lynch Option Volatility Estimate

MSP Major Swap Participant

MSR Mortgage Servicing Right

NAIC National Association of Insurance Commissioners

NAR National Association of Realtors

NAV Net Asset Value

NCUA National Credit Union Administration

NIM Net Interest Margin

NPRM Notice of Proposed Rulemaking

OCC Office of the Comptroller of the Currency

OFR Office of Financial Research

ON RRP Overnight Reverse Repurchase Agreement

OPEC Organization of Petroleum Exporting Countries

OPEC+ OPEC and non-OPEC Participating Countries

OTC Over-the-Counter

P/B Price-to-Book

P&C Property and Casualty

PBA Puerto Rico Public Buildings Authority

PBGC Pension Benefit Guaranty Corporation

PBOC People's Bank of China

PFMI Principles for Financial Market Infrastructures

PROMESA
Puerto Rico Oversight, Management, and Economic Stability Act

PSPA Preferred Stock Purchase Agreement

PTF Principal Trading Firm

QM	Qualified Mortgage
REIT	Real Estate Investment Trust
Repo	Repurchase Agreement
RMB	Renmimbi
RMBS	Residential Mortgage-Backed Security
ROA	Return on Assets
ROAA	Return on Average Assets
ROE	Return on Equity
RRC	Regulation and Resolution Committee
RWA	Risk-Weighted Asset
S&P	Standard & Poor's
SA-CCR	Standardized Approach for Counterparty Credit Risk
SBS	Security-Based Swap
SD	Swap Dealer
SDR	Stressed Default Rate
SEC	Securities and Exchange Commission
SEF	Swap Execution Facility
SIFMA	Securities Industry and Financial Markets Association
SLR	Supplementary Leverage Ratio
SMBs	Small and Mid-sized Regional Banks
SOFR	Secured Overnight Financing Rate
SRC	Systemic Risk Committee
TBA	To Be Announced
TIPS	Treasury Inflation-Protected Securities
TLAC	Total Loss Absorbing Capital
Treasury	Department of the Treasury
TYVIX	10-Year U.S. Treasury Volatility Index
UK	United Kingdom
ULI	Universal Loan Identifier
UMBS	Uniform Mortgage-Backed Security
UPB	Unpaid Principal balance
UPI	Unique Product Identifier
USD	U.S. Dollar
USDA	U.S. Department of Agriculture
UTI	Unique Transaction Identifier
VA	U.S. Department of Veterans Affairs
VIX	Chicago Board Options Exchange Volatility Index
WAM	Weighted-Average Maturity
YTD	Year-to-Date

8 Glossary

Additional Tier 1 Capital
A regulatory capital measure which may include items such as noncumulative perpetual preferred stock and mandatory convertible preferred securities which satisfy the eligibility criteria in the Revised Capital Rule, as well as related surplus and minority interests.

Advanced Approaches Capital Framework
The Advanced Approaches capital framework requires certain banking organizations to use an internal ratings-based approach and other methodologies to calculate risk-based capital requirements for credit risk and advanced measurement approaches to calculate risk-based capital requirements for operational risk. The framework applies to large, internationally active banking organizations—generally those with at least $250 billion in total consolidated assets or at least $10 billion in total on-balance sheet foreign exposure—and includes the depository institution subsidiaries of those firms.

Affiliate
In general, a company is an affiliate of another company if: (1) either company consolidates the other on financial statements prepared in accordance with U.S. Generally Accepted Accounting Principles, the International Financial Reporting Standards, or other similar standards; (2) both companies are consolidated with a third company on financial statements prepared in accordance with such principles or standards; (3) for a company that is not subject to such principles or standards, consolidation as described above would have occurred if such principles or standards had applied; or (4) a primary regulator determines that either company provides significant support to, or is materially subject to the risks or losses of, the other company.

Asset-Backed Commercial Paper (ABCP)
Short-term debt which has a fixed maturity of up to 270 days and is backed by some financial asset, such as trade receivables, consumer debt receivables, securities, or auto and equipment loans or leases.

Asset-Backed Security (ABS)
A fixed-income or other type of security which is collateralized by self-liquidating financial assets that allows the holder of the security to receive payments that depend primarily on cash flows from the assets.

Bilateral Repo
A repo between two institutions in which negotiations are conducted directly between the participants or through a broker, and in which the participants must agree on the specific securities to be used as collateral. The bilateral repo market includes both non-cleared trades and trades cleared through Fixed Income Clearing Corporation's delivery versus payment repo service.

Central Counterparty (CCP)
An entity which interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer, thereby ensuring the performance of open contracts.

Clearing Bank
A BHC subsidiary that facilitates payment and settlement of financial transactions, such as check clearing, or facilitates trades between the sellers and buyers of securities or other financial instruments or contracts.

Collateral
Any asset pledged by a borrower to guarantee payment of a debt.

Collateralized Loan Obligation (CLO)
A securitization vehicle backed predominantly by commercial loans.

Commercial Mortgage-Backed Security (CMBS)
A security which is collateralized by a pool of commercial mortgage loans and makes payments derived from the interest and principal payments on the underlying mortgage loans.

Commercial Paper (CP)
Short-term (maturity of up to 270 days), unsecured corporate debt.

Common Equity Tier 1 Capital (CET1)
A regulatory capital measure which includes capital with the highest loss-absorbing capacity, such as common stock and retained earnings.

Common Equity Tier 1 Capital Ratio
A ratio which divides common equity tier 1 capital by total risk-weighted assets. The ratio applies to all banking organizations subject to the Revised Capital Rule.

Comprehensive Capital Analysis and Review (CCAR)
An annual exercise by the Federal Reserve to ensure that institutions have robust, forward-looking capital planning processes which account for their unique risks and sufficient capital to continue operations throughout times of economic and financial stress.

Consumer Price Index (CPI)
A monthly index containing data on changes in the prices paid by urban consumers for a representative basket of goods and services.

Covenant-Lite Loan
A loan with fewer restrictions on the borrower. Covenant-lite loans generally lack financial maintenance covenants. Financial maintenance covenants that require the borrower periodically meet specific tests of its debt-service capabilities.

Credit Default Swap (CDS)
A financial contract in which one party agrees to make a payment to the other party in the event of a specified credit event, in exchange for one or more fixed payments.

Defined Benefit Plan
A retirement plan in which the cost to the employer is based on a predetermined formula to calculate the amount of a participant's future benefit. In defined benefit plans, the investment risk is borne by the plan sponsor.

Defined Contribution Plan
A retirement plan in which the cost to the employer is limited to the specified annual contribution. In defined contribution plans, the investment risk is borne by the plan participant.

Digital Asset
An electronic currency that can be used to make payments. Many digital asset payment networks are enabled by blockchains or distributed ledger technologies that record the ownership of the underlying asset.

Dodd-Frank Act Stress Tests (DFAST)
Annual stress tests required by the Dodd-Frank Act for national banks and federal savings associations with total consolidated assets of more than $10 billion.

Dry Powder
The amount of capital that has been committed to a private capital fund minus the amount that has been called by the general partner for investment.

Duration
The sensitivity of the prices of bonds and other fixed-income securities to changes in the level of interest rates.

Emerging Market Economy (EME)
Although there is no single definition, emerging market economies are generally classified according to their state of economic development, liquidity, and market accessibility. This report has grouped economies based on the classifications used by significant data sources such as the MSCI and Standard & Poor's, which include, for example, Brazil, China, India, and Russia.

Entity-Netted Notional (ENN)
A risk-based measure of size for the interest rate swap market. To describe ENNs intuitively, imagine that each pair of swap counterparties established its net interest rate risk position with bonds instead of swaps. More precisely, within each pair of counterparties, the counterparty that is net long has purchased a 5-year equivalent risk position in bonds from the counterparty that is net short. Then, the sum of those hypothetical bond positions across all pairs of counterparties is a measure of the size of the market and is equal to ENNs.

Exchange-Traded Product (ETP)
An investment fund or note that is traded on an exchange. ETPs offer continuous pricing—unlike mutual funds, which offer only end-of-day pricing. ETPs are often designed to track an index or a portfolio of assets. ETPs include: (1) exchange-traded funds (ETFs), which are registered as investment companies under the Investment Company Act of 1940 (1940 Act); (2) non-1940 Act pooled investment vehicles, which are generally trust or partnership vehicles that do not invest in securities; and (3) exchange-traded notes (ETNs), which are senior debt instruments issued by financial institutions that pay a return based on the performance of a "reference asset".

Federal Funds Rate
The interest rate at which depository institutions lend reserve balances to other depository institutions overnight. The FOMC sets a target range for the level of the overnight federal funds rate. The Federal Reserve Bank of New York then uses open market operations to influence the rate so that it trades within the target range.

FICO Score
A measure of a borrower's creditworthiness based on the borrower's credit data; developed by the Fair Isaac Corporation.

Financial and Banking Information Infrastructure Committee (FBIIC)
The FBIIC consists of 18 member organizations from across the financial regulatory community, both federal and state. It was chartered under the President's Working Group on Financial Markets following September 11, 2001 to improve coordination and communication among financial regulators, enhance the resiliency of the financial sector, and promote public-private partnership.

Financial Market Infrastructure (FMI)
A multilateral system among participating financial institutions, including the operator of the system, used for the purposes of recording, clearing, or settling payments, securities, derivatives, or other financial transactions. Under the Dodd-Frank Act, certain FMIs are recognized as FMUs.

Financial Market Utility (FMU)
A Dodd-Frank defined entity, which, subject to certain exclusions, is "any person that manages or operates a multilateral system for the purpose of transferring, clearing, or settling payments, securities, or other financial transactions among financial institutions or between financial institutions and the person."

Fire Sale
The disorderly liquidation of assets to meet margin requirements or other urgent cash needs. Such a sudden sell-off drives down prices, potentially below their intrinsic value, when the quantities to be sold are large relative to the typical volume of transactions. Fire sales can be self-reinforcing and lead to additional forced selling by some market participants which, subsequent to an initial fire sale and consequent decline in asset prices, may also need to meet margin or other urgent cash needs.

Fiscal Year
Any 12-month accounting period. The fiscal year for the federal government begins on October 1 and ends on September 30 of the following year; it is named after the calendar year in which it ends.

Futures Contract
An agreement to purchase or sell a commodity for delivery in the future: (1) at a price that is determined at initiation of the contract; (2) that obligates each party to the contract to fulfill the contract at the specified price; (3) that is used to assume or shift price risk; and (4) that may be satisfied by delivery or offset.

General Collateral Finance (GCF)
An interdealer repo market in which the Fixed Income Clearing Corporation plays the role of CCP. Trades are netted at the end of each day and settled at the tri-party clearing bank. See Tri-party Repo.

Government-Sponsored Enterprise (GSE)
A corporate entity with a federal charter authorized by law, but which is a privately owned financial institution. Examples include the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac).

Gross Domestic Product (GDP)
The broadest measure of aggregate economic activity, measuring the total value of all final goods and services produced within a country's borders during a specific period.

Gross Notional Exposure
The sum of the absolute values of long and short notional amounts. The "notional" amount of a derivative contract is the amount used to calculate payments due on that contract, just as the face amount of a bond is used to calculate coupon payments.

Haircut
The discount, represented as a percentage of par or market value, at which an asset can be pledged as collateral. For example, a $1,000,000 bond with a 5 percent haircut would collateralize a $950,000 loan. The purpose of a haircut is to provide a collateral margin for a secured lender.

Held-to-Maturity (HTM)
An accounting term for debt securities accounted for at amortized cost, under the proviso that the company can assert that it has the positive intent and ability to hold the securities to maturity.

High-Quality Liquid Asset (HQLA)
An asset—such as a government bond—which is considered eligible as a liquidity buffer in the U.S. banking agencies'

liquidity coverage ratio. High-quality liquid assets should be liquid in markets during times of stress and, ideally, be central bank-eligible.

Institutional Leveraged Loan
The term portion of a leveraged loan that is sold to institutional investors.

Interest Rate Swap
A derivative contract in which two parties swap interest rate cash flows on a periodic basis, referencing a specified notional amount for a fixed term. Typically one party will pay a predetermined fixed rate while the other party will pay a short-term variable reference rate which resets at specified intervals.

Index Tranche Credit Default Swaps (CDS)
A synthetic collateralized debt obligation (CDO) based on a CDS index where each tranche (equity, mezzanine, senior, and super senior) references a different segment of the loss distribution of the underlying CDS index.

Intermediate Holding Company (IHC)
A company established or designated by a FBO under the Federal Reserve Board's Regulation YY. Regulation YY requires that a FBO with U.S. non-branch assets of $50 billion or more must hold its entire ownership interest in its U.S. subsidiaries, with certain exclusions, through a U.S. IHC.

Legal Entity Identifier (LEI)
A 20-character alpha-numeric code that connects to key reference information which enables clear and unique identification of companies participating in global financial markets. The LEI system is designed to facilitate many financial stability objectives, including improved risk management in firms; better assessment of microprudential and macroprudential risks; expedition of orderly resolution; containment of market abuse and financial fraud; and provision of higher-quality and more accurate financial data.

Leveraged Buyout (LBO)
An acquisition of a company financed by a private equity contribution combined with borrowed funds, with debt constituting a significant portion of the purchase price.

Leveraged Loan
While numerous definitions of leveraged lending exist throughout the financial services industry, generally a leveraged loan is understood to be a type of loan that is extended to companies that already have considerable amounts of debt and/or have a non-investment grade credit rating or are unrated and/or whose post-financing leverage significantly exceeds industry norms or historical levels.

LIBOR
A rate based on submissions from a panel of banks. LIBOR is intended to reflect the rate at which large, globally-active banks can borrow on an unsecured basis in wholesale markets.

Liquidity Coverage Ratio (LCR)
A standard to ensure that covered companies maintain adequate unencumbered, high-quality liquid assets to meet anticipated liquidity needs for a 30-day horizon under a standardized liquidity stress scenario.

Loan-to-Value Ratio
The ratio of the amount of a loan to the value of the asset that the loan funds, typically expressed as a percentage. This is a key metric when considering the level of collateralization of a mortgage.

Major Swap Participant
A person that is not a swap dealer and maintains a substantial position in swaps, creates substantial counterparty exposure, or is a financial entity that is highly leveraged and not subject to federal banking capital rules.

Money Market Mutual Fund (MMF)
A type of mutual fund which invests in short-term, high-quality, liquid securities such as government bills, CDs, CP, or repos.

Mortgage-Backed Security (MBS)
An ABS backed by a pool of mortgages. Investors in the security receive payments derived from the interest and principal payments on the underlying mortgages.

Mortgage Servicing Company
A company which acts as an agent for mortgage holders by collecting and distributing mortgage cash flows. Mortgage servicers also manage defaults, modifications, settlements, foreclosure proceedings, and various notifications to borrowers and investors.

Mortgage Servicing Right (MSR)
The right to service a mortgage loan or a portfolio of mortgage loans.

Municipal Bond
A bond issued by states, cities, counties, local governmental agencies, or certain nongovernment issuers to finance certain general or project-related activities.

Net Asset Value (NAV)
An investment company's total assets minus its total liabilities.

Net Interest Margin (NIM)
Net interest income as a percent of interest-earning assets.

Net Stable Funding Ratio (NSFR)
A liquidity standard to promote the funding stability of internationally active banks, through the maintenance of stable funding resources relative to assets and off-balance sheet exposures.

Open Market Operations
The purchase and sale of securities in the open market by a central bank to implement monetary policy.

Operational Resilience
The ability to adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies. It can be resilience towards acts of terrorism, cyber attacks, pandemics, and catastrophic natural disasters.

Option
A financial contract granting the holder the right but not the obligation to engage in a future transaction on an underlying security or real asset. The most basic examples are an equity call option, which provides the right but not the obligation to buy a block of shares at a fixed price for a fixed period, and an equity put option, which similarly grants the right to sell a block of shares.

Over-the-Counter (OTC)
A method of trading which does not involve a registered exchange. An OTC trade could occur on purely a bilateral basis or could involve some degree of intermediation by a platform that is not required to register as an exchange. An OTC trade could, depending on the market and other circumstances, be centrally cleared or bilaterally cleared. The degree of standardization or customization of documentation of an OTC trade will depend on the whether it is cleared and whether it is traded on a non-exchange platform (and, if so, the type of platform).

Part 30 Accounts
Accounts which are for U.S. customers who trade futures and options on exchanges outside the U.S.

Primary Dealer
A financial institution that is a trading counterparty of the Federal Reserve Bank of New York. Primary dealers are expected to make markets for the Federal Reserve Bank of New York on behalf of its official accountholders as needed, and to bid on a pro-rata basis in all Treasury auctions at reasonably competitive prices.

Prudential Regulation
Regulation aimed at ensuring the safe and sound operation of financial institutions, set by both state and federal authorities.

Public Debt
All debt issued by Treasury and the Federal Financing Bank, including both debt held by the public and debt held in intergovernmental accounts, such as the Social Security Trust Funds. Not included is debt issued by government agencies other than Treasury.

Qualifying Hedge Fund
A hedge fund advised by a Large Hedge Fund Adviser that has a net asset value (individually or in combination with any feeder funds, parallel funds, and/or dependent parallel managed accounts) of at least $500 million as of the last day of any month in the fiscal quarter immediately preceding the adviser's most recently completed fiscal quarter. Large Hedge Fund Advisers are advisers that have at least $1.5 billion in hedge fund assets under management.

Real Estate Investment Trust (REIT)
An operating company which manages income-producing real estate or real estate-related assets. Certain REITs also operate real estate properties in which they invest. To qualify as a REIT, a company must have three-fourths of its assets and gross income connected to real estate investment and must distribute at least 90 percent of its taxable income to shareholders annually in the form of dividends.

Repurchase Agreement (Repo)
The sale of a security combined with an agreement to repurchase the security, or a similar security, on a specified future date at a prearranged price. A repo is a secured lending arrangement.

Residential Mortgage-Backed Security (RMBS)
A security which is collateralized by a pool of residential mortgage loans and makes payments derived from the interest and principal payments on the underlying mortgage loans.

Risk-Based Capital
An amount of capital, based on the risk-weighting of various asset categories, which a financial institution holds to help protect against losses.

Risk-Weighted Assets (RWAs)
A risk-based concept used as the denominator of risk-based capital ratios (common equity tier 1, tier 1, and total). The total RWAs for an institution are a weighted total asset value calculated from assigned risk categories or modeled analysis. Broadly, total RWAs are determined by calculating RWAs for market risk and operational risk, as applicable, and adding the sum of RWAs for on-balance sheet, off-balance sheet, counterparty, and other credit risks.

Rollover Risk
The risk that as an institution's debt nears maturity, the institution may not be able to refinance the existing debt or may have to refinance at less favorable terms.

Run Risk
The risk that investors lose confidence in an institution—stemming from concerns about counterparties, collateral, solvency, or related issues—and respond by pulling back their funding.

Secured Overnight Financing Rate (SOFR)
A broad measure of the cost of borrowing cash overnight collateralized by Treasury securities. The rate is calculated as a volume-weighted median of transaction-level tri-party repo data as well as GCF Repo transaction data and data on bilateral Treasury repo transactions.

Securities Lending/Borrowing
The temporary transfer of securities from one party to another for a specified fee and term, in exchange for collateral in the form of cash or securities.

Securitization
A financial transaction in which assets such as mortgage loans are pooled, securities representing interests in the pool are issued, and proceeds from the underlying pooled assets are used to service and repay the securities.

Security-Based Swap Dealer
A person that holds itself out as a dealer in security-based swaps, makes a market in security-based swaps, regularly enters into security-based swaps with counterparties, or engages in any activity causing it to be known as a dealer or market maker in security-based swaps; does not include a person entering into security-based swaps for such person's own account.

Short-Term Wholesale Funding
Short-term funding instruments not covered by deposit insurance which are typically issued to institutional investors. Examples include large checkable and time deposits, brokered CDs, CP, Federal Home Loan Bank borrowings, and repos.

Supplementary Leverage Ratio (SLR)
Tier 1 capital of an advanced approaches banking organization divided by total leverage exposure. All advanced approaches banking organizations must maintain an SLR of at least 3 percent. The SLR is effective January 1, 2018, and organizations must calculate and publicly disclose their SLRs beginning March 31, 2015.

Swap
An exchange of cash flows with defined terms and over a fixed period, agreed upon by two parties. A swap contract may reference underlying financial products across various asset classes including interest rates, credit, equities, commodities, and FX.

Swap Data Repository (SDR)
A person that collects and maintains information or records with respect to transactions or positions in, or the terms and conditions of, swaps entered into by third parties for the purpose of providing a centralized recordkeeping facility for swaps. In certain jurisdictions, SDRs are referred to as trade repositories. The Committee on Payments and Settlement Systems and IOSCO describe a trade repository as "an entity that maintains a centralized electronic record (database) of transaction data."

Swap Dealer
Section 1a(49) of the Commodity Exchange Act (CEA) defines the term "swap dealer" (SD) to include any person who: (1) holds itself out as a dealer in swaps; (2) makes a market in swaps; (3) regularly enters into swaps with counterparties as an ordinary course of business for its own account; or (4) engages in any activity causing the person to be commonly known in the trade as a dealer or market maker in swaps.

Swap Execution Facility (SEF)
A term defined in the Dodd-Frank Act as a trading system or platform which market participants use to execute and trade swaps by accepting bids and offers made by other participants, through any means of interstate commerce.

Swap Future
A futures contract which mimics the economic substance of a swap.

Swaption
An option granting the right to enter into a swap. See Option and Swap.

Syndicated Loan
A loan to a commercial borrower in which financing is provided by a group of lenders. The loan package may have a revolving portion, a term portion, or both.

Tier 1 Capital
A regulatory capital measure comprised of common equity tier 1 capital and additional tier 1 capital. See Common Equity Tier 1 Capital and Additional Tier 1 Capital.

Tier 2 Capital
A regulatory capital measure which includes subordinated debt with a minimum maturity of five years and satisfies the eligibility criteria in the Revised Capital Rule.

Time Deposits
Deposits which the depositor generally does not have the right to withdraw before a designated maturity date without paying an early withdrawal penalty. A CD is a time deposit.

Total Capital
A regulatory capital measure comprised of tier 1 capital and tier 2 capital. See Tier 1 Capital and Tier 2 Capital.

Tri-Party Repo
A repo in which a clearing bank acts as third-party agent to provide collateral management services and to facilitate the exchange of cash against collateral between the two counterparties.

Underwriting Standards
Terms, conditions, and criteria used to determine the extension of credit in the form of a loan or bond.

VIX (Chicago Board Options Exchange Market Volatility Index)
A standard measure of market expectations of short-term volatility based on S&P equity index option prices.

Weighted-Average Maturity (WAM)
A weighted average of the time to maturity on all loans in an asset-backed security.

Yield Curve
A graphical representation of the relationship between bond yields and their respective maturities.

9 List of Charts

FINANCIAL STABILITY
OVERSIGHT COUNCIL

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