Financial Stability Report

November 2018

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM

Financial Stability Report

November 28, 2018

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM

This and other Federal Reserve Board reports and publications are available online at www.federalreserve.gov/publications/default.htm.

To order copies of Federal Reserve Board publications offered in print, see the Board's Publication Order Form (www.federalreserve.gov/pubs/orderform.pdf)

or contact:
Publications Fulfillment
Mail Stop N-127
Board of Governors of the Federal Reserve System
Washington, DC 20551
(ph) 202-452-3245
(fax) 202-728-5886
(e-mail) Publications-BOG@frb.gov

Contents

Note: This report generally reflects information that was available as of October 31, 2018.

Purpose

This report summarizes the Federal Reserve Board's framework for assessing the resilience of the U.S. financial system and presents the Board's current assessment. By publishing this report, the Board intends to promote public understanding and increase transparency and accountability for the Federal Reserve's views on this topic.

Promoting financial stability is a key element in meeting the Federal Reserve's dual mandate for monetary policy regarding full employment and stable prices. As we saw in the 2007–09 financial crisis, in an unstable financial system, adverse events are more likely to result in severe financial stress and disrupt the flow of credit, leading to high unemployment and great financial hardship. Monitoring and assessing financial stability also support the Federal Reserve's regulatory and supervisory activities, which promote the safety and soundness of our nation's banks and other important financial institutions. Information gathered while monitoring the stability of the financial system helps the Federal Reserve develop its view of the salient risks to be included in the scenarios of the stress tests and its setting of the countercyclical capital buffer.[1]

The Board's *Financial Stability Report* is similar to those published by other central banks and complements the annual report of the Financial Stability Oversight Council, which is chaired by the Secretary of the Treasury and includes the Federal Reserve Board Chairman and other financial regulators.

[1] More information on the Federal Reserve's supervisory and regulatory activities is available on the Board's website; see the *Supervision and Regulation Report* (https://www.federalreserve.gov/supervisionreg/supervision-and-regulation-report.htm) as well as the Supervision and Regulation (https://www.federalreserve.gov/supervisionreg.htm) and Payment Systems (https://www.federalreserve.gov/paymentsystems.htm) sections of the site. Moreover, additional details about the conduct of monetary policy may also be found on the Board's website; see the *Monetary Policy Report* (https://www.federalreserve.gov/monetarypolicy/mpr_default.htm) and the Monetary Policy (https://www.federalreserve.gov/monetarypolicy.htm) section of the site.

Framework

A stable financial system, when hit by adverse events, or "shocks," continues to meet the demands of households and businesses for financial services, such as credit provision and payment services. In contrast, in an unstable system, these same shocks are likely to have much larger effects, disrupting the flow of credit and leading to declines in employment and economic activity.

Consistent with this view of financial stability, the Federal Reserve Board's monitoring framework distinguishes between shocks to and vulnerabilities of the financial system. Shocks, such as sudden changes to financial or economic conditions, are typically surprises and are inherently difficult to predict. Vulnerabilities tend to build up over time and are the aspects of the financial system that are most expected to cause widespread problems in times of stress. As a result, the framework focuses primarily on monitoring vulnerabilities and emphasizes four broad categories based on research.[2]

1. **Elevated valuation pressures** are signaled by asset prices that are high relative to economic fundamentals or historical norms and are often driven by an increased willingness of investors to take on risk. As such, elevated valuation pressures imply a greater possibility of outsized drops in asset prices.

2. **Excessive borrowing by businesses and households** leaves them vulnerable to distress if their incomes decline or the assets they own fall in value. In the event of such shocks, businesses and households with high debt burdens may need to cut back spending sharply, affecting the overall level of economic activity. Moreover, when businesses and households cannot make payments on their loans, financial institutions and investors incur losses.

3. **Excessive leverage within the financial sector** increases the risk that financial institutions will not have the ability to absorb even modest losses when hit by adverse shocks. In those situations, institutions will be forced to cut back lending, sell their assets, or, in extreme cases, shut down. Such responses can lead to credit crunches in which access to credit for households and businesses is substantially impaired.

4. **Funding risks** expose the financial system to the possibility that investors will "run" by withdrawing their funds from a particular institution or sector. Many financial institutions raise funds from the public with a commitment to return their investors' money on short notice, but those institutions then invest much of the funds in illiquid assets that are hard to sell quickly or in assets that have a long maturity. This liquidity and maturity

[2] For a review of the research literature in this area and further discussion, see Tobias Adrian, Daniel Covitz, and Nellie Liang (2015), "Financial Stability Monitoring," *Annual Review of Financial Economics*, vol. 7 (December), pp. 357–95.

transformation can create an incentive for investors to withdraw funds quickly in adverse situations. Facing a run, financial institutions may need to sell assets quickly at "fire sale" prices, thereby incurring substantial losses and potentially even becoming insolvent. Historians and economists often refer to widespread investor runs as "financial panics."

These vulnerabilities often interact with each other. For example, elevated valuation pressures tend to be associated with excessive borrowing by businesses and households because both borrowers and lenders are more willing to accept higher degrees of risk and leverage when asset prices are appreciating rapidly. The associated debt and leverage, in turn, make the risk of outsized declines in asset prices more likely and more damaging. Similarly, the risk of a run on a financial institution and the consequent fire sales of assets are greatly amplified when there is significant leverage involved.

It is important to note that liquidity and maturity transformation and lending to households, businesses, and financial firms are key aspects of how the financial system supports the economy. For example, banks provide safe, liquid assets to depositors and long-term loans to households and businesses; businesses rely on loans or bonds to fund investment projects; and households benefit from a well-functioning mortgage market when buying a home.

The Federal Reserve's monitoring framework also tracks domestic and international developments to identify near-term risks—that is, plausible adverse developments or shocks that could stress the U.S. financial system. The analysis of these risks focuses on assessing how such potential shocks may play out through the U.S. financial system, given our current assessment of the four areas of vulnerabilities.

While this framework provides a systematic way to assess financial stability, some potential risks do not fit neatly into it because they are novel or difficult to quantify. For example, cybersecurity and developments in crypto-assets are the subject of monitoring and policy efforts that may be addressed in future discussions of risks.[3] In addition, some vulnerabilities are difficult to measure with currently available data, and the set of vulnerabilities may evolve over time. Given these limitations, we continually rely on ongoing research by the Federal Reserve staff, academics, and other experts to improve our measurement of existing vulnerabilities and to keep pace with changes in the financial system that could create new forms of vulnerabilities or add to existing ones.

Federal Reserve actions to promote the resilience of the financial system

The assessment of financial vulnerabilities informs Federal Reserve actions to promote the resilience of the financial system. The Federal Reserve works with other domestic agencies directly and through the Financial Stability Oversight Council (FSOC) to monitor risks to

[3] This report does not currently report a standard set of metrics for determining the cyber resiliency of systems that are deemed to be critical to maintaining U.S. financial stability. Nonetheless, the Federal Reserve is utilizing the available information and working with the relevant domestic agencies to develop resiliency expectations and measures.

financial stability and to undertake supervisory and regulatory efforts to mitigate the risks and consequences of financial instability.

Actions taken by the Federal Reserve to promote the resilience of the financial system include its supervision and regulation of financial institutions—in particular, large bank holding companies (BHCs), the U.S. operations of certain foreign banking organizations, and financial market utilities. Specifically, in the post-crisis period, for the largest, most systemically important BHCs, these actions have included requirements for more and higher-quality capital, an innovative stress-testing regime, new liquidity regulation, and improvements in the resolvability of such BHCs.

In addition, the Federal Reserve's assessment of financial vulnerabilities informs the design of stress-test scenarios and decisions regarding the countercyclical capital buffer (CCyB). The stress scenarios incorporate some systematic elements to make the tests more stringent when financial imbalances are rising, and the assessment of vulnerabilities also helps identify salient risks that can be included in the scenarios. The CCyB is designed to increase the resilience of large banking organizations when there is an elevated risk of above-normal losses and to promote a more sustainable supply of credit over the economic cycle.

Overview

In the years leading up to the 2007–09 financial crisis, many parts of the U.S. financial system grew dangerously overextended. By early 2007, house prices were extremely high, and relaxed lending standards resulted in excessive mortgage debt. Financial institutions relied heavily on short-term, uninsured liabilities to fund longer-term, less-liquid investments. Money market mutual funds and other investment vehicles were highly susceptible to investor runs. Over-the-counter derivatives markets were largely opaque. And banks, especially the largest banks, had taken on significant risks without maintaining resources sufficient to absorb potential losses.

As a result of these vulnerabilities, a drop in house prices precipitated a financial panic. A broad initial retrenchment in asset prices led to sharp withdrawals of short-term funding from a wide range of institutions. These funding pressures resulted in fire sales, which contributed to additional declines in asset prices and generated further losses and even more withdrawals of funding. Some financial institutions failed, and many more pulled back on lending. As home prices continued to fall, and mortgage credit became scarce, millions of mortgages, many held in complex financial vehicles that increased investor leverage, could not be refinanced. Many mortgages ultimately went into default, creating devastating and widespread losses for homeowners.

Reforms undertaken since the financial crisis have made the U.S. financial system far more resilient than it was before the crisis. Working with other agencies, the Federal Reserve has taken steps to ensure that financial institutions and markets can support the needs of households and businesses through good times and bad. Banking institutions have built stronger capital and liquidity buffers that, together with reforms to the rules governing money market funds, strengthen the ability of institutions to withstand adverse shocks and reduce their susceptibility to destabilizing runs. Recovery and resolution plans have helped ensure that risks leading to the failure of financial intermediaries are borne by the institutions and investors taking the risks and not U.S. taxpayers. Reforms to derivatives markets have rendered them less opaque and have reduced credit exposures between derivatives counterparties.

Despite this important progress, vulnerabilities may build over time. This report examines a variety of quantitative and qualitative indicators across a range of markets and institutions to evaluate developments in the four broad areas of potential vulnerabilities described in the previous section. Our assessment of the current level of vulnerabilities is as follows:

- Valuation pressures are generally elevated, with investors appearing to exhibit a high tolerance for risk-taking, particularly with respect to assets linked to business debt.

- Borrowing by households has risen roughly in line with household incomes. However, debt owed by businesses relative to gross domestic product (GDP) is historically high, and there are signs of deteriorating credit standards.

- The nation's largest banks are strongly capitalized, and leverage of broker-dealers is substantially below pre-crisis levels. Insurance companies have also strengthened their financial position since the crisis.

- Funding risks in the financial system are low relative to the period leading up to the crisis. Banks hold more liquid assets, and money market mutual funds are less vulnerable to destabilizing runs by investors.

1. Asset valuation pressures

Overall, asset valuations and risk appetite are elevated

Asset valuations appear high relative to their historical ranges in several major markets, suggesting that investor appetite for risk is elevated. Spreads on high-yield corporate bonds and leveraged loans over benchmark rates are near the low ends of their ranges since the financial crisis. Equity price-to-earnings ratios have been trending up since 2012 and are generally above their median values over the past 30 years despite recent price declines. Commercial real estate (CRE) prices have been growing faster than rents for several years, and, as a result, commercial property capitalization rates relative to Treasury securities are near the bottom of their post-crisis range. While farmland values have fallen in recent years, they remain very high by historical standards. Residential real estate price-to-rent ratios have generally been rising since 2012 and are now a bit higher than estimates of their long-run trend.

Table 1 shows the size of the asset classes discussed in this section. The largest asset classes are those for equities, residential real estate, and CRE.

Table 1. Size of Selected Asset Markets

Item	Outstanding (billions of dollars)	Growth from 2017:Q2–2018:Q2 (percent)	Average annual growth, 1997–2018:Q2 (percent)
Equities	33,837	12.3	8.4
Residential real estate	33,274	7.0	5.6
Commercial real estate	21,191	8.9	7.1
Treasury securities	14,934	6.9	7.5
Investment-grade corporate bonds	5,512	3.9	8.5
Cropland	2,219	2.6	6.3
High-yield and unrated corporate bonds	1,302	–.4	6.3
Leveraged loans*	1,044	12.9	15.1
Price growth (real)			
Commercial real estate**		3.5	4.0
Residential real estate***		3.1	2.6

Note: The data extend through 2018:Q2. Equities, real estate, and cropland are at market value; bonds and loans are at book value.

* The amount outstanding shows institutional leveraged loans and generally excludes loan commitments held by banks. For example, lines of credit are generally excluded from this measure. Average annual growth of leveraged loans is from 2000 to 2018:Q2, as this market was fairly small before then.

** Average annual growth of commercial real estate prices is from 1998 to August 2018, and one-year growth is from August 2017 to August 2018.

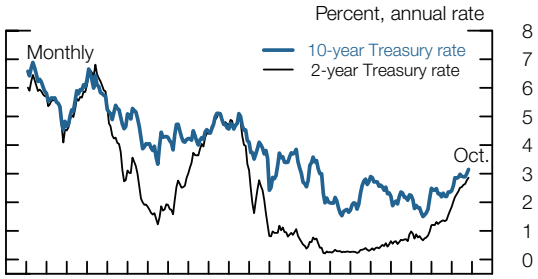
*** Average annual growth of residential real estate prices is from 1997 to August 2018, and one-year growth is from August 2017 to August 2018.

Source: For leveraged loans, S&P Global Market Intelligence, Leveraged Commentary & Data; for corporate bonds, Mergent, Inc., Corporate Fixed Income Securities Database; for cropland, Department of Agriculture; for residential real estate price growth, CoreLogic; for commercial real estate price growth, CoStar Group, Inc., CoStar Commercial Repeat Sale Indices (CCRSI); for all other items, Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

In Treasury markets, yields and term premiums are low . . .

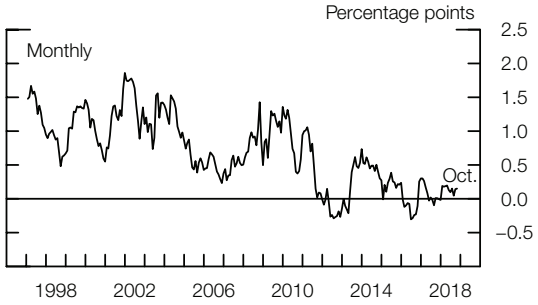
While short-term Treasury yields have moved up steadily since the Federal Open Market Committee (FOMC) began gradually raising its target range at the end of 2015, longer-term yields have risen more slowly, narrowing the gap between short- and long-term yields (figure 1-1). Treasury term premiums capture the extra yield investors require for holding longer-term Treasury securities, whose realized returns are more sensitive to risks from future inflation or volatility in interest rates than shorter-term securities. Estimates of term premiums have been low for some time, reflecting in part the low and stable level of U.S. inflation over many years (figure 1-2). Forward-looking measures of Treasury market volatility derived from options prices are also low by historical standards, indicating that it is relatively inexpensive for investors to buy protection against changes in Treasury yields (figure 1-3).

1-1. Yields on Nominal Treasury Securities



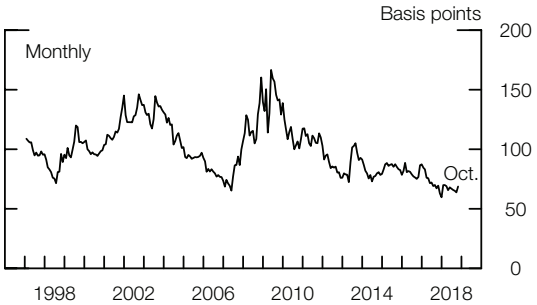
Note: The 2-year and 10-year Treasury rates are the constant-maturity yields based on the most actively traded securities.
Source: Federal Reserve Board, Statistical Release H.15, "Selected Interest Rates."

1-2. Term Premium on 10-Year Nominal Treasury Securities



Note: Term premiums are estimated from a three-factor term structure model using Treasury yields and Blue Chip interest rate forecasts.
Source: Department of the Treasury; Wolters Kluwer, Blue Chip Financial Forecasts; Federal Reserve Bank of New York; Federal Reserve Board staff estimates.

1-3. Option-Implied Volatility on the 10-Year Swap Rate

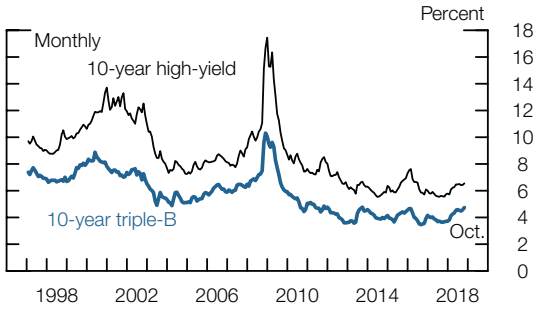


Note: Implied volatility on the 10-year swap rate 1 year ahead, derived from swaptions.
Source: Barclays PLC, Barclays Live.

. . . and spreads on high-yield corporate bonds and leveraged loans are low even as some credit risks have grown

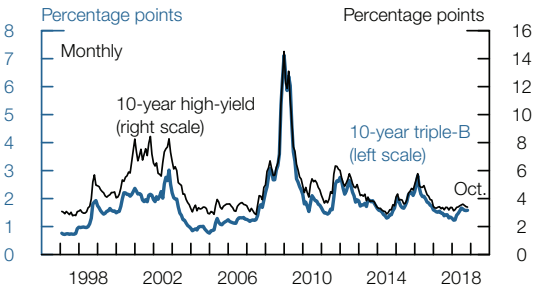
Consistent with the low level of interest rates overall, corporate bond yields have been low by historical standards for much of the post-crisis period, though they have moved up a bit in recent years as Treasury yields have begun to rise (figure 1-4). Spreads on corporate bonds over comparable-maturity Treasury securities reflect the premium investors require to hold debt subject to default or liquidity risks. High-yield corporate bond spreads are near the lower end of their historical range (figure 1-5). Low expected default rates cannot completely explain the low level of bond spreads; the excess bond premium, an estimate of the gap between bond spreads and expected credit losses, is also near the lower end of its historical distribution (figure 1-6).[4]

1-4. Corporate Bond Yields



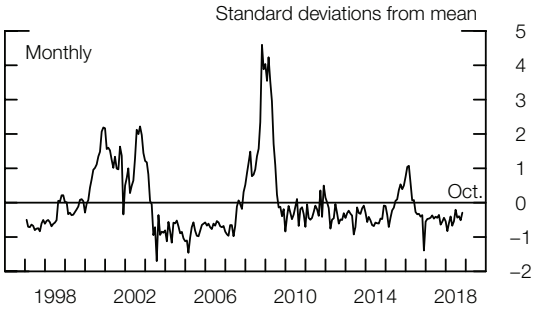
Note: The 10-year triple-B reflects the effective yield of the ICE BofAML 7-to-10-year triple-B U.S. Corporate Index (C4A4), and the 10-year high-yield reflects the effective yield of the ICE BofAML 7-to-10-year U.S. Cash Pay High Yield Index (J4A0).
Source: ICE Data Indices, LLC, used with permission.

1-5. Corporate Bond Spreads to Similar Maturity Treasury Securities



Note: The 10-year triple-B reflects the effective yield of the ICE BofAML 7-to-10-year triple-B U.S. Corporate Index (C4A4), and the 10-year high-yield reflects the effective yield of the ICE BofAML 7-to-10-year U.S. Cash Pay High Yield Index (J4A0). Treasury yields from smoothed yield curve estimated from off-the-run securities.
Source: ICE Data Indices, LLC, used with permission; Department of the Treasury.

1-6. Corporate Bond Premium over Expected Losses

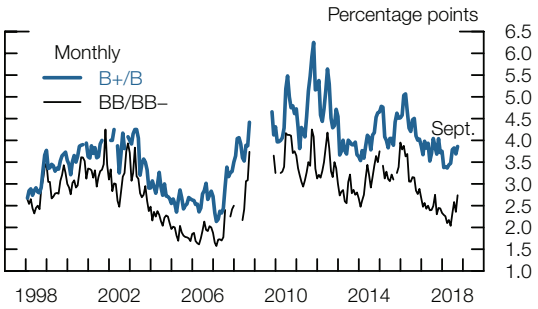


Note: Data are normalized to have a sample mean of zero and standard deviation of one.
Source: Federal Reserve Board staff calculations based on Lehman Brothers Fixed Income Database (Warga); Intercontinental Exchange, Inc., ICE Data Services; Center for Research in Security Prices, CRSP/Compustat Merged data, Wharton Research Data Services; S&P Global Market Intelligence, Compustat.

[4] For a description of the bond risk premium, see Simon Gilchrist and Egon Zakrajšek (2012), "Credit Spreads and Business Cycle Fluctuations," *American Economic Review*, vol. 102 (June), pp. 1692–1720.

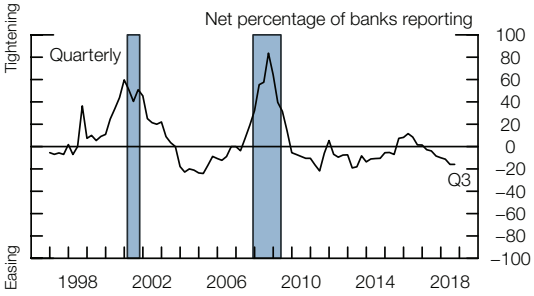
Spreads on newly issued leveraged loans widened a bit over the past few months but remain in the lower end of their range since the financial crisis (figure 1-7). The still relatively low level of spreads is notable given evidence that lenders have become more willing to extend loans with fewer credit protections to higher-risk borrowers. Moody's Loan Covenant Quality Indicator suggests that loan covenants are at their weakest levels since the index began in 2012, although this may reflect, in part, a greater prevalence of investors who do not traditionally exercise loan covenants. The Federal Reserve's Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS) indicates that a moderate net fraction of domestic banks have recently eased lending standards for commercial and industrial loans to middle- and large-sized firms (figure 1-8).

1-7. Spreads on Newly Issued Institutional Leveraged Loans



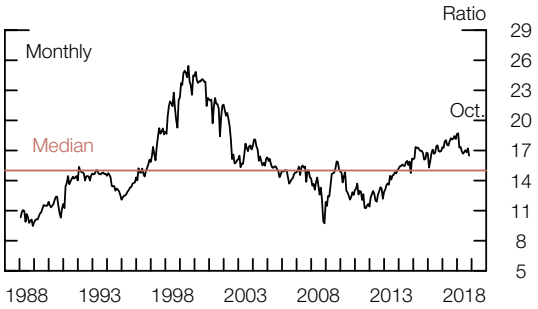
Note: Breaks in the series represent periods with no issuance. Spreads are calculated against three-month LIBOR (London interbank offered rate). The spreads do not include up-front fees.
Source: S&P Global, Leveraged Commentary & Data.

1-8. Change in Bank Lending Standards for C&I Loans



Note: Banks' responses are weighted by their C&I loan market shares. Results are shown for loans to large and medium-sized firms. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research. C&I is commercial and industrial.
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices; Federal Reserve Board staff calculations.

1-9. Forward Price-to-Earnings Ratio of S&P 500 firms



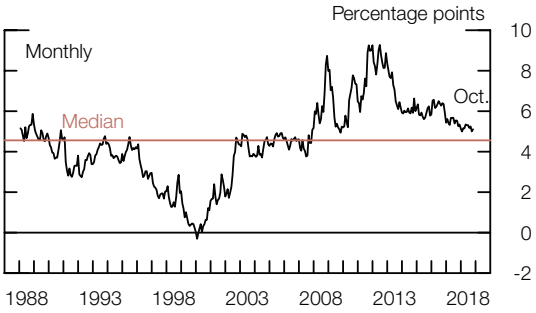
Note: Aggregate forward price-to-earnings ratio of S&P 500 firms. Based on expected earnings for 12 months ahead.
Source: Federal Reserve Board staff calculations using Refinitiv (formerly Thomson Reuters), IBES Estimates.

Equity prices are somewhat high relative to forecast earnings

For several years, broad U.S. equity market indexes have been moving upward more quickly than forward-looking corporate earnings forecasts. Although this trend has reversed this year, the S&P 500 forward price-to-earnings ratio remains above its median value over the past 30 years (figure 1-9). The gap between the forward earnings-to-price ratio and the 10-year real Treasury yield, a rough measure of the premium investors require for holding equities, is near the lower end of its range over the post-crisis period but still well above the very

low levels seen during the dot-com era (figure 1-10). Both realized and option-implied equity market volatility were low throughout 2017 and much of this year, although both measures jumped up in February and October (figure 1-11).

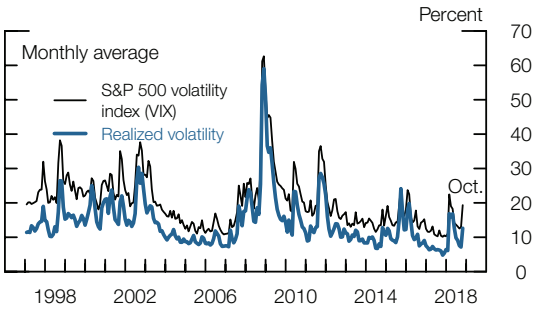
1-10. Spread of Forward Earnings-to-Price Ratio of S&P 500 Firms to 10-Year Real Treasury Bond Yield



Note: Aggregate forward earnings-to-price ratio of S&P 500 firms. Based on expected earnings for 12 months ahead. Treasury yields from smoothed yield curve estimated from off-the-run securities.

Source: Federal Reserve Board staff calculations using Refinitiv (formerly Thomson Reuters), IBES Estimates; Department of the Treasury.

1-11. S&P 500 Return Volatility



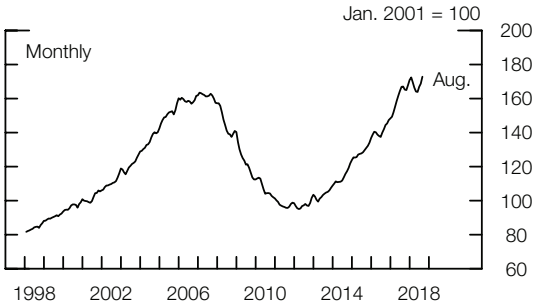
Note: Realized volatility estimated from five-minute returns using an exponentially weighted moving average with 75 percent of the weight distributed over the past 20 days.

Source: Bloomberg Finance LP.

Commercial real estate prices have grown faster than rents for several years, . . .

CRE prices have been about flat this year after having risen substantially over the previous seven years (figure 1-12). Capitalization rates, which measure annual income relative to prices for recently transacted properties, have been falling even as Treasury yields have increased (figure 1-13). As a result, spreads of capitalization rates over yields on 10-year Treasury-

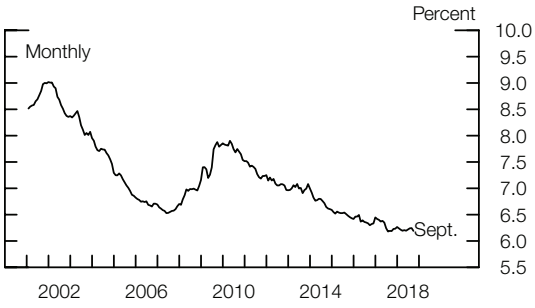
1-12. Commercial Real Estate Prices (Real)



Note: Series deflated using the consumer price index for all urban consumers less food and energy and seasonally adjusted by Board staff.

Source: CoStar Group, Inc., CoStar Commercial Repeat Sale Indices (CCRSI); Bureau of Labor Statistics consumer price index via Haver Analytics.

1-13. Capitalization Rate at Property Purchase

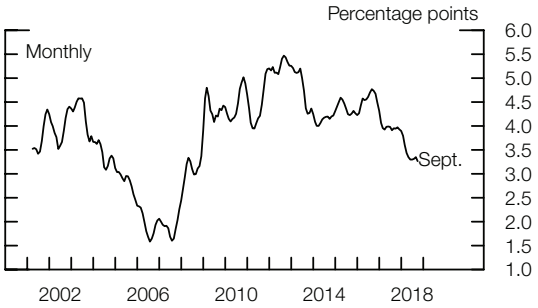


Note: The data are three-month moving averages of weighted capitalization rates in the industrial, retail, office, and multifamily sectors, based on national square footage in 2009.

Source: Real Capital Analytics; Andrew C. Florance, Norm G. Miller, Ruijue Peng, and Jay Spivey (2010), "Slicing, Dicing, and Scoping the Size of the U.S. Commercial Real Estate Market," *Journal of Real Estate Portfolio Management*, vol. 16 (May–August), pp.101–18.

securities are now near post-crisis lows, though well above lows seen before the crisis (figure 1-14). Returns to CRE property investors thus reflect a relatively low premium over very safe alternative investments. Data from the SLOOS indicated that CRE lending standards, which had been tightening in 2016 and 2017, have eased a bit over the past year (figure 1-15).

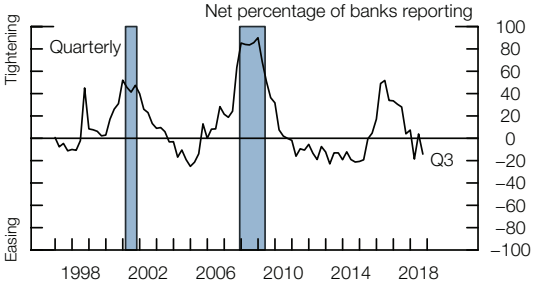
1-14. Spread of Capitalization Rate at Property Purchase to 10-Year Treasury Yield



Note: The data are three-month moving averages of weighted capitalization rates in the industrial, retail, office, and multifamily sectors, based on national square footage in 2009.

Source: Real Capital Analytics; Andrew C. Florance, Norm G. Miller, Ruijue Peng, and Jay Spivey (2010), "Slicing, Dicing, and Scoping the Size of the U.S. Commercial Real Estate Market," *Journal of Real Estate Portfolio Management*, vol. 16 (May–August), pp. 101–18.

1-15. Change in Bank Standards for CRE Loans



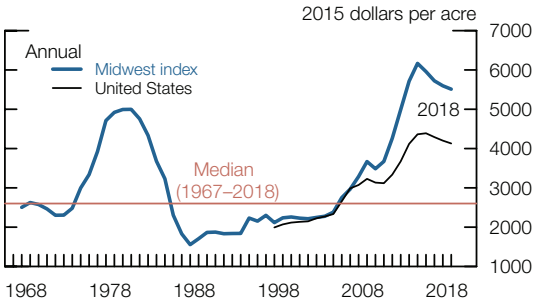
Note: Banks' responses are weighted by their CRE loan market shares. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research. CRE is commercial real estate.

Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices; Federal Reserve Board staff calculations.

. . . farmland prices are near historical highs, . . .

Agricultural land values nationally and in several midwestern states are down from their 2016 peak but remain at exceptionally high levels (figure 1-16). And farmland price-to-rent ratios are at historic highs (figure 1-17). Many farms face possible income losses from retaliatory tariffs on agricultural commodities and other factors, which may not yet be fully reflected in available farmland price measures.

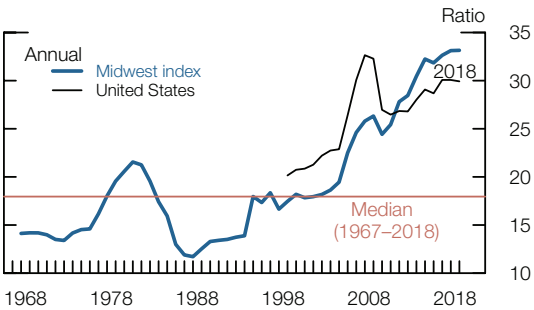
1-16. Cropland Values



Note: The data for the United States start in 1997. Midwest index is a weighted average of Corn Belt and Great Plains states. Values are given in real terms.

Source: Department of Agriculture.

1-17. Cropland Price-to-Rent Ratio



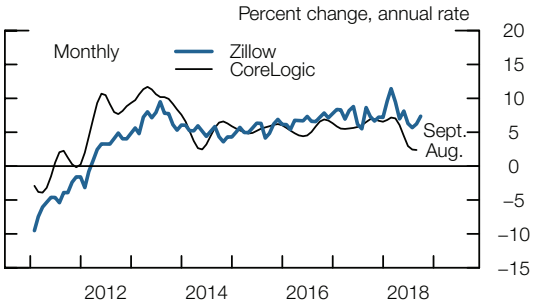
Note: The data for the United States start in 1998. Midwest index is the weighted average of Corn Belt and Great Plains states.

Source: Department of Agriculture.

. . . and home prices have been rising, but less so in recent months

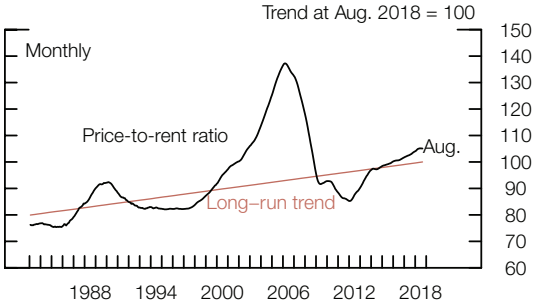
House prices have risen substantially since 2012, although the rate of price appreciation appears to have slowed significantly in recent months (figure 1-18). The aggregate house price-to-rent ratio is currently somewhat higher than an estimate of its long-run historical trend but still well below the extraordinarily high levels seen in the years just before the financial crisis (figure 1-19). House price-to-rent ratios differ significantly across regional markets, and in some markets, price-to-rent ratios that experienced large declines during the financial crisis are once again relatively high (figure 1-20). Measures of house prices relative to household income also suggest somewhat elevated valuation pressures in residential real estate nationwide.

1-18. Growth of Nominal Prices of Existing Homes



Source: CoreLogic; Zillow.

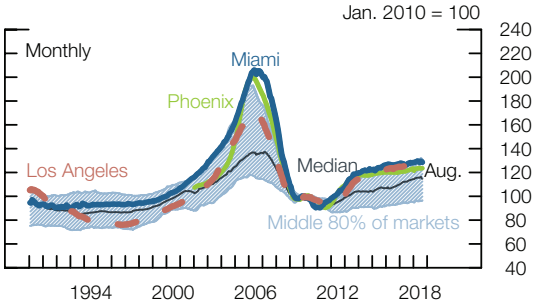
1-19. Housing Price-to-Rent Ratio



Note: Chart shows the log of the price-to-rent ratio. Long-run trend is estimated using data from 1978 to 2001, with the last value of the trend normalized to equal 100.

Source: For house prices, CoreLogic; for rent data, Bureau of Labor Statistics.

1-20. Selected Local Housing Price-to-Rent Ratio Indexes



Note: Seasonally adjusted. The data for Phoenix start in 2002. Monthly rent values for Phoenix are interpolated from semiannual numbers. Percentiles are based on 25 metropolitan statistical areas.

Source: For house prices, CoreLogic; for rent data, Bureau of Labor Statistics.

2. Borrowing by businesses and households

While household borrowing is at a low-to-moderate level relative to incomes, business-sector debt relative to GDP is historically high and there are signs of deteriorating credit standards

Overall, vulnerabilities arising from total private-sector credit appear moderate. Among businesses, debt levels are high, and there are signs of deteriorating credit standards. In addition, recently, debt has been growing fastest at firms with weaker earnings and higher leverage. By contrast, household borrowing has advanced more slowly than economic activity and is largely concentrated among low-credit-risk borrowers.

Table 2 shows the current volume and recent and historical growth rates of forms of debt owed by businesses and households. Over the year ending in the second quarter of 2018, business credit grew 4.5 percent, and household credit grew 3.5 percent.

Table 2. Outstanding amounts of business and household credit

Item	Outstanding (billions of dollars)	Growth from 2017:Q2–2018:Q2 (percent)	Average annual growth, 1997–2018:Q2 (percent)
Total private nonfinancial credit	30,103	4.0	5.6
Total business credit	14,783	4.5	5.7
Corporate business credit	9,425	4.0	5.1
Bonds and commercial paper	6,214	3.2	5.7
Bank lending	1,421	7.2	3.1
Leveraged loans*	992	12.9	15.1
Noncorporate business credit	5,358	5.3	7.2
Commercial real estate	2,364	6.7	6.4
Total household credit	15,320	3.5	5.5
Mortgages	10,182	2.9	5.7
Consumer credit	3,865	4.6	5.2
Student loans	1,531	5.7	9.7
Auto loans	1,129	3.5	5.1
Credit cards	999	4.6	3.1
Nominal GDP	20,412	5.1	4.2

Note: The data extend through 2018:Q2. The table reports the main components of corporate business credit, total household credit, and consumer credit. Other, smaller components are not reported. The commercial real estate (CRE) line shows CRE debt owed by both corporate and noncorporate businesses. The total household sector credit includes debt owed by other entities, such as nonprofit organizations. GDP is gross domestic product.

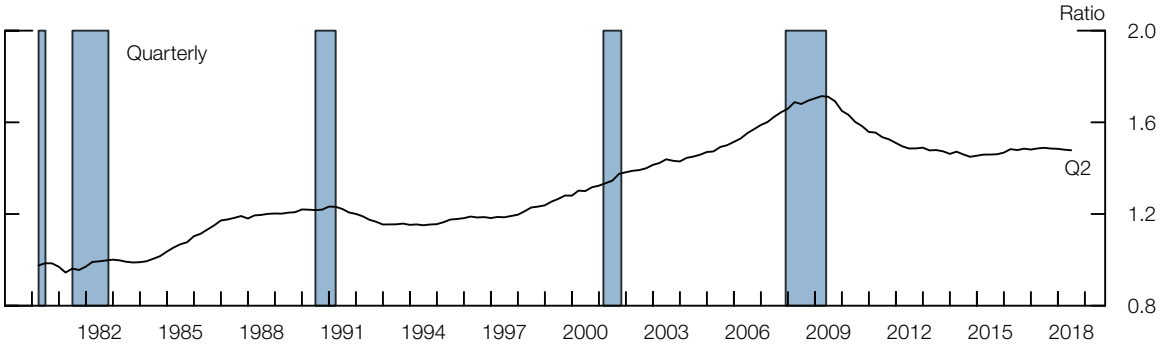
* Leveraged loans included in this table are an estimate of the leveraged loans that are made to nonfinancial businesses only and do not include the small amount of leveraged loans outstanding for financial businesses. The amount outstanding shows institutional leveraged loans and generally excludes loan commitments held by banks. For example, lines of credit are generally excluded from this measure. The average annual growth rate shown for leveraged loans is computed from 2000 to 2018:Q2, as this market was fairly small before 2000.

Source: For leveraged loans, S&P Global, Leveraged Commentary & Data; for GDP, Bureau of Economic Analysis, national income and product accounts; for all other items, Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

Total private credit has advanced roughly in line with economic activity . . .

Borrowing by businesses and households in excess of their ability to pay back that debt has often led to strains on borrowers and the financial system. However, over the past several years, total debt owed by businesses and households expanded at a pace similar to that of nominal GDP. As a result, the ratio of such debt to GDP has been broadly stable at levels similar to those in mid-2005, before the period of most rapid credit growth from 2006 to 2007 (figure 2-1).[5]

2-1. Private Nonfinancial-Sector Credit-to-GDP Ratio

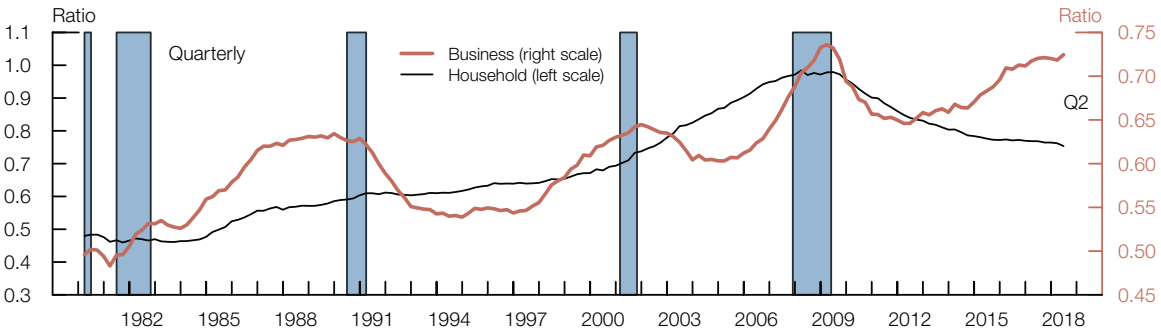


Note: The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research. GDP is gross domestic product.

Source: Federal Reserve Board staff calculations based on Bureau of Economic Analysis, national income and product accounts, and Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

Figure 2-2 shows the credit-to-GDP ratio disaggregated across two broad categories of borrowers: households and businesses. (Note that these businesses are nonfinancial; leverage of financial firms is discussed in the next section.) Before the crisis, household debt relative

2-2. Business- and Household-Sector Credit-to-GDP Ratio



Note: The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research. GDP is gross domestic product.

Source: Federal Reserve Board staff calculations based on Bureau of Economic Analysis, national income and product accounts, and Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

[5] An often-used alternative measure to assess whether credit is currently high or low by historical standards is the credit-to-GDP gap—that is, where the ratio of the level of total debt to GDP is relative to its longer-run statistical trend. Currently,

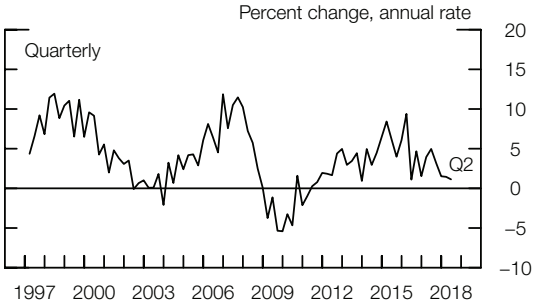
to GDP rose steadily to levels far above historical trends. After the crisis, household debt contracted sharply and has grown only moderately since then. Business borrowing tends to track the economic cycle more closely. After the crisis, business debt also contracted but has expanded significantly over the past several years.

. . . but debt owed by businesses is historically high, and risky debt issuance has picked up recently

After growing faster than GDP through most of the current expansion, total business-sector debt relative to GDP stands at a historically high level. However, growth of this debt slowed markedly in the first half of 2018 (figure 2-3).[6]

Growth in riskier forms of business debt—high-yield bonds and leveraged loans—which had slowed to zero in late 2016, rebounded in recent quarters (figure 2-4). The rebound reflected a decline in high-yield bonds outstanding more than offset by a notable pickup in growth of nonfinancial leveraged loans outstanding. On net, total risky debt rose about 5 percent over the year ending in the third quarter of 2018 and now represents over $2 trillion in debt outstanding.

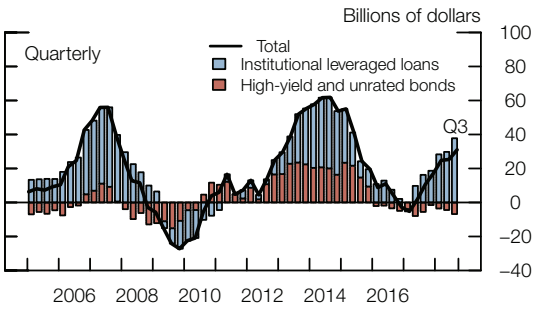
2-3. Growth of Real Aggregate Debt of the Business Sector



Note: Nominal debt growth is seasonally adjusted and is translated into real terms after subtracting the growth rate of the price deflator for nonfinancial business-sector output.

Source: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

2-4. Net Issuance of Risky Business Debt



Note: Total net issuance of risky debt is the sum of the net issuance of speculative-grade and unrated bonds and leveraged loans. The data are four-quarter moving averages.

Source: Mergent, Fixed Investment Securities Database (FISD); S&P Global, Leveraged Commentary & Data.

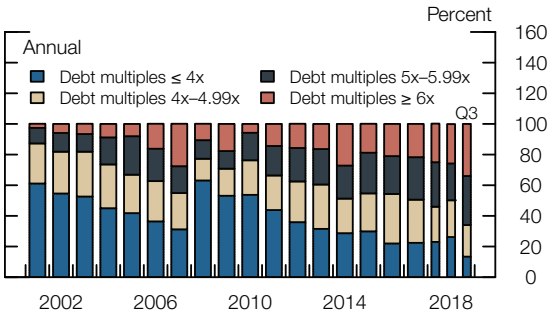
the ratio of total debt to GDP is noticeably below an estimate of its trend, implying a sizable negative gap. However, such comparisons need to be treated with caution because interpreting long-run trends involves a fair amount of judgment. In fact, alternative indicators for current credit conditions, such as the three-year cumulative credit growth rate of the credit-to-GDP ratio, point to a credit level more in line with current economic activity rather than one lagging behind.

[6] While figure 2-3 is about total business debt, most of the business credit discussion that follows is focused on publicly traded corporations because more information is available regarding their balance sheets. The debt owed by other types of businesses is predominantly in the form of bank loans rather than market-based sources of credit.

Moreover, credit standards for some business loans appear to have deteriorated further . . .

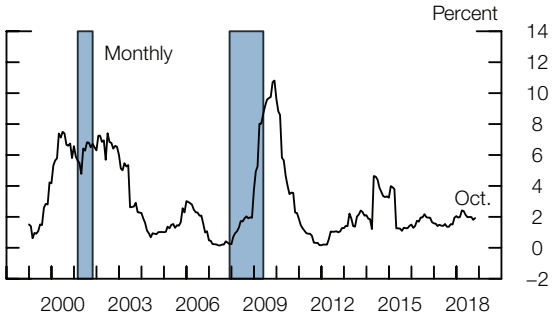
Credit standards for new leveraged loans appear to have deteriorated over the past six months. The share of newly issued large loans to corporations with high leverage—defined as those with ratios of debt to EBITDA (earnings before interest, taxes, depreciation, and amortization) above 6—has increased in recent quarters and now exceeds previous peak levels observed in 2007 and 2014 when underwriting quality was notably poor (figure 2-5). Moreover, there has been a recent rise in "EBITDA add backs," which add back nonrecurring expenses and future cost savings to historical earnings and could inflate the projected capacity of the borrowers to repay their loans. However, in part reflecting the strong economy, the credit performance of leveraged loans has so far been solid, with the default rate on leveraged loans at the low end of its historical range (figure 2-6).

2-5. Distribution of Large Institutional Leveraged Loan Volumes, by Debt-to-EBITDA Ratio



Note: The data for 2018 are quarterly. Volumes are for large corporations with earnings before interest, taxes, depreciation, and amortization (EBITDA) greater than $50 billion and exclude existing tranches of add-ons and amendments and restatements with no new money.
Source: S&P Global, Leveraged Commentary & Data.

2-6. Default Rates of Leveraged Loans



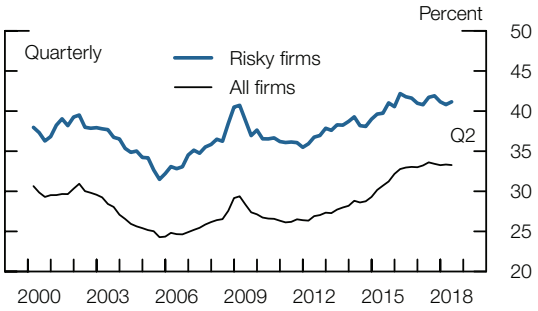
Note: The default rate is calculated as the amount in default over the past 12 months divided by the total outstanding volume at the beginning of the 12-month period. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.
Source: S&P Global, Leveraged Commentary & Data.

The credit quality of nonfinancial high-yield corporate bonds has been roughly stable over the past several years, with the share of high-yield bonds outstanding that are rated "deep junk" (B3/B- or below) staying flat at about one-third from 2015 to early 2018, below the financial crisis peak of 45 percent in 2009. In contrast, the distribution of ratings among investment-grade corporate bonds has deteriorated. The share of bonds rated at the lowest investment-grade level (for example, an S&P rating of triple-B) has reached near-record levels. As of the second quarter of 2018, around 35 percent of corporate bonds outstanding were at the lowest end of the investment-grade segment, amounting to about $2¼ trillion. In an economic downturn, widespread downgrades of these bonds to speculative-grade ratings could induce some investors to sell them rapidly, because, for example, they face restrictions on holding bonds with ratings below investment grade. Such sales could increase the liquidity and price pressures in this segment of the corporate bond market.

. . . and leverage of some firms is near its highest level seen over the past two decades

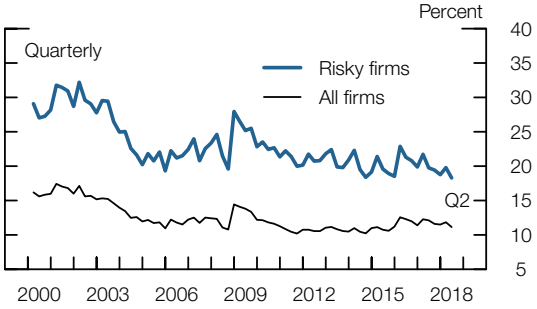
A broad indicator of the leverage of businesses, the ratio of debt to assets for all publicly traded nonfinancial firms, including speculative-grade and unrated firms, has been roughly flat since 2016 but remains near its highest level in 20 years (figure 2-7). An analysis of detailed balance sheet information of these firms indicates that, over the past year, firms with high leverage, high interest expense ratios, and low earnings and cash holdings have been increasing their debt loads the most. This development is in contrast to previous years when primarily high-earning firms with relatively low leverage were taking on the most additional debt. High leverage has historically been linked to elevated financial distress and retrenchment by businesses in economic downturns. Given the valuation pressures associated with business debt noted in the previous section, such an increase in financial distress, should it transpire, could trigger a broad adjustment in prices of business debt. That said, with interest rates low by historical standards, debt service costs are at the lower ends of their historical ranges, particularly for risky firms, and corporate credit performance remains generally favorable (figure 2-8).

2-7. Gross Balance Sheet Leverage of Public Nonfinancial Corporations



Note: Gross leverage is the ratio of the book value of total debt to the book value of total assets. The sample of risky firms is composed of firms with positive short-term or long-term debt that either have an S&P firm rating of speculative grade or have no S&P rating.
Source: Federal Reserve Board staff calculations based on S&P Global, Compustat.

2-8. Interest Expense Ratio for Public Nonfinancial Corporations



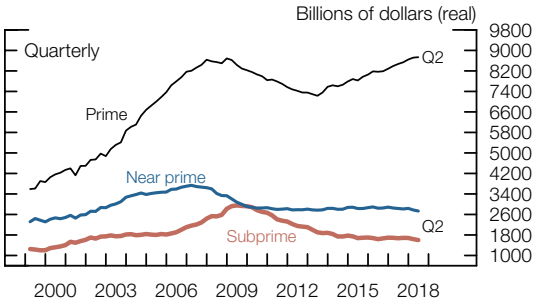
Note: Series calculated as the ratio of total interest expenses to earnings before interest, depreciation, and taxes. The sample of risky firms is composed of firms with positive short-term or long-term debt that either have an S&P firm rating of speculative grade or have no S&P rating.
Source: Federal Reserve Board staff calculations based on S&P Global, Compustat.

Borrowing by households, however, has risen in line with incomes and is concentrated among low-credit-risk borrowers

Expansion of household debt has been in line with income gains, and, for the past several years, all of the net increase in total household debt has been among borrowers with prime credit scores and very low historical delinquency rates. Loan balances for borrowers with a prime credit score, who account for about one-half of all borrowers and about two-thirds of all balances, continued to grow in the first half of 2018, reaching their pre-crisis levels (after an adjustment for general price inflation). In contrast, loan balances for the remaining one-

half of borrowers with near-prime and subprime credit scores were essentially unchanged from 2014 to the middle of 2018 (figure 2-9). These trends are particularly evident in new mortgage extensions and underscore the marked shift toward less-risky lending and borrowing that is broadly consistent with stronger underwriting standards (figure 2-10).

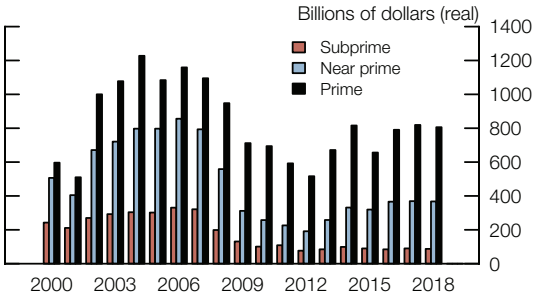
2-9. Total Household Loan Balances



Note: Near prime are those with an Equifax Risk Score from 620 to 719; prime are greater than 719. Scores are measured contemporaneously. Student loan balances before 2004 are estimated using average growth from 2004 to 2007, by risk score. The data are converted to constant 2018 dollars using the consumer price index.

Source: FRBNY Consumer Credit Panel/Equifax; Bureau of Labor Statistics consumer price index.

2-10. Estimate of New Mortgage Volume to Households



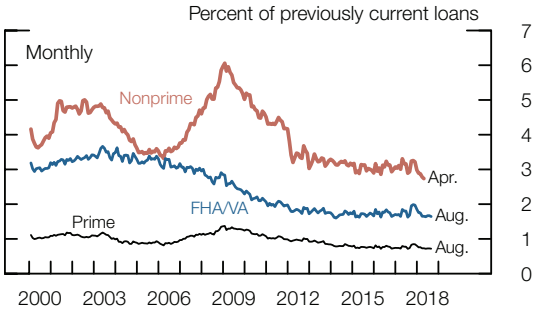
Note: Year-over-year change in balances for the second quarter of each year among those households whose balance increased over this window. Near prime are those with an Equifax Risk Score from 620 to 719; prime are greater than 719. Scores were measured a year ago. The data are converted to constant 2018 dollars using the consumer price index.

Source: FRBNY Consumer Credit Panel/Equifax; Bureau of Labor Statistics consumer price index.

Credit risk of outstanding mortgage debt appears to be generally solid . . .

Mortgages represent two-thirds of overall household debt outstanding. An early indicator of payment difficulties in this segment is the rate at which existing mortgages transition into delinquency. This transition rate has been very low for several years among borrowers with prime and nonprime credit scores and for loans in programs offered by the Federal Housing Administration and U.S. Department of Veterans Affairs (figure 2-11). Similarly, delinquency rates for newly originated mortgages, which give us a sense of recent underwriting standards, have also been low. In addition, the ratio of outstanding mortgage debt to home values is at the moderate level seen in the relatively calm housing markets of the late 1990s, suggesting that home mortgages are backed by sufficient collateral (figure 2-12).[7] Similarly,

2-11. Transition Rates into Mortgage Delinquency



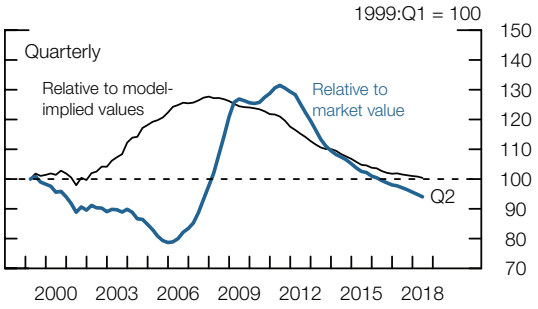
Note: Percent of previously current mortgages that transition from being current to being at least 30 days delinquent each month. The data are three-month moving averages. FHA is Federal Housing Administration; VA is U.S. Department of Veterans Affairs. Prime and nonprime are defined among conventional loans.

Source: For prime and FHA/VA, Black Knight McDash Data; for nonprime, CoreLogic.

[7] Home values, in this context, are computed both using current market values and using the level of house prices predicted by a staff model based on rents, interest rates, and a time trend shown in figure 1-19. To the extent that aggressive mortgage

the share of outstanding mortgages with negative equity—mortgages where the amount owed on a property exceeds the value of the underlying home—has continued to trend down (figure 2-13).

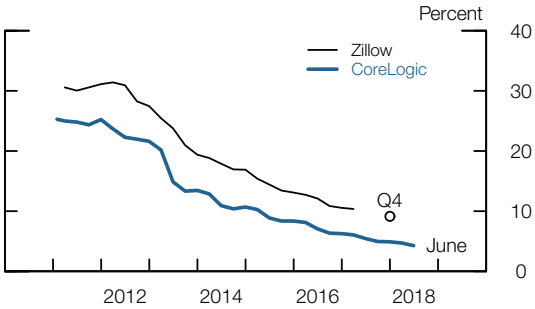
2-12. Estimates of Housing Leverage



Note: This measure is estimated as an index of the ratio of the average outstanding mortgage loan balance for owner-occupied homes with a mortgage to (1) current home values using the CoreLogic national house price index and (2) model-implied house prices estimated by a staff model based on rents, interest rates, and a time trend.

Source: FRBNY Consumer Credit Panel/Equifax; CoreLogic; Bureau of Labor Statistics.

2-13. Estimate of Mortgages with Negative Equity



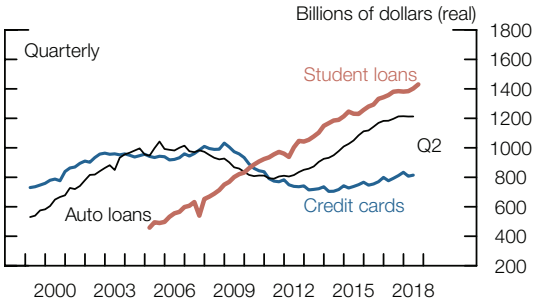
Note: Estimated share of mortgages with negative equity according to CoreLogic and Zillow. For CoreLogic, the data are monthly. For Zillow, the data are quarterly and, for 2017, are available only for the first and fourth quarters.

Source: CoreLogic; Zillow.

. . . although some households are struggling with their debt

Student loans, auto loans, and credit card loans represent the majority of the remaining overall household debt outstanding (figure 2-14). Student loans are the largest of these, with aggregate balances of about $1.5 trillion at the end of the second quarter of 2018. Over 90 percent of these loans are guaranteed by the U.S. Department of Education and were extended through programs that did not involve traditional loan underwriting. Through the first half of 2018, student loan delinquency rates continued to improve gradually but remain elevated by longer-run standards. Growth in auto loans to borrowers with subprime and near-prime credit scores and growth in credit card debt owed by borrowers with nonprime credit scores seem to have peaked after having

2-14. Consumer Credit Balances



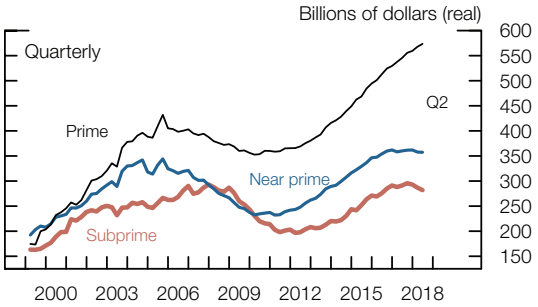
Note: The data are converted to constant 2018 dollars using the consumer price index.

Source: FRBNY Consumer Credit Panel/Equifax; Bureau of Labor Statistics consumer price index.

lending is associated with rapid increases in home prices (as in the early-to-middle 2000s), it is preferable, when assessing systemic vulnerabilities, to relate mortgage debt to home values that are closer to what would be implied by economic fundamentals instead of market values.

been relatively strong for several years (figure 2-15). Responses to the SLOOS suggest that the leveling off in nonprime credit card borrowing may reflect some tightening of lending standards. Similarly, payment delinquency rates for subprime credit cards and auto loans, which were on the rise for the past few years, also seem to be stabilizing, although, in the latter case, they remain relatively high (figure 2-16). In addition, early payment delinquencies (delinquencies occurring on relatively new credit accounts) remain high for credit cards and have continued to rise for auto loans in the first half of 2018, suggesting that underwriting standards might continue to be looser than usual in these two segments and underscoring the need for ongoing monitoring of associated vulnerabilities.

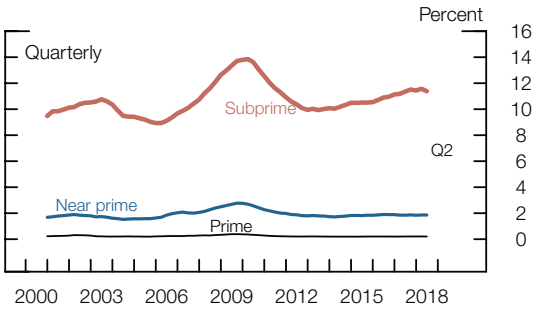
2-15. Auto Loan Balances



Note: Near prime are those with an Equifax Risk Score from 620 to 719; prime are greater than 719. Scores are measured contemporaneously. The data are converted to constant 2018 dollars using the consumer price index.

Source: FRBNY Consumer Credit Panel/Equifax; Bureau of Labor Statistics consumer price index.

2-16. Auto Loan Delinquency Rates



Note: Delinquency is at least 30 days past due, excluding severe derogatory loans. The data are four-quarter moving averages. Near prime are those with an Equifax Risk Score from 620 to 719; prime are greater than 719. Credit scores are lagged four quarters.

Source: FRBNY Consumer Credit Panel/Equifax.

3. Leverage in the financial sector

Leverage in the financial sector has been low in recent years

Leverage at financial firms is low relative to historical standards, in part because of regulatory reforms enacted since the financial crisis. In particular, regulators require that banks—especially the largest banks—meet much higher standards in the amount and quality of capital on their balance sheets and in the ways they assess and manage their financial risks. A greater amount and a higher quality of capital improve the ability of banks to bear losses while continuing to lend and support the economy. Capital levels at broker-dealers have also increased substantially relative to pre-crisis levels, and major insurance companies have strengthened their financial positions since the crisis. However, some indicators suggest that hedge fund leverage is at post-crisis highs.

To put into perspective the relative size of the types of financial institutions discussed in this section, table 3 shows the level and the growth rates, recently and over a longer period, of their total assets.

Table 3. Size of selected types of financial institutions and vehicles

Item	Total assets (billions of dollars)	Growth from 2017:Q2–2018:Q2 (percent)	Average annual growth, 1997–2018:Q2 (percent)
Banks and credit unions	18,976	2.9	5.8
Mutual funds	16,078	8.7	9.9
Insurance companies	10,065	2.5	5.7
Life	7,664	2.1	5.8
Property and casualty	2,401	4.0	5.4
Hedge funds*	7,270	13.5	7.9
Broker-dealers	3,139	–2.4	4.7
	Outstanding (billions of dollars)		
Securitization	10,096	2.6	5.4
Agency	8,939	3.4	6.0
Non-agency	1,157	–3.1	3.1

Note: The data extend through 2018:Q2.

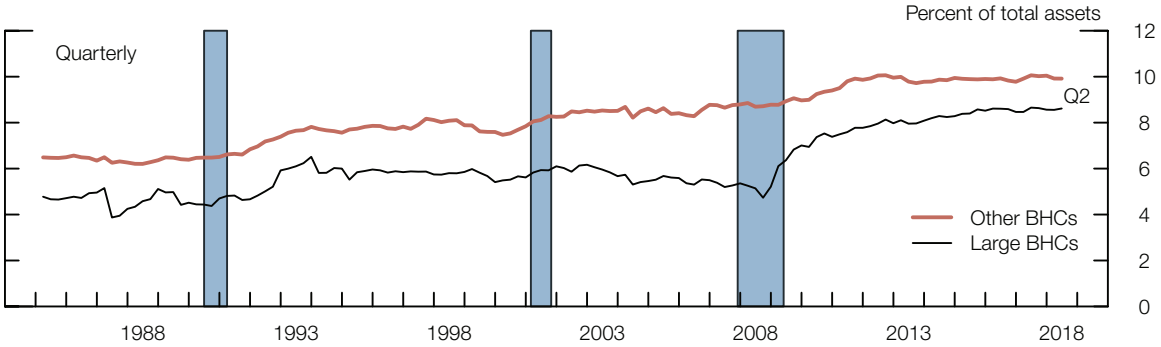
* Hedge fund data start in 2013:Q4 and are updated through 2017:Q4.

Source: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States"; Federal Reserve Board staff calculations based on Securities and Exchange Commission, Form PF, Reporting Form for Investment Advisers to Private Funds and Certain Commodity Pool Operators and Commodity Trading Advisors.

Banks have strong capital positions . . .

Capital ratios for the larger banks are well above levels seen before the financial crisis (figures 3-1 and 3-2). Regulatory capital ratios also exceed the fully phased-in enhanced minimum requirements plus regulatory buffers. Banks appear well positioned to maintain capital through retained earnings as profitability has advanced beyond post-crisis lows on account of increased net income and lower tax rates. The scenarios used in the supervisory stress tests routinely feature a severe global recession, steep declines in asset prices, and a substantial deterioration in business credit quality. The results of the most recent stress test released in June by the Federal Reserve Board indicate that the nation's largest banks would be able to continue to lend to households and businesses even during such a severe scenario.[8]

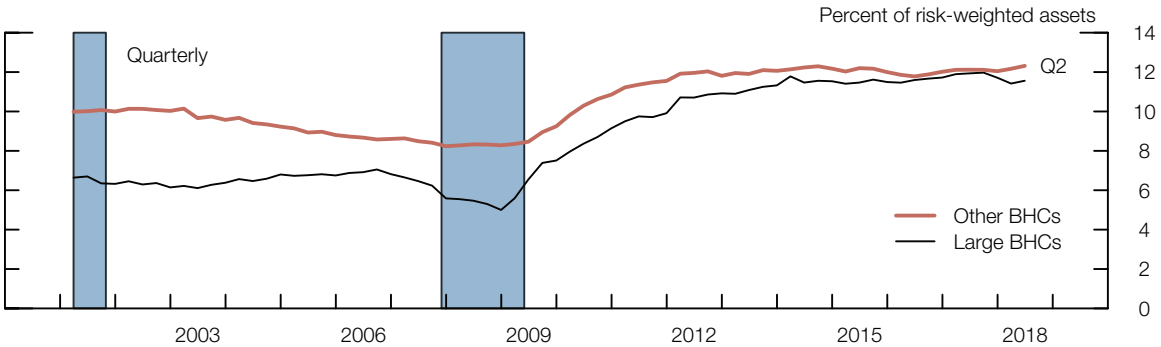
3-1. Ratio of Tangible Bank Equity to Assets



Note: Bank equity is total equity capital net of preferred equity and intangible assets, and assets are total assets. The data are seasonally adjusted by Board staff. Large bank holding companies (BHCs) are those with greater than $50 billion in total assets. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.

Source: Federal Financial Institutions Examination Council, Call Report Form FFIEC 031, Consolidated Reports of Condition and Income for a Bank with Domestic and Foreign Offices.

3-2. Common Equity Tier 1 Ratio of Banks



Note: The data are seasonally adjusted by Board staff. Sample includes banks as of 2018:Q2. Before 2014:Q1, the numerator of the common equity Tier 1 ratio is Tier 1 common capital for advanced-approaches bank holding companies (BHCs) (before 2015:Q1, for non-advanced-approaches BHCs). Afterward, the numerator is common equity Tier 1 capital. Large BHCs are those with greater than $50 billion in total assets. The denominator is risk-weighted assets. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.

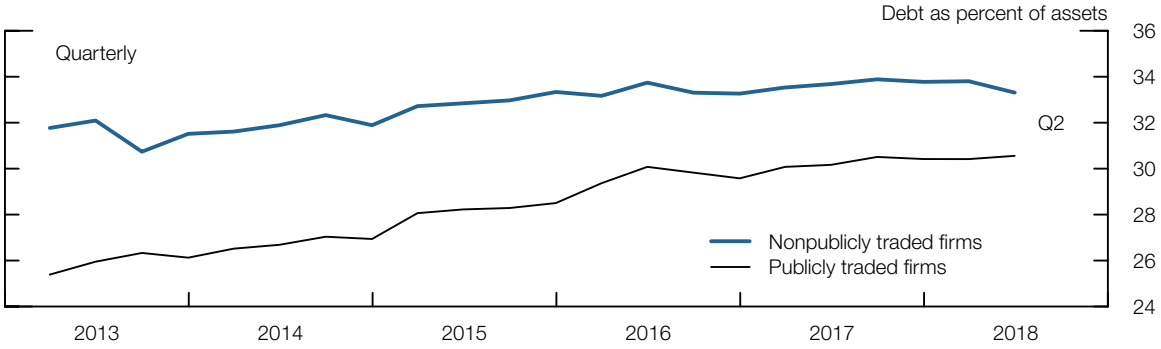
Source: Federal Reserve Board, Form FR Y-9C, Consolidated Financial Statements for Holding Companies.

---

[8] See Board of Governors of the Federal Reserve System (2018), "Federal Reserve Board Releases Results of Supervisory Bank Stress Tests," press release, June 21, https://www.federalreserve.gov/newsevents/pressreleases/bcreg20180621a.htm.

Across the entire banking sector, the credit quality of bank loans appears strong, although there are some signs of more aggressive risk-taking by banks. For example, lending standards for commercial and industrial (C&I) loans and mortgages have been easing somewhat in recent quarters, and the leverage of borrowers who are receiving C&I loans from the largest banks has been trending up in recent years, reflecting the overall upward trend in business leverage (figure 3-3).

3-3. Borrower Leverage for Bank C&I Loans

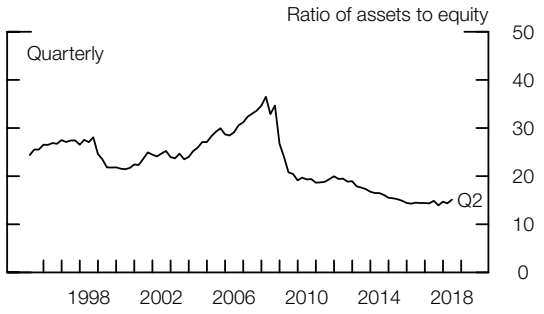


Note: Weighted median leverage of firms (excluding financials) that borrow using commercial and industrial (C&I) loans from the 26 banks that have filed in every quarter since 2013:Q1. Leverage is measured as the ratio of the book value of total debt to the book value of total assets of the borrower, as reported by the lender, and the median is weighted by committed amounts.
Source: Federal Reserve Board, Form FR Y-14Q (Schedule H.1), Capital Assessments and Stress Testing.

. . . and broker-dealers and insurance companies have strengthened their financial positions since the crisis . . .

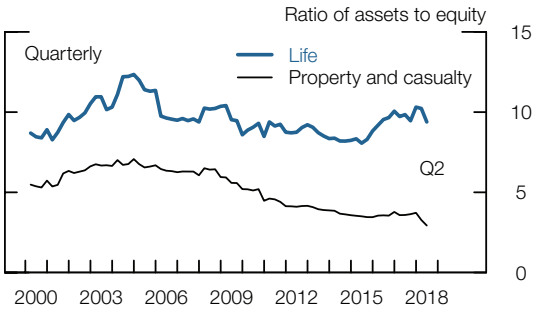
Leverage of broker-dealers has been trending down and is now substantially below pre-crisis levels (figure 3-4). At property and casualty insurance firms, leverage has also been falling, while it has been roughly constant over the past decade for life insurance companies (figure 3-5).

3-4. Leverage of Broker–Dealers



Note: Leverage is calculated by dividing financial assets by equity.
Source: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

3-5. Leverage of Insurance Companies

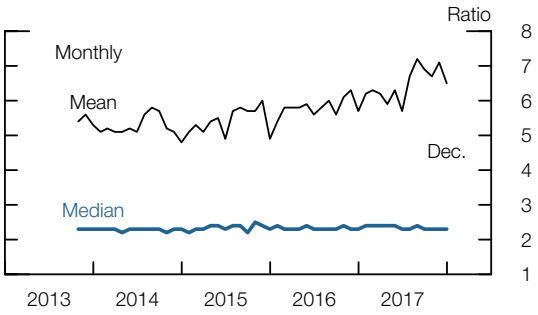


Note: The data extend through 2018:Q2. Ratio is calculated as (total assets – separate account assets)/(total capital – accumulated other comprehensive income).
Source: S&P Global, Inc., S&P Market Intelligence.

. . . even as there are signs of increased borrowing at other nonbank financial firms

Several indicators suggest that hedge fund leverage has been increasing over the past two years. A comprehensive measure that incorporates margin loans, repurchase agreements (repos), and derivatives—but is only available with a significant time lag—suggests that average hedge fund leverage has risen by about one-third over the course of 2016 and 2017 (figure 3-6). Consistent with this indicator, dealers responding to the Federal Reserve's Senior Credit Officer Opinion Survey on Dealer Financing Terms, or SCOOS, reported some increase in the use of leverage by hedge funds, on average, over the past two years (figure 3-7) as well as some easing in both price terms (for example, interest rates and lending fees) and nonprice terms (for example, margins and loan maturities) for credit extended to hedge funds. The increased use of leverage by hedge funds exposes their counterparties to risks and raises the possibility that adverse shocks would result in forced asset sales by hedge funds that could exacerbate price declines. That said, hedge funds do not play the same central role in the financial system as banks or other institutions.

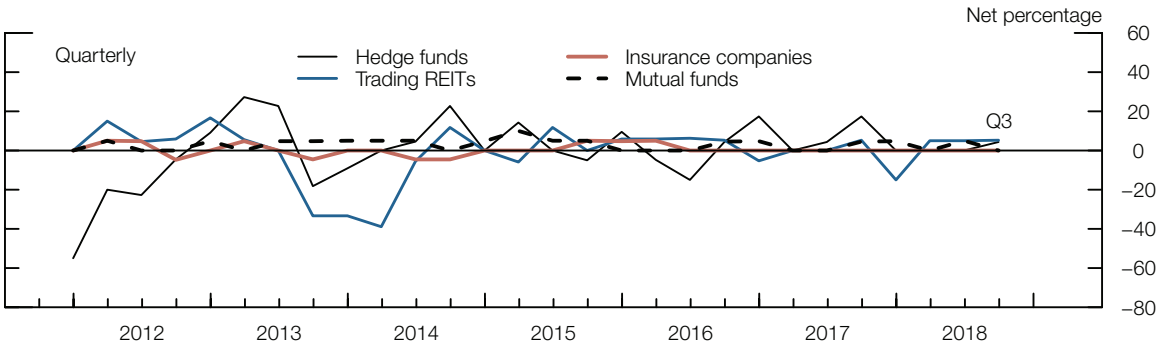
3-6. Gross Leverage of Hedge Funds



Note: Leverage is computed as the ratio of hedge funds' gross notional exposure to net asset value, including derivative notional exposure and short positions. Data are reported on a three-quarter lag.

Source: Federal Reserve Board staff calculations based on Securities and Exchange Commission, Form PF, Reporting Form for Investment Advisers to Private Funds and Certain Commodity Pool Operators and Commodity Trading Advisors.

3-7. Change in the Use of Financial Leverage



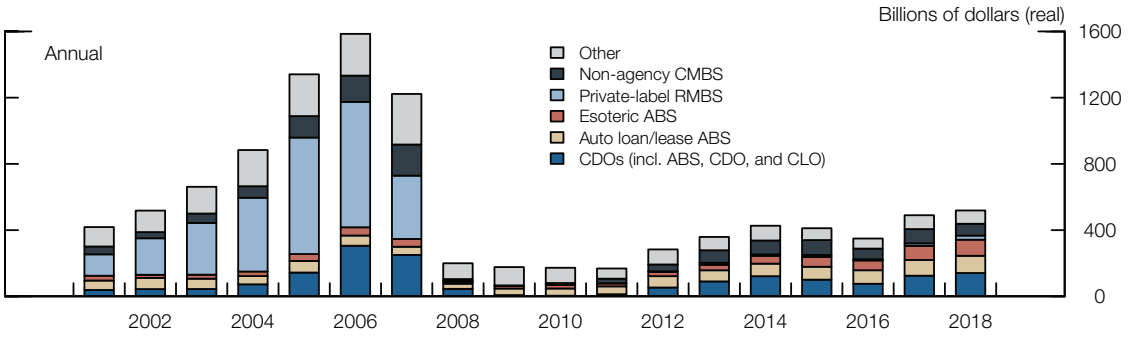
Note: Net percentage equals the percentage of institutions that reported increased use of financial leverage over the past three months minus the percentage of institutions that reported decreased use of financial leverage over the past three months. REIT is real estate investment trust.

Source: Federal Reserve Board, Senior Credit Officer Opinion Survey on Dealer Financing Terms.

In a process known as "securitization," financial institutions bundle loans or other financial assets together and sell investors claims on the bundle as securities that can be traded much like a bond. Examples of the resulting securities, or securitized instruments, are collateralized loan obligations (CLOs), asset-backed securities, and commercial and residential mortgage-backed securities. By funding assets with debt obligations, securitization can add leverage to the financial system. Issuance volumes of non-agency securitized instruments (that is, those for which the instrument is not guaranteed by a government-sponsored enterprise or by the federal government) have been rising in recent years but remain well below the levels seen in the years ahead of the financial crisis (figure 3-8). A type of securitization that

has grown rapidly over the past year is CLOs, which are predominantly backed by leveraged loans. Amid the general deterioration in the underwriting standards on leveraged loans (discussed in the section on business leverage), gross issuance of CLOs hit $71 billion in the first half of 2018. This pace represents an increase by about one-third compared with the same period last year, and CLOs now purchase about 60 percent of leveraged loans at origination. It is important to continue to monitor developments in this sector.

3-8. Issuance of Non-Agency Securitized Products, by Asset Class

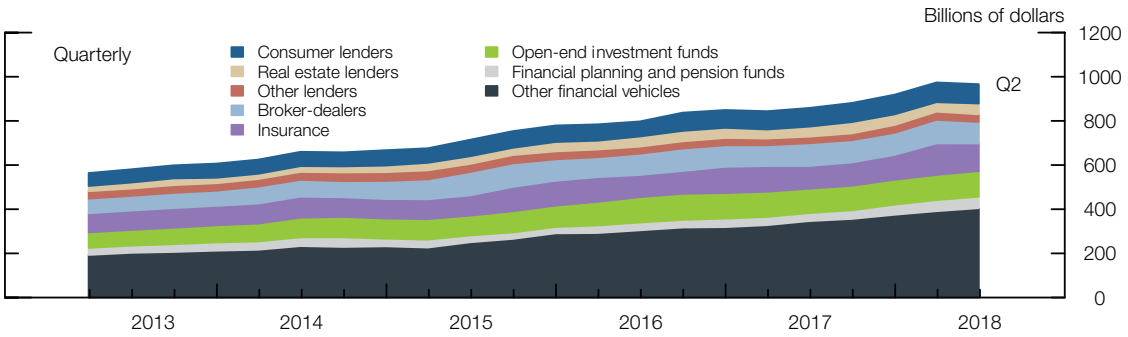


Note: The data from the first three quarters of 2018 are annualized to create the 2018 bar. Esoteric asset-backed securities (ABS) are backed by unsecured personal loans, mobile phones, reperforming residential mortgages, aircraft and shipping container leases, marketplace lending, and franchise payments. CMBS is commercial mortgage-backed securities; CDO is collateralized debt obligation; RMBS is residential-mortgage-backed securities; CLO is collateralized loan obligation. The "Other" category consists of subprime mortgages, real estate mortgage investment conduit (Re-REMIC) RMBS, Re-REMIC CMBS, and ABS backed by credit card debt, student loans, equipment, and floor plans. The data are converted to constant 2018 dollars using the consumer price index.

Source: Harrison Scott Publications, Asset-Backed Alert (ABAlert.com) and Commercial Mortgage Alert (CMAlert.com); Bureau of Labor Statistics, consumer price index via Haver Analytics.

Because information on the financial institutions that operate outside of the banking sector is limited, data on banks' lending to these institutions can be informative about nonbanks' use of leverage. Nonbank financial institutions—such as finance companies, asset managers, securitization vehicles, and mortgage real estate investment trusts—have access to about $1 trillion in committed lines of credit, an increase of about two-thirds over the past five years (figure 3-9). To date, borrowing institutions have utilized $300 billion of these lines of credit.

3-9. Large Bank Lending to Nonbank Financial Firms: Committed Amounts



Note: Committed amounts on credit lines and term loans extended to nonbank financial firms by a balanced panel of 25 bank holding companies that have filed Form FR Y-14Q in every quarter since 2012:Q3. Nonbank financial firms are identified based on reported NAICS (North American Industry Classification System) codes, excluding other domestic and foreign banks, monetary authorities, and credit unions. Broker-dealers also include commodity contracts dealing and brokerages and other securities and commodity exchanges. Other financial vehicles include closed-end investment and mutual funds, real estate investment trusts, special purpose vehicles, and other vehicles.

Source: Federal Reserve Board, Form FR Y-14Q, Capital Assessments and Stress Testing.

4. Funding risk

Vulnerabilities from liquidity and maturity mismatches are currently low

A measure of the total amount of liabilities that are most vulnerable to runs, including those issued by nonbanks, is relatively low (top panel of table 4). Banks are holding higher levels of liquid assets and relying less on funding sources that proved susceptible to runs than in the period leading up to the crisis, in part because of liquidity regulations introduced after the financial crisis and banks' greater understanding of their liquidity risks. Money market fund reforms implemented in 2016 have reduced "run risk" in that industry.

Table 4. Size of selected instruments and institutions

Item	Outstanding/Total Assets (billions of dollars)	Growth from 2017:Q2–2018:Q2 (percent)	Average annual growth, 1997–2018:Q2 (percent)
Total runnable money-like liabilities	13,153	3.1	3.5
Uninsured deposits	4,652	2.1	11.9
Repurchase agreements	3,190	–1.6	5.3
Domestic money market funds*	2,821	4.2	3.6
Commercial paper	1,052	13.6	2.4
Securities lending	684	4.0	7.5
Bond mutual funds**	3,920	5.1	9.2

Note: The data extend through 2018:Q2, except for bond mutual fund and money market fund data, which extend through 2018:Q3. Average annual growth rates for total runnable money-like liabilities and securities lending are from 2002:Q2 to 2018:Q2. Securities lending includes only lending collateralized by cash.

* Average annual growth is from 2000 to 2018:Q3, and one-year growth is from 2017:Q3 to 2018:Q3.

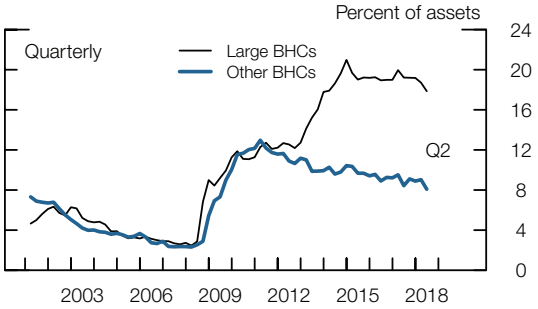
** Average annual growth is from 1997 to 2018:Q3, and one-year growth is from 2017:Q3 to 2018:Q3.

Source: Securities and Exchange Commission, Private Funds Statistics; iMoneyNet, Inc., Offshore Money Fund Analyzer; Bloomberg Finance LP; Securities Industry and Financial Markets Association: U.S. Municipal VRDO Update; Risk Management Association, Securities Lending Report; DTCC Solutions LLC, an affiliate of the Depository Trust & Clearing Corporation: Commercial Paper data; Federal Reserve Board staff calculations based on Investment Company Institute data; Federal Reserve Board, Statistical Release H.6, "Money Stock and Debt Measures" (M3 monetary aggregate); Federal Financial Institutions Examination Council, Consolidated Reports of Condition and Income (Call Report); Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States"; Morningstar, Inc., Morningstar Direct; Moody's Analytics, Inc., CreditView, ABCP Program Index.

Banks have high levels of liquid assets and stable funding

Banks have strong liquidity positions. In total, liquid assets in the banking system have increased more than $3 trillion since the financial crisis. Large banks in particular hold substantial amounts of liquid assets, far exceeding pre-crisis levels and well above regulatory requirements (figure 4-1). Bank funding is less susceptible to runs now than in the period leading up to the financial crisis—further reducing vulnerabilities from liquidity transformation. Core deposits, which include checking accounts, small-denomination time deposits, and other retail deposits that are typically insured, are near historical highs as a share of banks' total liabilities. Core deposits have traditionally been a relatively stable source of funds for banks, in the sense that they have been less prone to runs. In contrast, short-term wholesale funding, a source of funds that proved unreliable during the crisis, is near historical lows as a share of banks' total liabilities (figure 4-2).

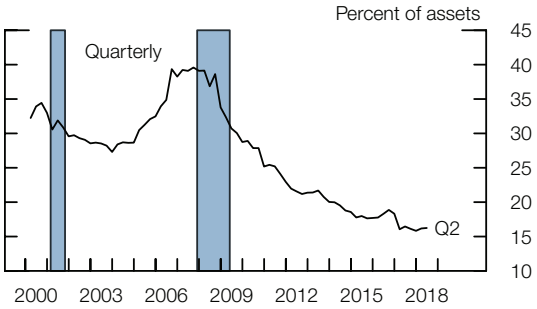
4-1. Liquid Assets Held by Banks



Note: Liquid assets are excess reserves plus estimates of securities that qualify as high-quality liquid assets. Haircuts and Level 2 asset caps are incorporated into the estimate. Large bank holding companies (BHCs) are those with greater than $50 billion in total assets.

Source: Federal Reserve Board, Form FR Y-9C, Consolidated Financial Statements for Holding Companies; Federal Reserve Board, Form FR 2900, Report of Transaction Accounts, Other Deposits and Vault Cash.

4-2. Short-Term Wholesale Funding of Banks



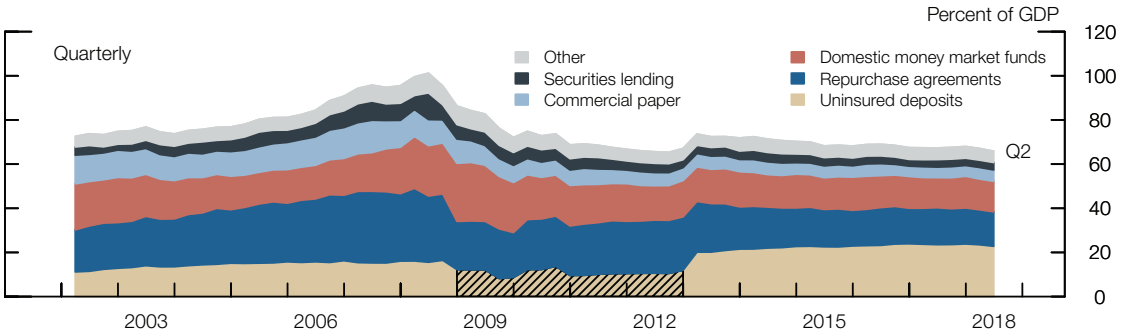
Note: Short-term wholesale funding is defined as the sum of large time deposits with maturity less than one year, federal funds purchased and securities sold under agreements to repurchase, deposits in foreign offices with maturity less than one year, trading liabilities (excluding revaluation losses on derivatives), and other borrowed money with maturity less than one year. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.

Source: Federal Reserve Board, Form FR Y-9C, Consolidated Financial Statements for Holding Companies.

Run risk in short-term funding markets has declined substantially since the crisis . . .

During the financial crisis, runs occurred in the markets for asset-backed commercial paper, repos, and money market fund shares, as well as on individual institutions, greatly aggravating the economic harm from the crisis. An aggregate measure of private short-term, wholesale, and uninsured instruments that could be prone to runs—a measure that includes repos, commercial paper, money funds, uninsured bank deposits, and other forms of short-term debt—currently stands at $13 trillion, significantly lower than its peak at the start of the financial crisis (figure 4-3).

4-3. Runnable Money-Like Liabilities as a Share of GDP, by Instrument and Institution



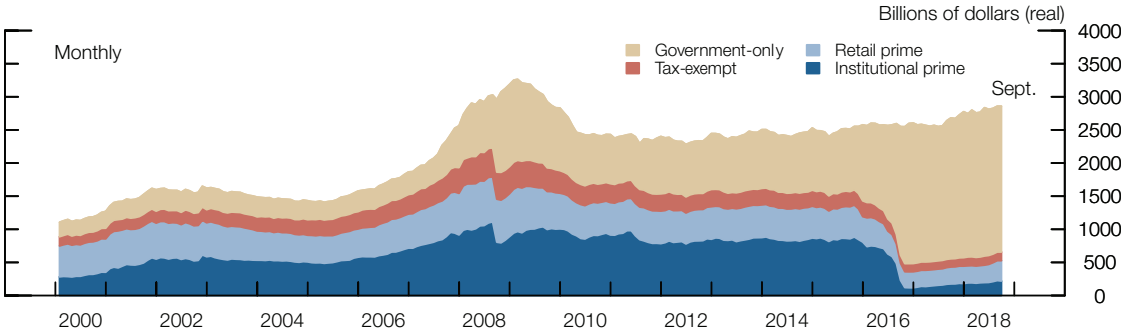
Note: The black striped area denotes the period from 2008:Q4 to 2012:Q4, when insured deposits increased because of the Transaction Account Guarantee Program. "Other" consists of variable-rate demand obligations, federal funds, funding-agreement-backed securities, private liquidity funds, offshore money market funds, and local government investment pools. Securities lending includes only lending collateralized by cash. GDP is gross domestic product.

Source: Securities and Exchange Commission, Private Funds Statistics; iMoneyNet, Inc., Offshore Money Fund Analyzer; Bloomberg Finance LP; Securities Industry and Financial Markets Association: U.S. Municipal VRDO Update; Risk Management Association, Securities Lending Report; DTCC Solutions LLC, an affiliate of the Depository Trust & Clearing Corporation: Commercial Paper data; Federal Reserve Board staff calculations based on Investment Company Institute data; Federal Reserve Board, Statistical Release H.6, "Money Stock and Debt Measures" (M3 monetary aggregate); Federal Financial Institutions Examination Council, Consolidated Reports of Condition and Income (Call Report); Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States"; Moody's Analytics, Inc., CreditView, ABCP Program Index; Bureau of Economic Analysis, gross domestic product via Haver Analytics.

. . . and money market funds are less susceptible to runs

Money market fund (MMF) reforms implemented in 2016 have reduced run risk in the financial system. MMFs proved vulnerable to runs in the past, largely because they almost always maintained stable share prices by rounding net asset values to $1, which created an incentive for investors to redeem their shares quickly in the face of any perceived risk of losses to the assets held by the funds. The reforms required institutional prime MMFs, the most vulnerable segment, to discontinue the use of rounding and instead use "floating" net asset values that adjust with the market prices of the assets they hold. As the deadline for implementing the reforms approached, assets under management at prime MMFs fell sharply (figure 4-4). Many investors in those funds shifted their holdings to government

4-4. Domestic Money Market Fund Assets



Note: The data are converted to constant 2018 dollars using the consumer price index.

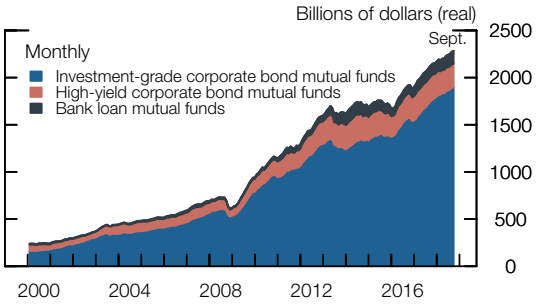
Source: Federal Reserve Board staff calculations based on Investment Company Institute data; Bureau of Labor Statistics consumer price index via Haver Analytics.

MMFs, which continue to use rounded $1 share prices but have assets that are safer and less prone to losing value in times of financial stress. A shift in investments toward short-term investment vehicles that provide alternatives to MMFs and could also be vulnerable to runs or run-like dynamics would increase risk, but assets in these alternatives have increased only modestly compared to the drop in prime MMF assets.

Mutual funds holding corporate debt have grown in size . . .

Total assets under management in corporate bond mutual funds and loan mutual funds have more than doubled in the past decade to over $2 trillion (figure 4-5). Corporate bond mutual funds are estimated to hold about one-tenth of outstanding corporate bonds, and loan funds purchase about one-fifth of newly originated leveraged loans. The mismatch between the ability of investors in open-end bond or loan mutual funds to redeem shares daily and the longer time often required to sell corporate bonds or loans creates, in principle, conditions that can lead to runs, although widespread runs on mutual funds other than money market funds have not materialized during past episodes of stress. If corporate debt prices were to move sharply lower, a rush to redeem shares by investors in open-end mutual funds could lead to large sales of relatively illiquid corporate bond or loan holdings, further exacerbating price declines and run incentives. Moreover, as noted in earlier sections, business borrowing is at historically high levels, and valuations of high-yield bonds and leveraged loans appear high. Such valuation pressures may make large price adjustments more likely, potentially motivating investors to quickly redeem their shares.

4-5. Corporate Bond Mutual Fund and Loan Mutual Fund Assets



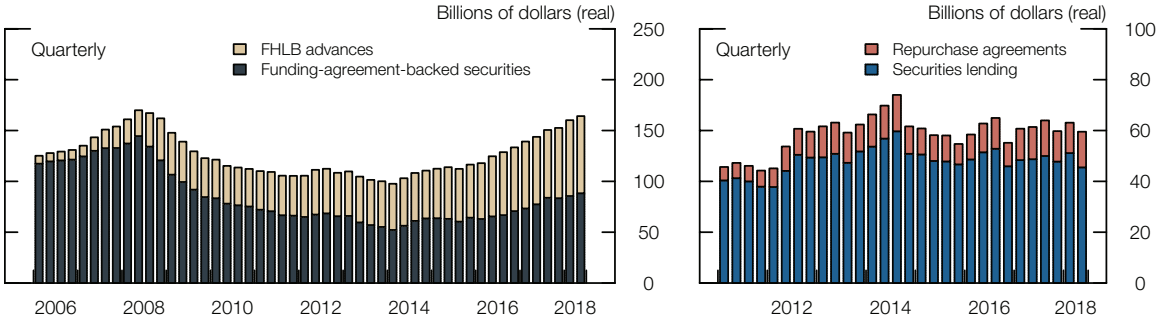
Note: The data are converted to constant 2018 dollars using the consumer price index.
Source: Morningstar, Inc., Morningstar Direct; Bureau of Labor Statistics, consumer price index via Haver Analytics.

. . . and life insurers have increased their holdings of less-liquid assets recently, though they now make less use of funding sources that suffered runs in the crisis

Funding risks in the insurance industry have declined significantly since the financial crisis. Life insurance companies' nontraditional liabilities—repos, funding-agreement-backed securities, securities lending cash collateral, all of which suffered runs during the financial crisis, and Federal Home Loan Bank, or FHLB, advances—have edged up over the past few years. However, the amounts of these nontraditional liabilities remain small relative to total assets of life insurance firms and continue to be below pre-crisis peaks (figure 4-6).[9] That said, life insurers have been shifting their portfolios toward less liquid assets, somewhat weakening their liquidity positions.

[9] The data on securities lending and repos of life insurers are not available for the pre-crisis period. However, the firm American International Group, Inc., or AIG, alone had $88.4 billion in securities lending outstanding at the peak in 2007:Q3. See American International Group, Form 10-Q Quarterly Report for the Quarterly Period Ended September 30, 2007.

4-6. Nontraditional Liabilities of U.S. Life Insurers, by Liability Type



Note: The data are converted to constant 2018 dollars using the consumer price index and extend through 2018:Q2. FHLB is Federal Home Loan Bank.

Source: Bureau of Labor Statistics consumer price index via Haver Analytics and Federal Reserve Board staff estimates based on data from Bloomberg Finance LP; Moody's Analytics, Inc., CreditView, ABCP Program Index; Securities and Exchange Commission, Form 10-Q and 10-K; National Association of Insurance Commissioners, quarterly and annual statutory filings accessed via the S&P Global Market Intelligence Platform.

Central clearing of financial transactions has grown, providing financial stability benefits but warranting continued attention

Central clearing of derivatives and securities transactions has grown over the past several decades—both in absolute terms and relative to the size of financial markets. Since the financial crisis, global regulatory efforts have contributed to this growth by encouraging and, in some cases, mandating central clearing of over-the-counter derivatives. By some estimates, the percentage of such activity that is centrally cleared now exceeds 60 percent. Some of the growth in central clearing of both securities and derivatives transactions has also been driven by market participants' recognition of its benefits. Central clearing can improve financial stability by insulating firms from each other's default, by reducing financial firms' gross exposures through the netting of positions by central counterparties (CCPs), and by improving risk management. That said, some CCPs are large, concentrated, highly interconnected, and systemically important and warrant continued monitoring. CCPs reduce credit risk partly through the daily exchange of margin. Such practices, however, expose CCPs and their counterparties to liquidity risk that must be managed, especially when volatility rises or financial conditions deteriorate unexpectedly.

Near-term risks to the financial system

Developments in domestic and international markets could pose near-term risks to the U.S. financial system. The ultimate effects of shocks arising from such developments likely depend on the vulnerabilities in the financial system identified in the previous sections of this report.

Brexit and euro-area fiscal challenges pose risks for U.S. markets and institutions . . .

Large European economies have notable financial and economic linkages with the United States, and stresses emanating from Europe may pose risks for the U.S. financial system. Two of those risks are particularly salient now. First, the United Kingdom and the European Union (EU) have not yet ratified the terms for the U.K. March 2019 withdrawal from the EU, known as Brexit. Besides its extensive implications for trade and a host of other activities, Brexit calls for a significant reorganization of financial arrangements between U.K. and EU residents. Without a withdrawal agreement, there will be no transition period for European entities following the U.K. exit from the EU, and a wide range of economic and financial activities could be disrupted. Second, confidence in the euro area's fiscal and financial prospects remains sensitive to ongoing developments despite improvement since the 2010–12 sovereign debt crisis. Recently, Italy's new budget proposal, which includes a wider deficit projection than anticipated, is leading to concerns among market participants and EU officials that this plan would put Italy's sovereign debt on an unsustainable path. European banks are exposed to these fiscal risks as significant investors in euro-area sovereign bonds.

The potential consequences for the U.S. financial system from these European risks arise through several transmission channels. First, an intensification of sovereign debt concerns or unresolved uncertainty about the implications of Brexit could lead to market volatility and a sharp pullback of investors and financial institutions from riskier assets, as occurred following the June 2016 Brexit referendum in the United Kingdom and earlier during the European debt crisis. Second, spillover effects from U.K. and other European banks could be transmitted to the U.S. financial system directly through credit exposures as well as indirectly through the common participation of globally active banks in a broad range of activities and markets. Moreover, because London is an important international financial center, U.S. banks and broker-dealers participate in some of the markets most likely to be affected by Brexit. Third, an economic downturn in Europe, likely accompanied by dollar appreciation, would also affect the United States through trade channels, which could harm the creditworthiness of some U.S. firms, particularly exporters.

. . . and problems in China and other emerging market economies could spill over to the United States

In China, the pace of economic growth has been slowing recently, and years of rapid credit expansion have left lenders more exposed in the event of a slowdown. Chinese nonfinancial

private credit has almost doubled since 2008, to more than 200 percent of GDP. Against this backdrop, developments that significantly strain the repayment capacity of Chinese borrowers and financial intermediaries—including an escalation in international trade disputes or a collapse in Chinese real estate prices—could trigger adverse dynamics.

A number of other emerging market economies (EMEs) have also seen significant increases in either corporate or sovereign debt that could be difficult to service in the event of an economic downturn. For some borrowers, much of this debt is denominated in foreign currencies, so as monetary policy normalizes in the United States and in other advanced economies, EMEs may be vulnerable to rising global interest rates or to stronger advanced-economy currencies. Although the recent market turbulence faced by Argentina and Turkey in part reflects higher vulnerabilities in those countries, if global interest rates rose faster than currently anticipated or if other shocks hit the global economy, wider stress in EMEs could occur.

Should significant problems arise in China or in EMEs more broadly, spillovers, including dollar appreciation, declines in world trade and commodity prices, and a pullback from risk-taking by investors outside the affected markets, could be sizable. In addition, the effect of a stronger dollar and weaker foreign economies on trade could affect the creditworthiness of U.S. firms, particularly exporters and commodity producers.

Trade tensions, geopolitical uncertainty, or other developments could make investors more averse, in general, to taking risks

An escalation in trade tensions, geopolitical uncertainty, or other adverse shocks could lead to a decline in investor appetite for risks in general. The resulting drop in asset prices might be particularly large, given that valuations appear elevated relative to historical levels. In addition to generating losses for asset holders, a significant fall in asset prices would make it more costly for nonfinancial businesses to obtain funding, putting pressure on a sector where leverage is already high. Markets and institutions that may have become accustomed to the very low interest rate environment of the post-crisis period will also need to continue to adjust to monetary policy normalization by the Federal Reserve and other central banks. Even if central bank policies are fully anticipated by the public, some adjustments could occur abruptly, contributing to volatility in domestic and international financial markets and strains in institutions.

The banking sector is resilient, however, as evidenced by high levels of capital and liquidity. Moreover, stress tests conducted by the Federal Reserve on the largest banks routinely feature large declines in asset prices, suggesting that those institutions are positioned to weather asset price changes without having to significantly pull back on their lending activities. The broader financial system is also substantially more resilient, with less leverage and funding risk than leading up to the financial crisis, so these sources of vulnerability are less likely to amplify the effects of falling asset prices.

Board of Governors of the Federal Reserve System
www.federalreserve.gov
1118