Financial Stability Report

May 2023

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM

The Federal Reserve System is the central bank of the United States. It performs five key functions to promote the effective operation of the U.S. economy and, more generally, the public interest.

The Federal Reserve

- **conducts the nation's monetary policy** to promote maximum employment and stable prices in the U.S. economy;
- **promotes the stability of the financial system** and seeks to minimize and contain systemic risks through active monitoring and engagement in the U.S. and abroad;
- **promotes the safety and soundness of individual financial institutions** and monitors their impact on the financial system as a whole;
- **fosters payment and settlement system safety and efficiency** through services to the banking industry and the U.S. government that facilitate U.S.-dollar transactions and payments; and
- **promotes consumer protection and community development** through consumer-focused supervision and examination, research and analysis of emerging consumer issues and trends, community economic development activities, and administration of consumer laws and regulations.

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Contents

Note: This report generally reflects information that was available as of April 21, 2023.

Purpose and Framework

This report presents the Federal Reserve Board's current assessment of the stability of the U.S. financial system. By publishing this report, the Board intends to promote public understanding by increasing transparency around, and creating accountability for, the Federal Reserve's views on this topic. Financial stability supports the objectives assigned to the Federal Reserve, including full employment and stable prices, a safe and sound banking system, and an efficient payments system.

A financial system is considered stable when banks, other lenders, and financial markets are able to provide households, communities, and businesses with the financing they need to invest, grow, and participate in a well-functioning economy—and can do so even when hit by adverse events, or "shocks."

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 are inherently difficult to predict, while vulnerabilities, which are the aspects of the financial system that would exacerbate stress, can be monitored as they build up or recede over time. As a result, the framework focuses primarily on assessing vulnerabilities, with an emphasis on four broad categories and how those categories might interact to amplify stress in the financial system.[1]

More on the Federal Reserve's Monitoring Efforts

See the Financial Stability section of the Federal Reserve Board's website for more information on how the Federal Reserve monitors the stability of the U.S. and world financial systems.

The website includes:

- a more detailed look at our monitoring framework for assessing risk in each category;
- more data and research on related topics;
- information on how we coordinate, cooperate, and otherwise take action on financial system issues; and
- public education resources describing the importance of our efforts.

1. **Valuation pressures** arise when asset prices are high relative to economic fundamentals or historical norms. These developments are often driven by an increased willingness of investors to take on risk. As such, elevated valuation pressures may increase the possibility of outsized drops in asset prices (see Section 1, Asset Valuations).

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

2. Excessive **borrowing by businesses and households** exposes the borrowers to distress if their incomes decline or the assets they own fall in value. In these cases, businesses and households with high debt burdens may need to cut back spending, affecting economic activity and causing losses for investors (see Section 2, Borrowing by Businesses and Households).
3. Excessive **leverage within the financial sector** increases the risk that financial institutions will not have the ability to absorb losses without disruptions to their normal business operations when hit by adverse shocks. In those situations, institutions will be forced to cut back lending, sell their assets, or even shut down. Such responses can impair credit access for households and businesses, further weakening economic activity (see Section 3, Leverage in the Financial Sector).
4. **Funding risks** expose the financial system to the possibility that investors will rapidly withdraw their funds from a particular institution or sector, creating strains across markets or institutions. 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 those funds in assets that are hard to sell quickly or have a long maturity. This liquidity and maturity transformation can create an incentive for investors to withdraw funds quickly in adverse situations. Facing such withdrawals, financial institutions may need to sell assets quickly at "fire sale" prices, thereby incurring losses and potentially becoming insolvent, as well as causing additional price declines that can create stress across markets and at other institutions (see Section 4, Funding Risks).

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 spread through the U.S. financial system, given our current assessment of vulnerabilities.

While this framework provides a systematic way to assess financial stability, some potential risks may be novel or difficult to quantify and therefore are not captured by the current approach. Given these complications, we 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 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 the aftermath of the 2007–09 financial crisis, these actions have included requirements for more and higher-quality capital, an innovative stress-testing regime, and new liquidity regulations applied to the largest banks in the United States. In addition, the Federal Reserve's assessment of financial vulnerabilities informs decisions regarding the countercyclical capital buffer (CCyB). 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

This report reviews conditions affecting the stability of the U.S. financial system by analyzing vulnerabilities related to valuation pressures, borrowing by businesses and households, financial-sector leverage, and funding risks. It also highlights several near-term risks that, if realized, could interact with these vulnerabilities.

Since the November 2022 *Financial Stability Report* was released, Silicon Valley Bank (SVB), Signature Bank, and First Republic Bank failed following substantial deposit outflows prompted by concerns over poor management of interest rate risk and liquidity risk. In March, to prevent broader spillovers in the banking system, the Federal Reserve, together with the Federal Deposit

Overview of financial system vulnerabilities

Asset valuations

- Yields on Treasury securities declined across all maturities in March amid heightened financial market volatility.
- Risk premiums in equity and corporate bond markets continued to be near the middle of their historical distributions.
- Real estate valuations remained very elevated even though activity weakened. Both house prices and commercial property prices have shown recent declines.

Borrowing by businesses and households

- The ratio of total private debt to gross domestic product (GDP) edged down but was still at a moderate level.
- The business debt-to-GDP ratio remained at a high level, but debt issuance by the riskiest companies slowed markedly. Interest coverage ratios for publicly traded firms declined a bit from historically high levels.
- Household debt remained at modest levels relative to GDP and was concentrated among prime-rated borrowers.

Leverage in the financial sector

- Poor management of interest rate risk and liquidity risk contributed to three sizable bank failures since March 2023. Concerns over broader spillovers in the banking sector led to official interventions by the Federal Reserve, the Federal Deposit Insurance Corporation, and the U.S. Department of Treasury.
- Broker-dealer leverage rested near historically low levels. The limited willingness and ability of dealers to intermediate during times of distress can amplify volatility.
- Hedge fund leverage remained elevated. Bank lending to nonbank financial institutions stabilized at high levels.

Funding risks

- Some banks experienced notable funding strains following the failures of Silicon Valley Bank and Signature Bank. The actions by the official sector reduced funding strains in the banking system.
- Structural vulnerabilities persisted at money market funds, other cash-management vehicles, and stablecoins. Certain types of mutual funds continued to be susceptible to large redemptions.
- Liquidity risks for life insurers remained elevated as the share of illiquid and risky assets continued to edge up.

Insurance Corporation (FDIC) and the Department of the Treasury, took decisive actions to protect bank depositors and support the continued flow of credit to households and businesses. Owing to these actions and the resilience of the banking and financial sector, financial markets normalized, and deposit flows have stabilized since March, although some banks that experienced large deposit outflows continued to experience stress. These developments may weigh on credit conditions going forward.

A summary of the developments in the four broad categories of vulnerabilities since the last report is as follows:

1. **Asset valuations.** Yields on Treasury securities declined in March amid heightened financial market volatility. Measures of equity prices relative to expected earnings were volatile over the period but remained above their historical median, while risk premiums in corporate bond markets stayed near the middle of their historical distributions. Valuations in residential real estate remained elevated despite weakening activity. Similarly, commercial real estate (CRE) valuations remained near historically high levels, even as price declines have been widespread across CRE market segments (see Section 1, Asset Valuations).
2. **Borrowing by businesses and households.** On balance, vulnerabilities arising from borrowing by nonfinancial businesses and households were little changed since the November report and remained at moderate levels. Business debt remained elevated relative to gross domestic product (GDP), and measures of leverage remained in the upper range of their historical distributions, although there are indications that business debt growth began to slow toward the end of last year. Measures of the ability of firms to service their debt stayed high. Household debt remained at modest levels relative to GDP, and most of that debt is owed by households with strong credit histories or considerable home equity (see Section 2, Borrowing by Businesses and Households).
3. **Leverage in the financial sector.** Concerns over heavy reliance on uninsured deposits, declining fair values of long-duration fixed-rate assets associated with higher interest rates, and poor risk management led market participants to reassess the strength of some banks (discussed in the box "The Bank Stresses since March 2023"). Overall, the banking sector remained resilient, with substantial loss-absorbing capacity. Broker-dealer leverage remained historically low. Leverage at life insurance companies edged up but stayed below its pandemic peak. Hedge fund leverage remained elevated, especially for large hedge funds (see Section 3, Leverage in the Financial Sector).
4. **Funding risks.** Substantial withdrawals of uninsured deposits contributed to the failures of SVB, Signature Bank, and First Republic Bank and led to increased funding strains for some other banks, primarily those that relied heavily on uninsured deposits and had substantial interest rate risk exposure. Policy interventions by the Federal Reserve and other agencies helped mitigate these strains and limit the potential for further stress (discussed in the box

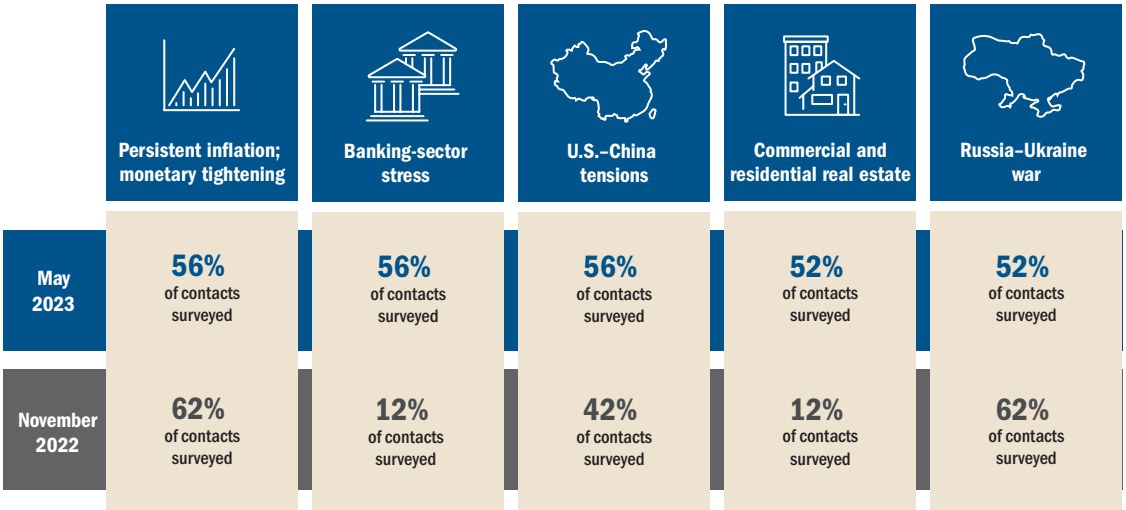
"The Federal Reserve's Actions to Protect Bank Depositors and Support the Flow of Credit to Households and Businesses"). Overall, domestic banks have ample liquidity and limited reliance on short-term wholesale funding. Structural vulnerabilities remained in short-term funding markets. Prime and tax-exempt money market funds (MMFs), as well as other cash-investment vehicles and stablecoins, remained vulnerable to runs. Certain types of bond and loan funds experienced outflows and remained susceptible to large redemptions, as they hold securities that can become illiquid during periods of stress. Life insurers continued to have elevated liquidity risks, as the share of risky and illiquid assets remained high (see Section 4, Funding Risks).

This report also discusses potential near-term risks based in part on the most frequently cited risks to U.S. financial stability as gathered from outreach to a wide range of researchers, academics, and market contacts conducted from February to April (discussed in the box "Survey of Salient Risks to Financial Stability"). Frequently cited topics in this survey included persistent inflation and tighter monetary policy, banking-sector stress, commercial and residential real estate, and geopolitical tensions. The box "Transmission of Stress Abroad to the U.S. Financial System" describes how financial stresses abroad can spill over to the U.S. financial system.

Finally, the report contains additional boxes that analyze salient topics related to financial stability: "Update on the Transition to the Secured Overnight Financing Rate," "Financial Institutions' Exposure to Commercial Real Estate Debt," and "Financial Stability Risks from Private Credit Funds Appear Limited."

Survey of salient risks to the U.S. financial system

Survey respondents cited several risks to the U.S. financial system. For more information, see the box "Survey of Salient Risks to Financial Stability."



1 | Asset Valuations

Asset valuation pressures remained moderate despite notable fluctuations in financial markets

Since the November report, significant strains in the banking sector, along with increased uncertainty about the economic outlook and the path of monetary policy, led to notable fluctuations in financial asset prices. Yields on Treasury securities declined across all maturities. Broad equity indexes were volatile but have increased, on net, since the previous report. Corporate credit spreads were moderately lower, on net, and near their historical averages.

Liquidity in short-term Treasury markets experienced notable strains associated with the high volatility and elevated uncertainty that roiled financial markets in the middle of March, while equity and corporate bond markets also saw liquidity deteriorate during that period. Despite these worsened liquidity conditions, market functioning proved largely resilient.

As has been the case for some time now, valuation pressures remained elevated in property markets. In residential real estate, valuations remained near all-time highs despite weakening activity and falling prices in recent months. Valuations in the commercial segment also remained near historical highs even though price declines have been widespread. In addition, fundamentals have weakened, particularly for the office segment. Farmland prices were also historically elevated relative to rents, reflecting higher crop prices and limited inventories of land.

Table 1.1 shows the sizes of the asset markets discussed in this section. The largest asset markets are those for residential real estate, equities, Treasury securities, and CRE.

Treasury yields declined sharply following the Silicon Valley Bank and Signature Bank failures, particularly for shorter-maturity securities

On net, yields on Treasury securities moved lower since the November report (figure 1.1). However, the monthly averages plotted in the figure obscure some important daily movements during the month of March. Throughout February and into early March, the yields on Treasury securities moved notably higher following stronger-than-expected economic data but abruptly reversed course following the failures of SVB and Signature Bank. These failures raised uncertainty about the economic outlook and future path of interest rates, prompting investors to reallocate portfolios toward safer assets. The market for two-year Treasury securities was most acutely affected, with the two-year yield falling by more than 60 basis points on March 13, the single largest daily decline since 1987. Yields on longer-term Treasury securities also declined in March, but by a smaller amount.

Table 1.1. Size of selected asset markets

Item	Outstanding (billions of dollars)	Growth, 2021:Q4–2022:Q4 (percent)	Average annual growth, 1997–2022:Q4 (percent)
Residential real estate	55,670	10.4	6.4
Equities	46,819	−21.0	8.7
Treasury securities	23,845	5.7	8.1
Commercial real estate	23,796	−1.4	6.8
Investment-grade corporate bonds	7,116	4.8	8.1
Farmland	3,188	10.1	5.7
High-yield and unrated corporate bonds	1,677	−6.6	6.6
Leveraged loans*	1,424	6.2	13.9
Price growth (real)			
Commercial real estate**		−1.9	3.1
Residential real estate***		.3	2.5

Note: The data extend through 2022:Q4. Growth rates are measured from Q4 of the year immediately preceding the period through Q4 of the final year of the period. Equities, real estate, and farmland are at nominal market value; bonds and loans are at nominal book value.

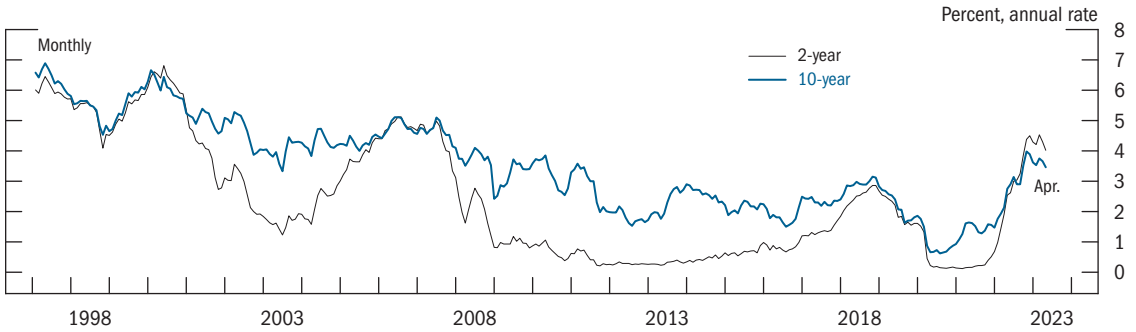
* The amount outstanding shows institutional leveraged loans and generally excludes loan commitments held by banks. For example, lines of credit are generally excluded from this measure. Average annual growth of leveraged loans is from 2000 to 2022:Q4, as this market was fairly small before then.

** One-year growth of commercial real estate prices is from December 2021 to December 2022, and average annual growth is from 1998:Q4 to 2022:Q4. Both growth rates are calculated from equal-weighted nominal prices deflated using the consumer price index (CPI).

*** One-year growth of residential real estate prices is from December 2021 to December 2022, and average annual growth is from 1997:Q4 to 2022:Q4. Nominal prices are deflated using the CPI.

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

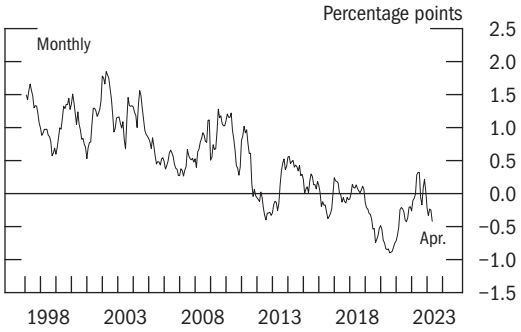
Figure 1.1. Nominal Treasury yields fell in March and April



Source: Federal Reserve Board, Statistical Release H.15, "Selected Interest Rates."

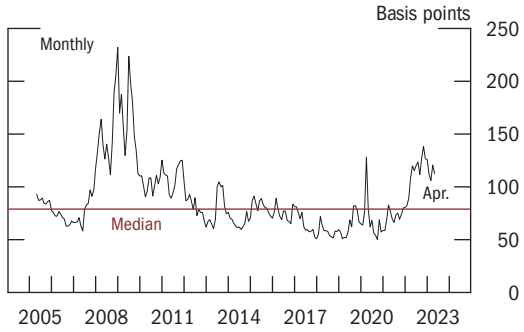
A model-based estimate of the nominal Treasury term premium—a measure of the compensation that investors require to hold longer-term Treasury securities rather than shorter-term ones—remained low relative to its long-run history (figure 1.2). Treasury market volumes, particularly in the on-the-run segment, increased dramatically in March as well. Interest rate volatility implied by options remained well above its historical median (figure 1.3).

Figure 1.2. An estimate of the nominal Treasury term premium remained low



Source: Department of the Treasury; Wolters Kluwer, Blue Chip Financial Forecasts; Federal Reserve Bank of New York; Federal Reserve Board staff estimates.

Figure 1.3. Interest rate volatility remained above its long-term median

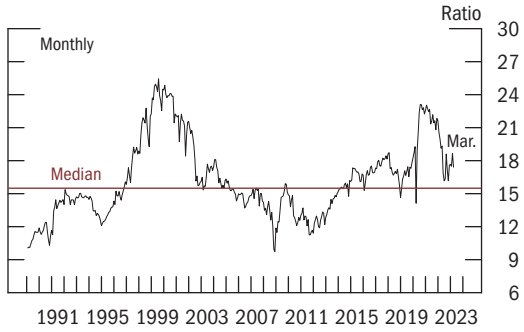


Source: For data through July 13, 2022, Barclays Trading and IHS Markit; for data from July 14, 2022, onward, ICAP, Swaptions and Interest Rate Caps and Floors Data.

Equity market valuation pressures increased modestly

Equity prices in the banking sector fell following the SVB and Signature Bank failures to levels well below those that prevailed at the time of the November report. Broad equity indexes experienced considerable volatility but, smoothing through the ups and downs, were up a bit from the previous report. All told, equity market valuation pressures increased modestly since the November report as equity price growth outpaced growth in earnings forecasts, pushing the forward price-to-earnings ratio higher to a level notably above its historical average (figure 1.4).

Figure 1.4. The price-to-earnings ratio of S&P 500 firms continued to be above its historical median

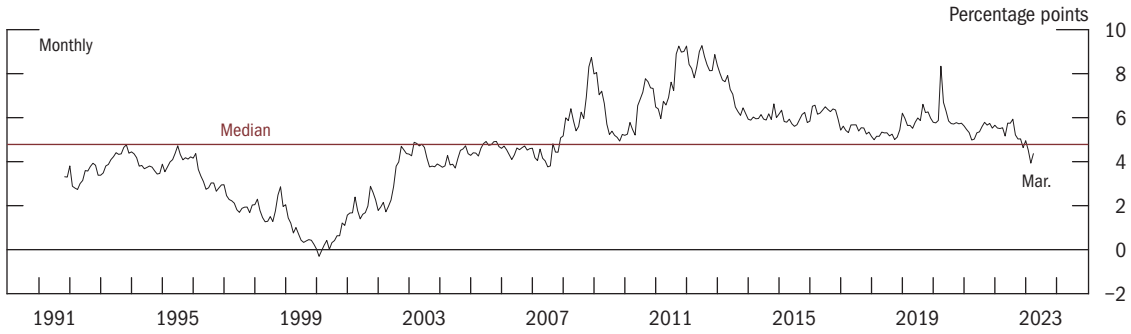


Source: Federal Reserve Board staff calculations using Refinitiv, Institutional Brokers' Estimate System.

An estimate of the expected equity premium—one measure of the additional return that investors require for holding stocks relative to risk-free bonds—declined since the November report to somewhat below its

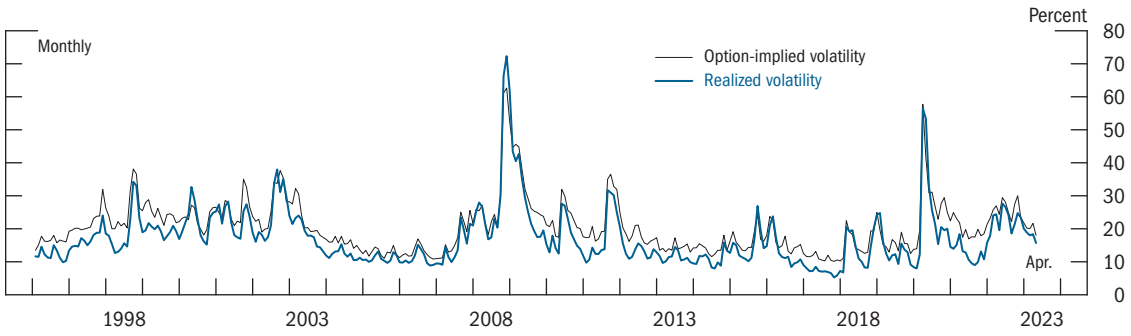
historical median (figure 1.5).[2] Equity market volatility remained elevated during the first quarter of 2023, reflecting strains in the banking system and continued uncertainty around monetary policy and future economic conditions, but fell to near its historical median in April (figure 1.6).

Figure 1.5. An estimate of the equity premium fell below its historical median



Source: Federal Reserve Board staff calculations using Refinitiv (formerly Thomson Reuters), Institutional Brokers' Estimate System; Department of the Treasury; Federal Reserve Bank of Philadelphia, Survey of Professional Forecasters.

Figure 1.6. Volatility in equity markets remained elevated



Source: Refinitiv, DataScope Tick History; Federal Reserve Board staff estimates.

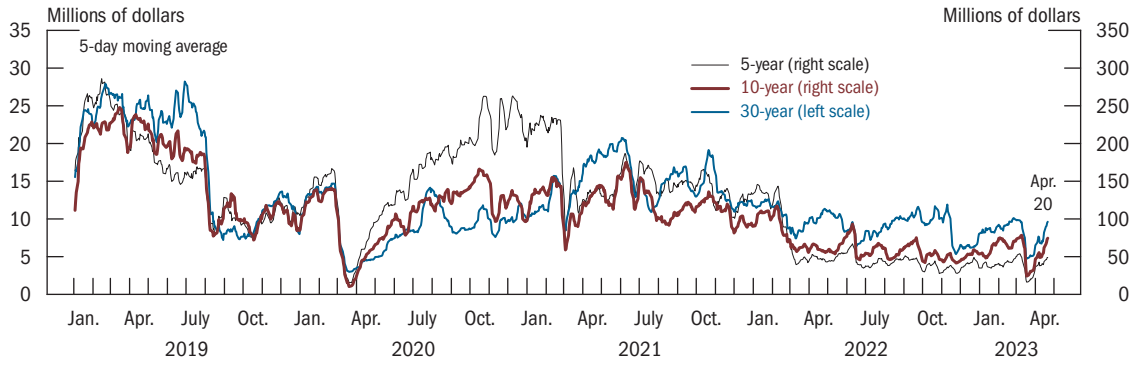
Market liquidity worsened in key markets amid heightened uncertainty

Market liquidity refers to the ease and cost of buying and selling an asset. Low liquidity can amplify the volatility of asset prices and result in larger price moves in response to shocks. In extreme cases, low liquidity can threaten market functioning, leading to a situation in which participants are unable to trade without incurring a significant cost.

[2] This estimate is constructed based on expected corporate earnings for 12 months ahead. Alternative measures of the equity premium that incorporate longer-term earnings forecasts suggest more elevated equity valuation pressures.

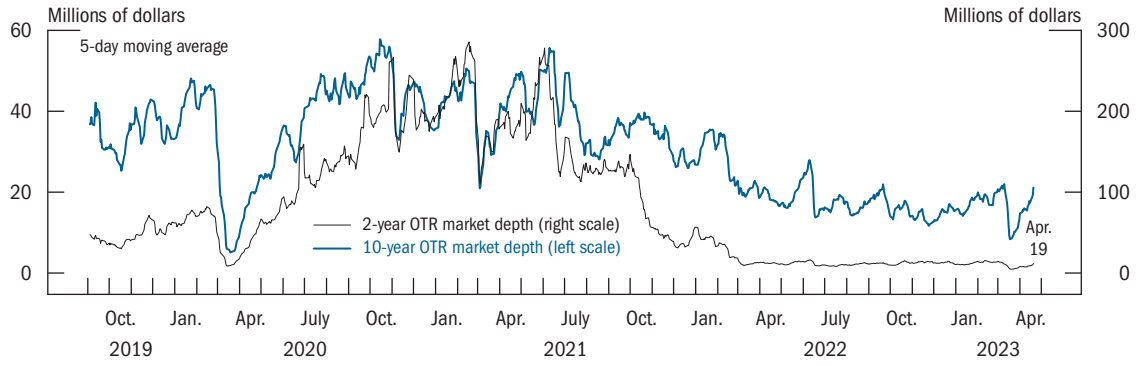
Liquidity conditions in the market for Treasury securities are particularly important due to the key role those securities play in the financial system. Throughout much of last year and into early 2023, various measures of liquidity—the average size of bid and ask orders posted on electronic platforms at the best prices ("market depth") and bid-ask spreads—indicated that liquidity in the Treasury market was lower and less resilient than is typical.[3] Market liquidity conditions came under even greater strain as a result of distress in the banking sector. Market depth in on-the-run Treasury securities, normally the most liquid segment, fell substantially in mid-March (figures 1.7 and 1.8), and bid-ask spreads rose marketwide, with particularly notable increases for shorter-maturity notes. Further, the intraday volatility of bid-ask spreads on short-maturity securities rose to levels last seen in March 2020.[4] These additional liquidity strains in March 2023 appeared to

Figure 1.7. Treasury market depth remained below historical norms



Source: Inter Dealer Broker Community.

Figure 1.8. On-the-run market depth worsened in March then recovered



Source: BrokerTec; Federal Reserve Board staff calculations.

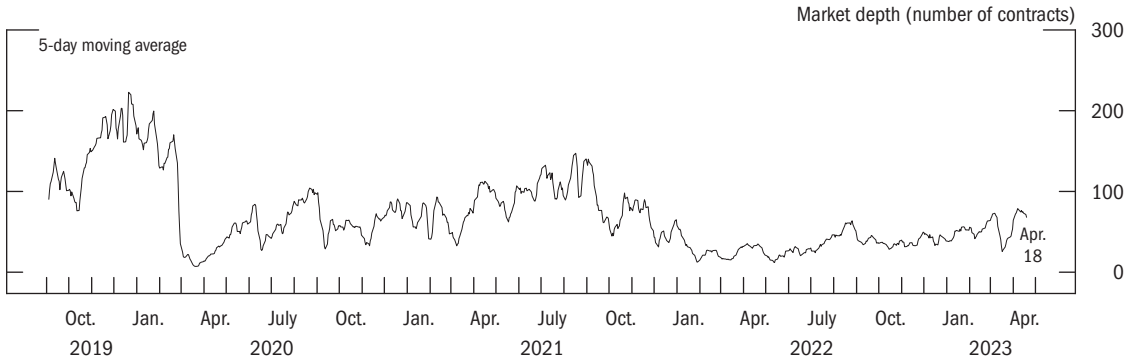
[3] The bid-ask spread is the difference between the best "bid" quote to buy an asset and the best "ask" quote to sell that asset; smaller bid-ask spreads indicate lower trading costs and, hence, more liquid markets.

[4] For further discussions about the liquidity risks posed by volatile bid-ask spreads, see Dobrislav Dobrev and Andrew Meldrum (2020), "What Do Quoted Spreads Tell Us about Machine Trading at Times of Market Stress? Evidence from Treasury and FX Markets during the COVID-19-Related Market Turmoil in March 2020," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, September 25), https://doi.org/10.17016/2380-7172.2748.

be a consequence of the elevated interest rate volatility that followed the heightened uncertainty around the future economic outlook and path of monetary policy. Despite these strains, Treasury markets continued to function throughout the episode without severe dislocations or reports of investors being unable to transact. By early April, the most acute strains had dissipated, and liquidity conditions in Treasury markets returned to the levels that prevailed for much of the past year.

Liquidity deteriorated in a range of other markets in March as well. Bid-ask spreads on corporate bonds widened, particularly for investment-grade financial bonds, although these spreads remained well below pandemic levels. In equity markets, depth in the S&P 500 futures markets declined before stabilizing at below-average levels (figure 1.9). Equity and corporate bond market functioning remained largely smooth despite the rising transaction costs associated with lower liquidity, and liquidity conditions normalized by early April.

Figure 1.9. A measure of liquidity in equity markets fell sharply in March



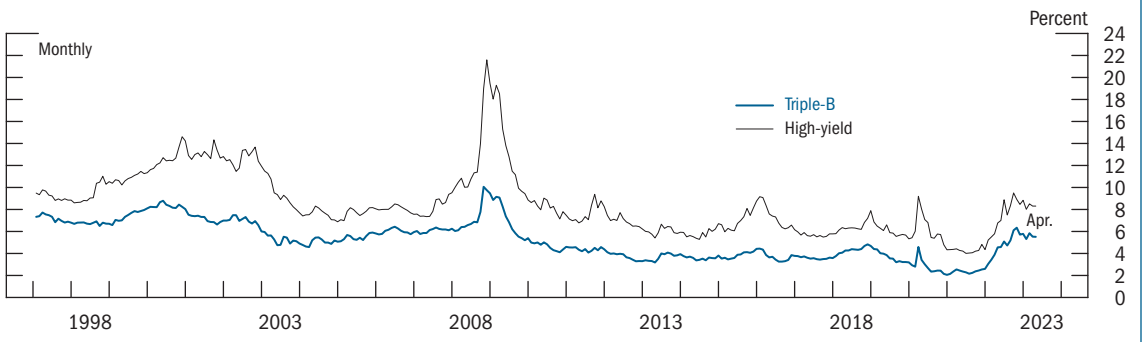
Source: Refinitiv, DataScope Tick History; Federal Reserve Board staff calculations.

Corporate debt market valuations remained near their historical averages

Yields on corporate bonds fell since the November report and by more than yields on comparable-maturity Treasury securities (figure 1.10). Consequently, corporate bond spreads, measured as the difference in yields between corporate bonds and comparable-maturity Treasury securities, were moderately lower since November and near their historical average levels (figure 1.11). The excess bond premium—a measure that captures the gap between corporate bond spreads and expected credit losses—has remained near its historical average (figure 1.12).

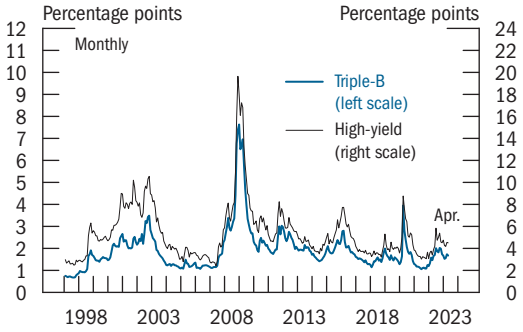
Valuation pressures in leveraged loan markets were little changed from the November report. The average spread on leveraged loans above their benchmark rates in the secondary market declined moderately and was near its average over the past decade (figure 1.13). The excess loan

Figure 1.10. Corporate bond yields fell to near their historical averages



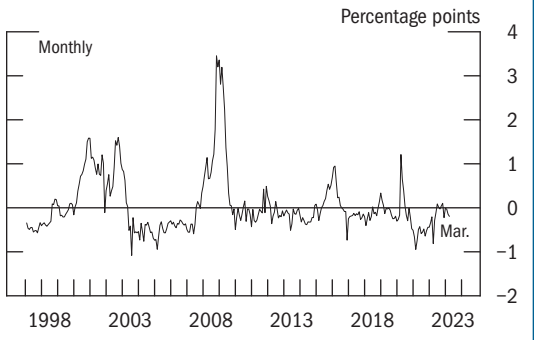
Source: ICE Data Indices, LLC, used with permission.

Figure 1.11. Spreads to similar-maturity Treasury securities edged down



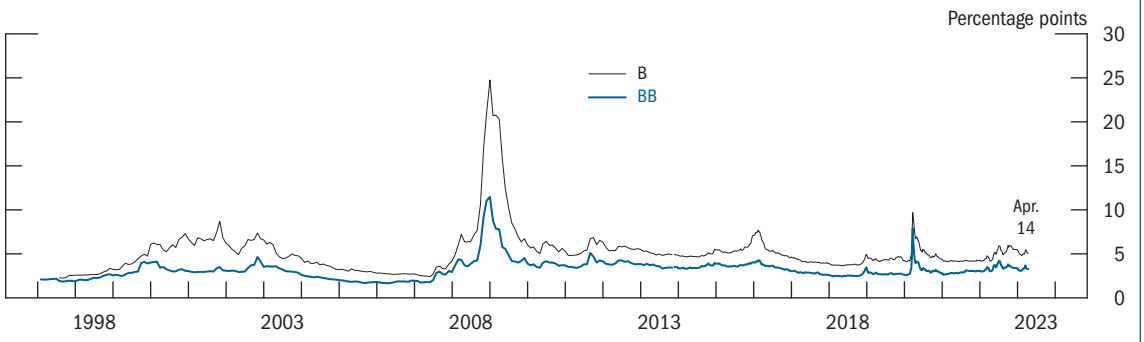
Source: ICE Data Indices, LLC, used with permission.

Figure 1.12. The excess bond premium stayed near its historical average



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 Database, Wharton Research Data Services; S&P Global, Compustat.

Figure 1.13. Spreads in the leveraged loan market fell modestly



Source: PitchBook Data, Leveraged Commentary & Data.

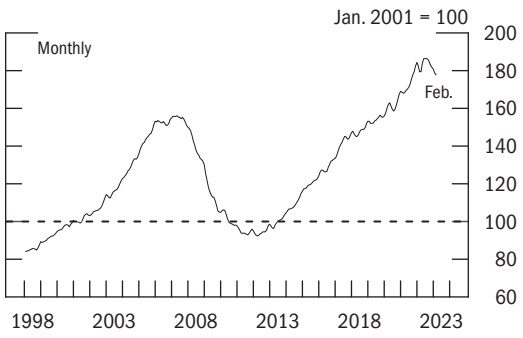
premium, a measure of the risk premium in leveraged loans, increased notably during March and remained at an elevated level, indicating subdued investor risk appetite. The trailing 12-month loan default rate increased moderately but remained somewhat below its historical median, while the year-ahead expected default rate rose moderately, suggesting a mild deterioration of the credit quality of leveraged loan borrowers and a worsening outlook.

The transition away from LIBOR as the benchmark rate in the leveraged loan market was nearly complete, with almost all new leveraged loan activity being conducted using the Secured Overnight Financing Rate (SOFR) (see the box "Update on the Transition to the Secured Overnight Financing Rate").

Commercial real estate prices declined, but valuations remained high

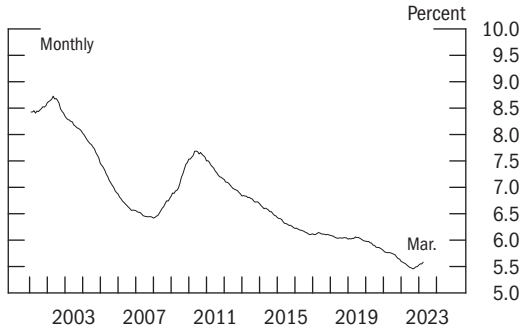
Valuation pressures in the CRE sector have eased slightly since the November report but remained at high levels. Aggregate CRE prices measured in inflation-adjusted terms have declined (figure 1.14). These prices are based on repeat sales and may mask growing weaknesses, as more distressed properties are generally less likely to trade. Capitalization rates at the time of property purchase, which measure the annual income of commercial properties relative to their prices, have turned up modestly from their historically low levels (figure 1.15). While price declines were widespread across all property types, fundamentals in the office sector were particularly weak for offices in central business districts, with vacancy rates increasing further and rent growth declining since the November report. In the January 2023 Senior Loan Officer Opinion Survey (SLOOS), banks reported weaker demand and tighter standards for all CRE loan categories over

Figure 1.14. Commercial real estate prices, adjusted for inflation, declined



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

Figure 1.15. Income of commercial properties relative to prices turned up but remained near historically low levels



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.

Box 1.1. Update on the Transition to the Secured Overnight Financing Rate

The banks contributing to the U.S. dollar (USD) LIBOR rates are due to end their submissions after June 30, 2023, marking the end of LIBOR as a representative benchmark. The transitions from the euro, Swiss franc, Japanese yen, and sterling LIBOR rates, which ended last year, went smoothly, but the transition from USD LIBOR poses particular risks because of the very large exposures to these rates both domestically and abroad. The Alternative Reference Rates Committee (ARRC) has estimated that USD LIBOR is used in $74 trillion of financial contracts maturing after June 2023, and it is also used extensively in nonfinancial contracts.

New activity

Following guidance issued by the Federal Reserve, FDIC, and Office of the Comptroller of the Currency warning that most new use of USD LIBOR in contracts after 2021 would create safety and soundness risks, almost all new transactions have moved to SOFR. Adjustable-rate retail mortgage originations and almost all floating-rate debt issuance are now based on SOFR, and SOFR represents more than 90 percent of risk traded in new derivatives activity. Although SOFR just began publication in 2018, there are now more than $60 trillion of SOFR derivatives and $4 trillion in SOFR loans and debt instruments outstanding.

While most new derivatives, floating-rate debt, and consumer products reference SOFR or averages of SOFR directly, the bulk of new lending activity has moved to term SOFR rates. The term SOFR rates are forward-looking benchmarks with 1-, 3-, 6- , and 12-month maturities similar to LIBOR. They are derivatives products based on futures markets for SOFR rather than drawing directly from transactions in the Treasury repurchase agreement (repo) market that overnight SOFR is based on and, thus, depend on the continued high level of transaction depth in overnight SOFR futures and other derivatives markets in order to be robustly produced.

Recently, CME Group, the administrator of the term SOFR rates, has moved to explicitly incorporate limits on the use of its rates that mirror the ARRC's recommendations in its licensing agreements, which should help ensure that use of these rates remains in line with financial stability considerations. The FSOC and Financial Stability Board have both recognized the use of these types of term rates in legacy LIBOR cash products and some business loans but have warned against more widespread use. In line with these recommendations, the ARRC has recognized the use of term SOFR rates as a fallback in legacy cash products and certain new issuances of cash products, particularly business loans, but has recommended that use of term SOFR rates in derivatives and most other cash markets remain limited.

Legacy products

In December, the Board issued its final rule implementing the Adjustable Interest Rate (LIBOR) Act (LIBOR Act). The LIBOR Act directed the Board to select spread-adjusted benchmark replacements based on SOFR for LIBOR contracts that mature after June 30, 2023, and do not have clear and practicable fallback language. While the International Swaps and Derivatives Association and the ARRC have worked over the past several years to develop and encourage the use of fallback language that adequately addresses the impending cessation of LIBOR, many older contracts only have fallbacks appropriate for a temporary outage of LIBOR rather than its permanent cessation, and some contracts do not have any fallbacks at all. This is a particular problem for legacy floating-rate debt, securitizations, and consumer products, all of which are difficult to amend. The Board's final rule will replace (or allow for the replacement of) LIBOR in these products with spread-adjusted versions of CME Group's term SOFR rates or averages of SOFR following June 30, 2023.

(continued)

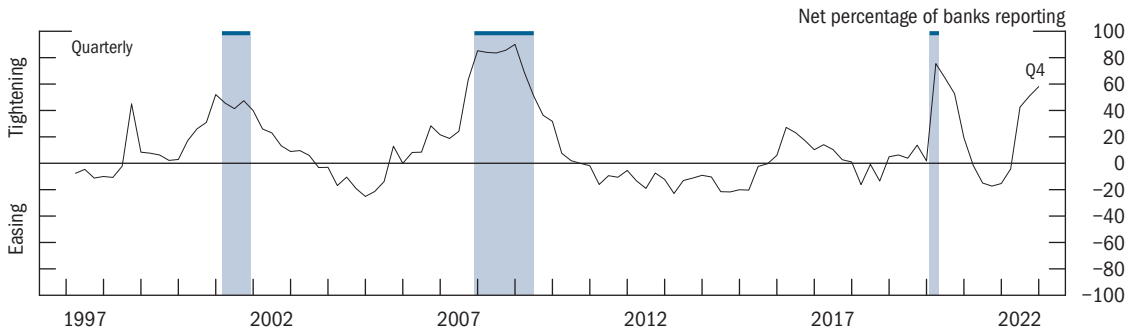
Box 1.1—*continued*

While the banks submitting to the remaining USD LIBOR rate panel will withdraw as of June 30, 2023, the U.K. Financial Conduct Authority (FCA) has announced that it will require the administrator of LIBOR to continue publishing 1-, 3-, and 6-month USD LIBOR on a "synthetic" basis for an additional 15 months, through September 2024. The FCA has stated that these synthetic LIBOR rates will be nonrepresentative, meaning that, in the FCA's official judgement, they will not reflect the underlying market that LIBOR was intended to represent. The FCA has also stated that it intends the publication of these synthetic rates to help the transition of legacy contracts not subject to U.S. law and therefore not covered by the LIBOR Act. The synthetic version of USD LIBOR will be published as LIBOR but would match the spread-adjusted term SOFR rates that the Board has selected under the LIBOR Act as the benchmark replacement rate applicable to most nonconsumer cash products. Most contracts under U.S. law will not be affected by the publication of these synthetic rates either because they have more recent fallback language designed to move away from LIBOR once it is declared to be nonrepresentative or because they are covered by the LIBOR Act. Nonetheless, there are some contracts issued under U.S. law that would fall back to a non-LIBOR rate (and so are not covered by the LIBOR Act) that may reference the synthetic LIBOR rates, primarily older loan agreements that otherwise would fall back to the prime rate (which is much higher than LIBOR) if LIBOR is unavailable.

LCH and CME Group are implementing plans to convert outstanding LIBOR derivatives that they clear to SOFR over April and May 2023. The Board has encouraged banks to similarly remediate their LIBOR loans ahead of June 30, 2023, where feasible, citing operational risks that could arise from attempting to convert a large book of LIBOR loans in a short period of time following June 2023. While firms have set deadlines to complete the remediation of their outstanding LIBOR loans ahead of June 30, 2023, there are risks that they will fall behind schedule. Progress in remediating syndicated leveraged loans, which can require consent or nonobjection from a majority of the lenders—in many cases including nonbank financial institutions (NBFIs)—has been particularly slow, although there have been recent signs that the pace of remediation may be increasing. Many firms had planned to use refinancing as an opportunity to move these loans off of LIBOR, but refinancing activity has declined over the past year. Securities cannot easily be remediated ahead of the June 30, 2023, deadline, but the ARRC and FSOC have encouraged issuers and other relevant parties to use the Depository Trust and Clearing Corporation's LIBOR Replacement Index Communication Tool in order to inform investors about the rate changes that will take effect after June 2023.

the fourth quarter of 2022 (figure 1.16). The box "Financial Institutions' Exposure to Commercial Real Estate Debt" offers more detail on where losses might arise in the event of a significant correction in CRE prices.

Figure 1.16. Banks reported tightening lending standards in commercial real estate loans

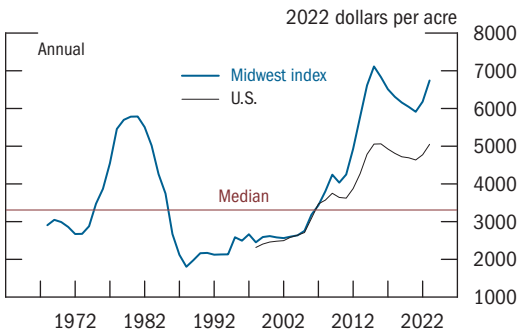


Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices; Federal Reserve Board staff calculations.

Farmland valuations remained at high levels

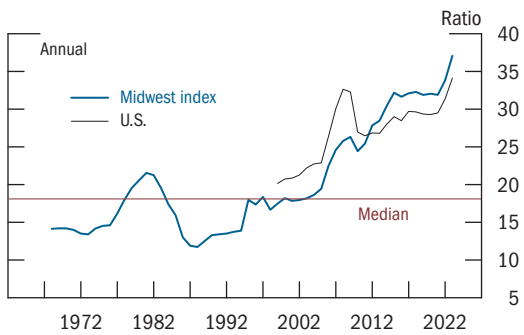
Farmland prices were near the peak values of their historical distribution, remaining unchanged since the November report (figure 1.17). Similarly, the ratios of farmland prices to rents remained historically high (figure 1.18). These high valuations were driven by strong agricultural commodity prices, limited inventory of farmland, and significant increases in cropland revenues that had more than offset higher operating costs.

Figure 1.17. Farmland prices reached near historical highs



Source: Department of Agriculture; Federal Reserve Bank of Minneapolis staff calculations.

Figure 1.18. Farmland prices grew faster than rents



Source: Department of Agriculture; Federal Reserve Bank of Minneapolis staff calculations.

Box 1.2. Financial Institutions' Exposure to Commercial Real Estate Debt

The shift toward telework in many industries has dramatically reduced demand for office space, which could lead to a correction in the values of office buildings and downtown retail properties that largely depend on office workers. Moreover, the rise in interest rates over the past year increases the risk that CRE mortgage borrowers will not be able to refinance their loans when the loans reach the end of their term. With CRE valuations remaining elevated (see Section 1, Asset Valuations), the magnitude of a correction in property values could be sizable and therefore could lead to credit losses by holders of CRE debt.[1] This discussion presents data on the exposures of various financial institutions to CRE mortgage debt, focusing on nonfarm nonresidential properties (a diverse category that includes office buildings, hotels, retail stores, and warehouses) and the construction and land development loans associated with these property types.[2]

Table A shows the dollar volume of nonfarm nonresidential CRE loans outstanding held by different categories of financial institutions. Banks hold about 60 percent of these CRE loans, of which more than two-thirds are held by banks other than Category I–IV banks.[3] Insurance companies and holders of commercial mortgage-backed securities (CMBS) also have significant exposures to CRE mortgages. Insurance companies hold higher-rated tranches of CMBS and shares of equity real estate investment trusts (REITs) that own CRE properties, so the exposure of insurance companies to CRE is larger than their exposure through whole loans shown in the table. Institutions that hold lower-rated tranches of CMBS include private equity funds, mortgage REITs, and finance companies. Mortgages specifically backed by office or downtown retail property tend to be about one-third of each set of institutions' CRE holdings, on average. That said, individual institutions can specialize in certain types of loans, so the portfolio composition of any given institution may differ from the average shown for its category. Loans for construction or land development of nonfarm nonresidential properties (included in column 1 but not shown separately) are about 15 percent of aggregate bank nonfarm nonresidential CRE holdings.

Losses on CRE loans will depend on their leverage because owners of buildings with substantial equity cushions are less likely to default. Also, loans with high loan-to-value (LTV) ratios are typically harder to refinance or modify. As of the fourth quarter of 2022, current LTVs (that is, ratios that incorporate recent estimates of building value rather than building value at loan origination) of mortgages backed by office and downtown retail properties were in the range of 50 to 60 percent, on average, for the loan-level data that are available (Category I–IV banks, insurance companies, and CMBS pools). Current LTVs were in a similar range for the broader category of nonfarm nonresidential CRE mortgages. LTVs were low for many mortgages because for most property types—retail being a notable exception—values rose materially in the years leading up to the pandemic. Even so, some CRE mortgages do have fairly high LTVs, in particular at some Category I–IV banks. Two important caveats are worth emphasizing. First, information on the LTVs of CRE mortgages held by banks other than Category I–IV banks is limited. Second, CRE property valuations are elevated, and current LTVs could rise considerably if CRE property valuations were to fall.

(continued)

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[1] For example, Gupta, Mittal, and Van Nieuwerburgh (2022) estimate that the shift to remote work will lead to a drop in commercial office property values of nearly 40 percent; see Arpit Gupta, Vrinda Mittal, and Stijn Van Nieuwerburgh (2022), "Work from Home and the Office Real Estate Apocalypse," NBER Working Paper Series 30526 (Cambridge, Mass.: National Bureau of Economic Research, September), https://www.nber.org/papers/w30526.

[2] Specifically, this analysis does not include multifamily mortgages (for example, mortgages backed by apartment buildings) because the fundamentals of that sector are substantially different. In addition, although financial institutions are also exposed to a potential CRE market correction if they hold CRE properties directly, that channel is outside the scope of this discussion.

[3] Category I banks are U.S. G-SIBs. Category II–IV banks tend to have assets greater than $100 billion and are defined according to the tailoring rule of 2019 as listed on page 2 of a visualization of the rule on the Board's website at https://www.federalreserve.gov/aboutthefed/boardmeetings/files/tailoring-rule-visual-20191010.pdf. Other banks include remaining depository institutions.

Box 1.2—*continued*

The ability of an institution to withstand CRE-related credit losses also depends critically on the fraction of loans to this sector relative to the institution's overall portfolio. Nonfarm nonresidential CRE mortgages tend to be a small share of total assets held by banks overall, but about one-fifth of total assets of banks other than Category I–IV banks. Importantly, some banks may have more concentrated exposures to CRE mortgages than average and therefore may experience higher-than-average losses should CRE conditions weaken. In response to concerns about CRE, the Federal Reserve has increased monitoring of the performance of CRE loans and expanded examination procedures for banks with significant CRE concentration risk.

Table A. Commercial real estate holdings in 2022:Q4: Nonfarm nonresidential, including office and downtown retail, by investor type

Investor type	Holdings of nonfarm nonresidential CRE (trillions of dollars)	Percent of total CRE loans outstanding	Holdings of office and downtown retail CRE (trillions of dollars)	Total assets held by each investor type (trillions of dollars)
Total	3.57			
Banks	2.17	61	.72	28.5
Category I banks (U.S. G-SIBs)	.28	8	.10	14.3
Category II–IV banks	.34	9	.11	6.8
Other	1.55	43	.51	7.4
Life insurers	.47	13	.17	5.4
Holders of non-agency CMBS	.53	15	.17	
Other nonbank	.40	11		

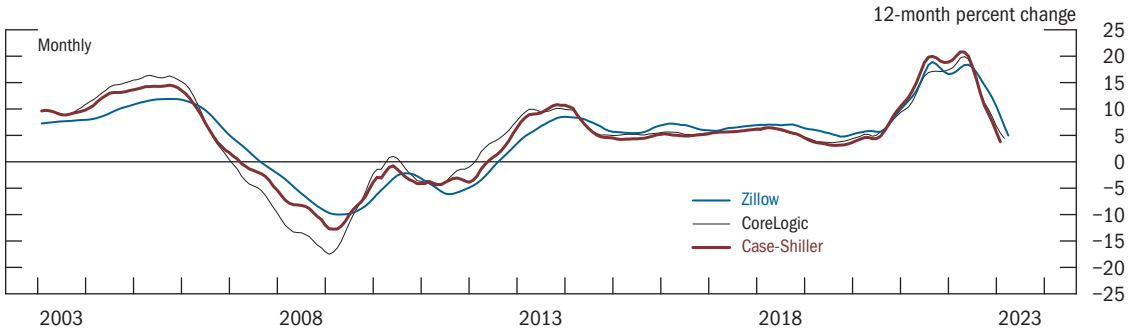
Note: Total nonfarm nonresidential commercial real estate (CRE) is all commercial mortgage assets as reported in Table L.220: Commercial Mortgages in the "Financial Accounts of the United States." For banks, the data are private depository institutions' CRE loans. For life insurers, the data are life insurers' CRE loans. Life insurer total assets do not consider reinsurance. For holders of non-agency commercial mortgage-backed securities (CMBS), the data include real estate investment trust (REIT) holdings of CMBS. For other nonbank holders of CRE mortgages, the data are computed as total commercial mortgages less banks, life insurers, and holders of CMBS. This category includes REITs, government, and nonfinancial businesses, among other sectors. Category I U.S. G-SIBs are global systemically important bank holding companies. Totals for banks are constructed as the sum of loans secured by nonfarm nonresidential properties and a fraction (0.847) of non–one- to four-family construction lending. This fraction reflects the estimated fraction of non–one- to four-family construction lending that is not multifamily. A list of banks in each category is available on the Board's website at https://www.federalreserve.gov/aboutthefed/boardmeetings/files/tailoring-rule-visual-20191010.pdf. The office loan holdings for the groups adjust the groups' CRE holdings by staff estimates for the office loan holdings as a share of nonfarm nonresidential CRE loans in the group. Other banks' CRE lending is constructed by subtracting Category I U.S. G-SIBs' and Category II–IV banks' CRE lending from the bank total. Total assets for these banks are calculated using data from the FR Y-9C and Call Reports. The office and downtown retail share for other banks is assumed to be consistent with the average loan-balance weighted share of Category II–IV banks. Holder percentages may not sum due to rounding.

Source: Federal Reserve Board staff calculations based on the following: Federal Reserve Board, Form FR Y-14Q (Schedule H.2), Capital Assessments and Stress Testing; Morningstar, Inc., Morningstar CMBS data; National Association of Insurance Commissioners, Schedule B; CBRE Econometric Advisors; Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States"; Federal Reserve Board, Form FR Y-9C, Consolidated Financial Statements for Holding Companies; S&P Global, Capital IQ Pro; and Federal Financial Institutions Examination Council, Call Report Forms FFIEC 031, FFIEC 041, and FFIEC 051, Consolidated Reports of Condition and Income (Call Reports).

House prices declined in recent months, but valuations remained high

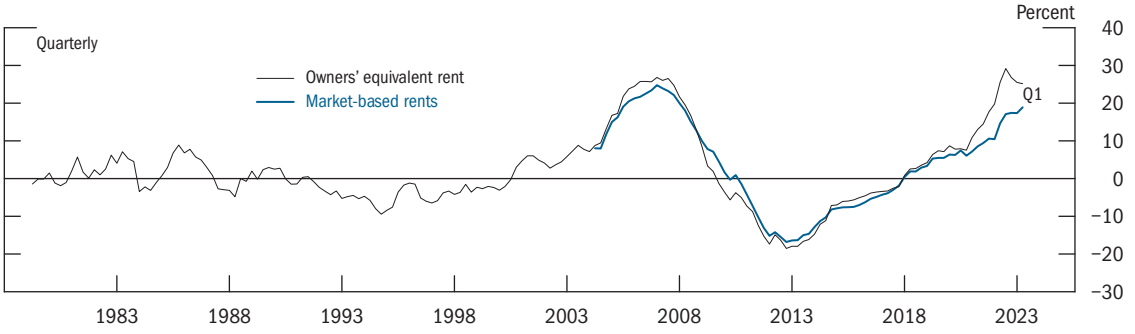
Rising borrowing costs have contributed to a moderation of prices in housing markets, as year-over-year house price increases have decelerated (figure 1.19), and some data suggested small declines in recent months. Nevertheless, valuation pressures in residential real estate remain elevated. A model of house price valuation based on prices relative to owners' equivalent rent and the real 10-year Treasury yield remained near historically high levels despite having fallen somewhat in the first quarter. Another measure based on market rents also pointed to stretched valuations, although to a lesser extent (figure 1.20). Similarly, while price-to-rent ratios have declined across a wide distribution of geographic areas since the November report, the median price-to-rent ratio remained above its previous peak in the mid-2000s (figure 1.21). While housing fundamentals have weakened, foreclosures and distressed sales, which could amplify downward pressure on prices, remained limited because mortgage underwriting standards did not loosen substantially

Figure 1.19. House price growth decelerated sharply



Source: CoreLogic, Inc., Real Estate Data; Zillow, Inc., Real Estate Data; S&P Case-Shiller Home Price Indices.

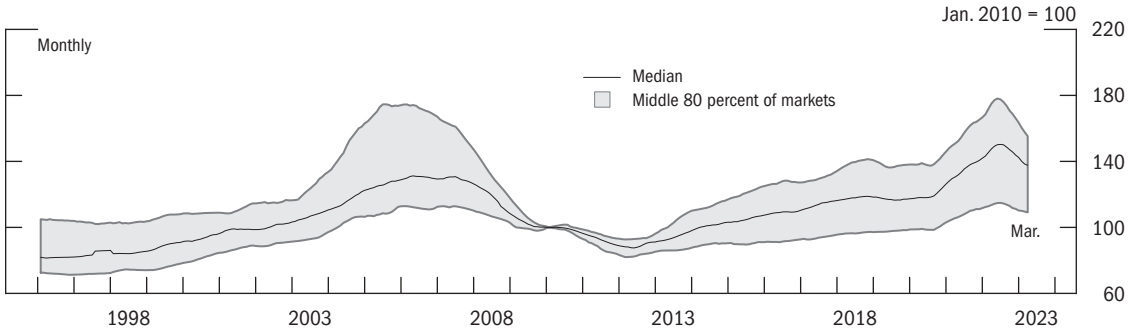
Figure 1.20. Model-based measures of house price valuations remained historically high



Source: For house prices, Zillow, Inc., Real Estate Data; for rent data, Bureau of Labor Statistics.

as they did in the early 2000s. In addition, homeowner equity cushions remained considerable, and the share of second-home buyers also remained near historical lows.

Figure 1.21. House price-to-rent ratios remained elevated across geographic areas



Source: For house prices, Zillow, Inc., Real Estate Data; for rent data, Bureau of Labor Statistics.

2 | Borrowing by Businesses and Households

Vulnerabilities from business and household debt remained moderate

On balance, vulnerabilities arising from borrowing by businesses and households were little changed since the November report and remained at moderate levels. For businesses, both the business debt-to-GDP ratio and gross leverage remained at high levels, although they were significantly lower than the record highs reached at the onset of the pandemic. Nevertheless, median interest coverage ratios remained high, supported by strong earnings growth. Recent data show that earnings growth has started to slow for the largest firms. In the event of an economic downturn, sizable declines in corporate earnings could weaken the debt-servicing capacity of firms. Indicators of household vulnerabilities, including the household debt-to-GDP ratio and the aggregate household debt service ratio, remained at modest levels. However, if household nominal income fails to keep pace with higher prices, tighter budgets may make it more difficult to service existing debt. In addition, an economic downturn or a correction in real estate prices remain risks for household credit performance.

Table 2.1 shows the amounts outstanding and recent historical growth rates of forms of debt owed by nonfinancial businesses and households as of the fourth quarter of 2022. Total outstanding private credit was split about evenly between businesses and households, with businesses owing $19.9 trillion and households owing $19.0 trillion. The combined total debt of nonfinancial businesses and households grew more slowly than nominal GDP since the November report, leading to a modest decline in the debt-to-GDP ratio, which moved back closer to the level that had prevailed for much of the decade before the pandemic (figure 2.1). The decline in the overall ratio was driven by a larger decline in household debt-to-GDP ratio compared to the business debt-to-GDP ratio (figure 2.2).

Key indicators point to little change in business debt vulnerabilities, which remained moderate relative to historical levels

Overall vulnerabilities from nonfinancial business debt remained moderate since the November report, as measures of leverage remained elevated and robust earnings boosted interest coverage ratios. There are some indications that business debt growth has slowed. Nonfinancial real business debt adjusted for inflation declined slightly (figure 2.3). In addition, net issuance of risky debt dropped sharply as institutional leveraged loan issuance turned negative for the first time since 2020 amid rapidly increasing borrowing costs and weaker investor demand driven by elevated uncertainty and market volatility (figure 2.4). Further, the net issuance of high-yield and unrated

Table 2.1. Outstanding amounts of nonfinancial business and household credit

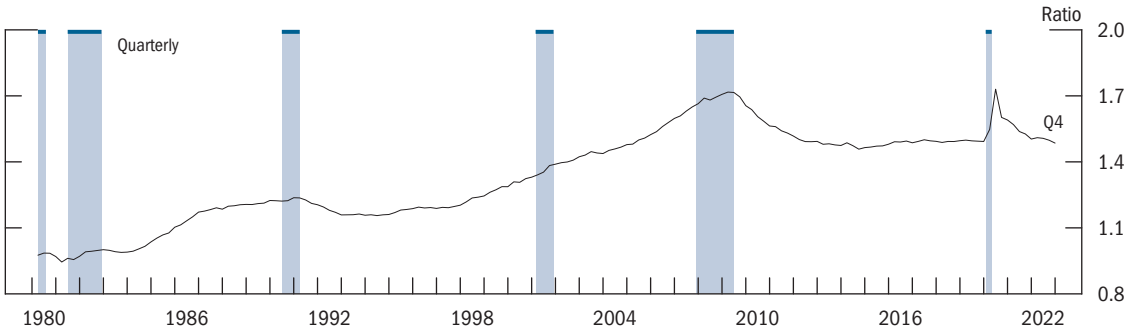
Item	Outstanding (billions of dollars)	Growth, 2021:Q4–2022:Q4 (percent)	Average annual growth, 1997–2022:Q4 (percent)
Total private nonfinancial credit	38,832	6.0	5.6
Total nonfinancial business credit	19,877	5.9	5.9
Corporate business credit	12,765	5.5	5.3
Bonds and commercial paper	7,545	.7	5.5
Bank lending	2,171	20.9	4.2
Leveraged loans*	1,388	11.3	14.1
Noncorporate business credit	7,111	6.6	7.0
Commercial real estate credit	3,069	8.1	6.3
Total household credit	18,955	6.2	5.4
Mortgages	12,515	7.2	5.6
Consumer credit	4,781	7.9	5.2
Student loans	1,757	1.4	8.0
Auto loans	1,412	7.5	5.1
Credit cards	1,203	15.5	3.5
Nominal GDP	26,145	7.2	4.5

Note: The data extend through 2022:Q4. Outstanding amounts are in nominal terms. Growth rates are measured from Q4 of the year immediately preceding the period through Q4 of the final year of the period. 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) row shows CRE debt owed by nonfinancial corporate and noncorporate businesses as defined in Table L.220: Commercial Mortgages in the "Financial Accounts of the United States." Total household 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 2022:Q4, as this market was fairly small before 2000.

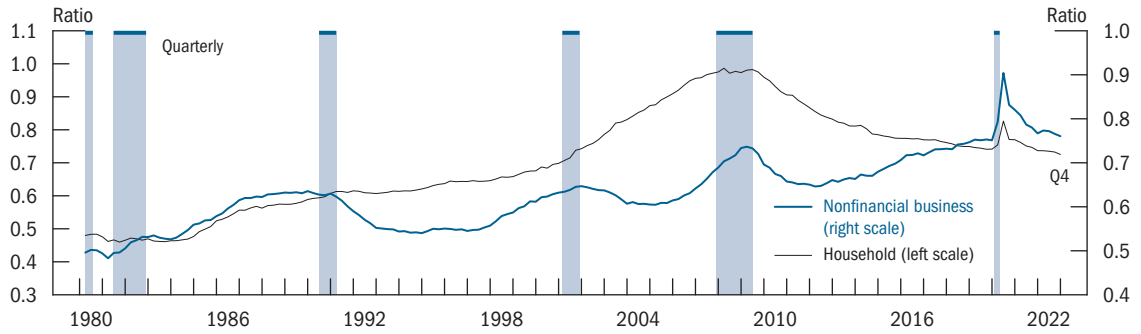
Source: For leveraged loans, PitchBook Data, Leveraged Commentary & Data; for GDP, Bureau of Economic Analysis, national income and product accounts; for all other items, Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

Figure 2.1. The total debt of households and businesses relative to GDP declined further



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. Both business and household debt-to-GDP ratios edged down

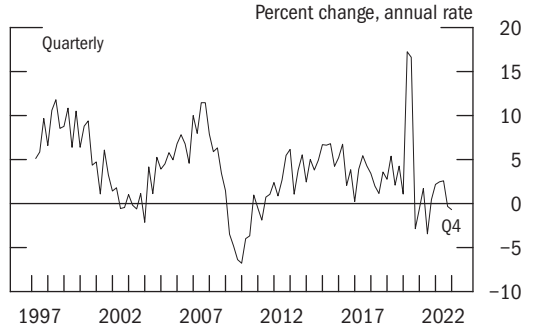


Source: Federal Reserve Board staff calculations based on Bureau of Economic Analysis, national income and product accounts, and Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

bonds remained negative. Gross leverage—the ratio of debt to assets—of all publicly traded nonfinancial firms remained high by historical standards, roughly unchanged from the values seen in 2021 and lower than its historical peak in mid-2020 (figure 2.5). Net leverage—the ratio of debt less cash to total assets—continued to edge up among all large publicly traded businesses and remained high relative to its history.

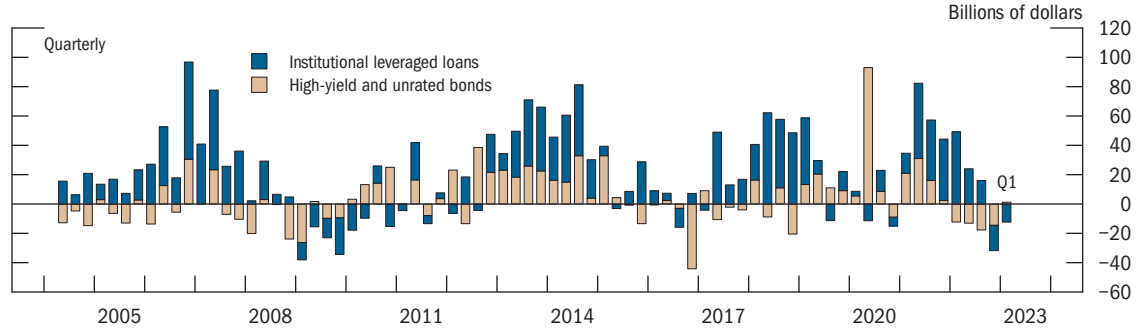
The interest coverage ratio for all publicly traded firms, measured by the median ratio of earnings to interest expenses, retreated from its recent high but nonetheless remained in

Figure 2.3. Business debt adjusted for inflation declined modestly



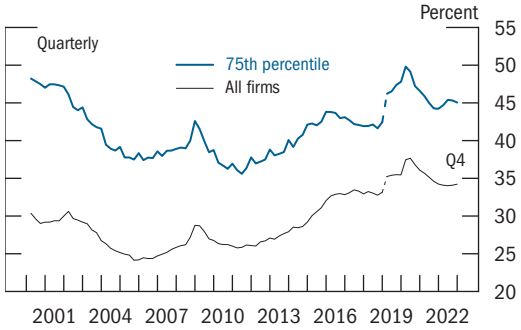
Source: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

Figure 2.4. Net issuance of risky debt remained subdued



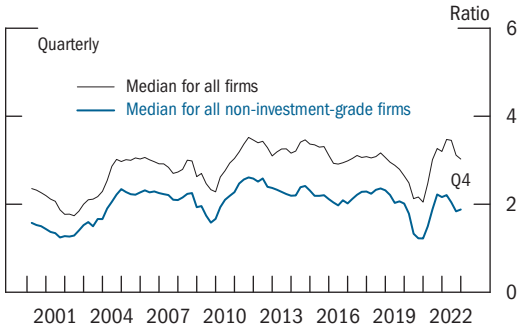
Source: Mergent, Inc. Fixed Income Securities Database; PitchBook Data, Leveraged Commentary & Data.

Figure 2.5. Gross leverage of large businesses remained at high levels



Source: Federal Reserve Board staff calculations based on S&P Global, Compustat.

Figure 2.6. Firms' ability to service their debt, as measured by the interest coverage ratio, was strong



Source: Federal Reserve Board staff calculations based on S&P Global, Compustat.

the upper range of its historical distribution, suggesting that large businesses were able to service their debt (figure 2.6). The absence of significant deterioration in the level of the median interest coverage ratio despite rising interest rates over the past year has reflected the combination of solid earnings and the sizable share of fixed-rate bonds in corporations' debt liabilities.[5] A higher share of fixed-rate liabilities mutes the pass-through of increased interest rates into debt-servicing costs. That said, earnings have shown some signs of weakness. In the future, a sharper-than-expected slowing or a decline in economic activity could make debt obligations more challenging to meet for some businesses. For riskier firms with a non-investment-grade rating, interest coverage ratios remained below their historical median levels.[6]

The credit performance of outstanding corporate bonds remained strong since the November report. The volume of downgrades and defaults remained low, but market expectations of defaults over the next year rose as investor perceptions of the economic outlook worsened. More than half of investment-grade bonds outstanding continued to be rated in the lowest category of the investment-grade range (triple-B). If a large share of these bonds were downgraded, debt cost would increase when the bonds need to roll over, putting pressure on firms' balance sheets.

Meanwhile, the available data for smaller middle-market firms that are privately held—which have less access to capital markets and primarily borrow from banks, private credit and equity funds, and sophisticated investors—also indicated that leverage declined over the second half of 2022. The interest coverage ratio for the median firm in this category remained high during the same

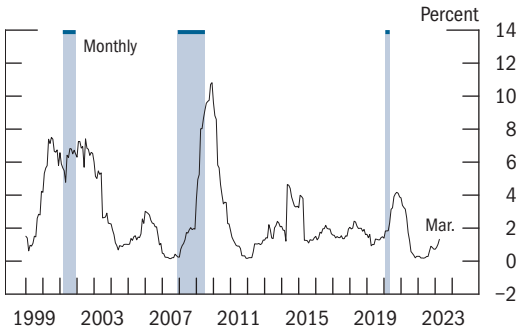
[5] Only about 5 percent of outstanding bonds rated triple-B and 1 percent of outstanding high-yield bonds are due within a year.

[6] While these firms represent a large share of the number of publicly traded firms (85 percent), their debt constitutes only 35 percent of the total debt in the sector.

period and was above the level at publicly traded firms. However, an important caveat is that the data on smaller middle-market firms are not as comprehensive as those on large firms.

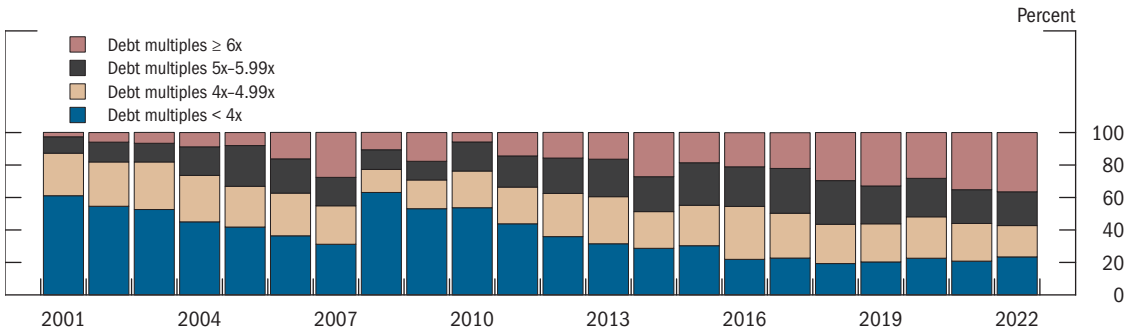
The credit quality of leveraged loans remained solid through the second half of 2022 but has shown some signs of deterioration. The volume of credit rating downgrades exceeded the volume of upgrades over this period, and default rates inched up for four consecutive quarters, albeit from historically low levels (figure 2.7). The share of newly issued loans to large corporations with debt multiples—defined as the ratio of debt to earnings before interest, taxes, depreciation, and amortization—greater than 5 remained at a historically high level in 2022, indicating stable tolerance for additional leverage among investors in this market (figure 2.8). Rising interest rates, in combination with a potential slowdown in earnings growth posed by the less favorable economic outlook, could put pressure on the credit quality of outstanding leveraged loans, as their floating debt service costs would increase.

Figure 2.7. Default rates on leveraged loans inched up from historically low levels



Source: PitchBook Data, Leveraged Commentary & Data.

Figure 2.8. The majority of new leveraged loans last year have debt multiples greater than 5



Source: Mergent, Inc., Fixed Income Securities Database; PitchBook Data, Leveraged Commentary & Data.

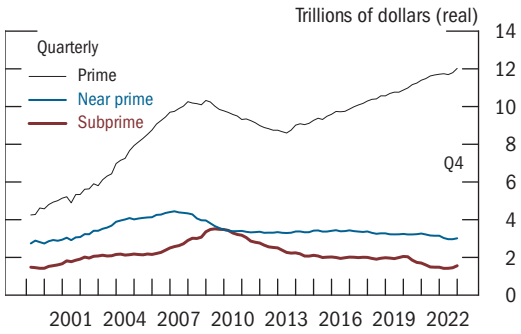
Delinquencies at small businesses edged up, but credit quality remained solid

Delinquency rates for small businesses edged up from relatively low levels, but overall credit quality remained solid. Borrowing costs increased in 2022 and now stand a touch higher than prevailing pre-pandemic rates. In addition, the share of small businesses that borrow regularly increased

according to the National Federation of Independent Business Small Business Economic Trends Survey but remained low relative to historical levels; the share of firms with unmet financing needs also remained quite low.

Vulnerabilities from household debt remained moderate

Figure 2.9. Real household debt edged up



Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax; consumer price index, Bureau of Labor Statistics via Haver Analytics.

Elevated levels of liquid assets and still-large home equity cushions helped households maintain strong balance sheets through the second half of last year. That said, some borrowers remained financially stretched and more vulnerable to future shocks.

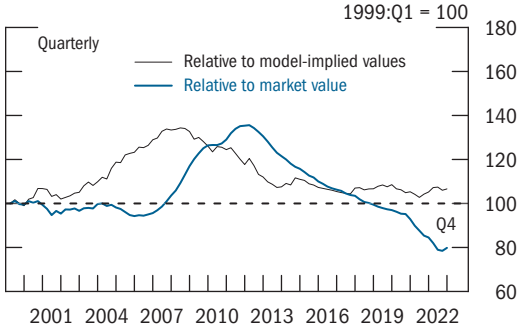
Outstanding household debt adjusted for inflation edged up in the second half of 2022 (figure 2.9). While the increase was broad based across the credit score distribution, most of the growth was driven by borrowers with prime credit scores, who accounted for more than half of the total number of borrowers.

Credit risk of outstanding household debt remained generally low

The ratio of total required household debt payments to total disposable income (the household debt service ratio) increased slightly since the November report. This increase means that some borrowers allocated a larger portion of their income to pay the interest and principal on their loans, potentially weakening their ability to withstand shocks to their income. Nonetheless, the ratio remained at modest levels after reaching a historical low in the first quarter of 2021 amid extensive fiscal stimulus, credit card paydowns, and low interest rates. With the increase in interest rates over the past year only partially passed through to household interest expenses, the household debt service ratio could increase further. With the exception of credit card debt, only a small share of household debt is subject to floating rates, which should limit the effect of increased interest rates in the near term. For most other types of household debt, rising interest rates increase borrowing costs only for new loan originations.

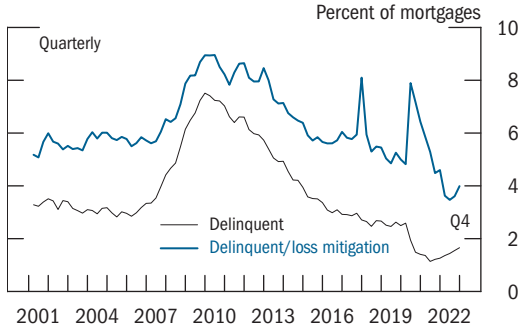
Mortgage debt, which accounts for roughly two-thirds of total household debt, grew a bit more slowly than GDP in 2022:Q4. Estimates of housing leverage when measuring home values as a function of rents and other market fundamentals remained flat and significantly lower than their peak levels before 2008 (figure 2.10, black line). The overall mortgage delinquency rate ticked up

Figure 2.10. A model-based estimate of housing leverage was flat



Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax; Zillow, Inc., Real Estate Data; Bureau of Labor Statistics via Haver Analytics.

Figure 2.11. Mortgage delinquency rates remained at historically low levels

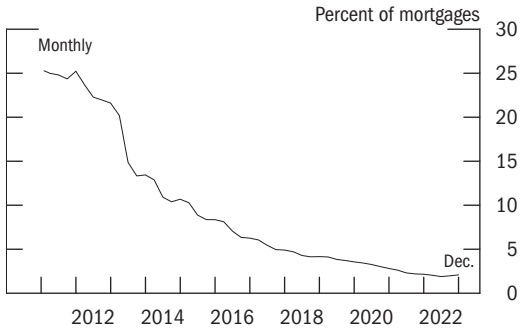


Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax.

from a historically low level (figure 2.11), and the share of mortgage balances in a loss-mitigation program remained low. A very low share of borrowers had negative home equity in the last quarter of 2022 (figure 2.12).

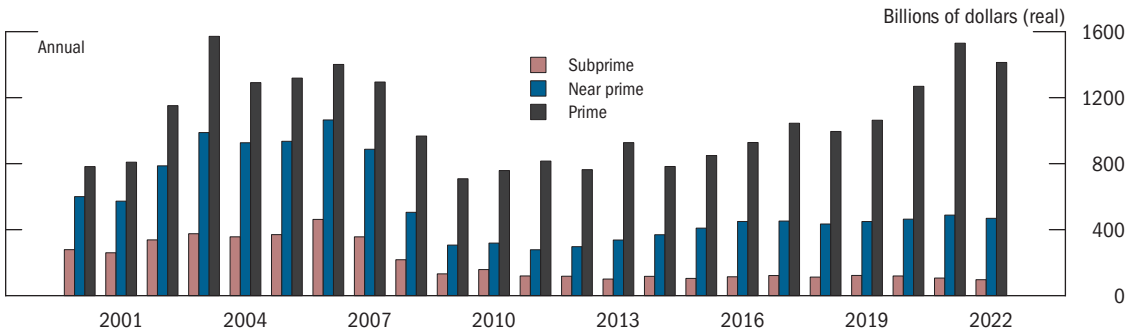
New mortgage extensions, which have skewed heavily toward prime borrowers in recent years, declined in the last quarter of 2022 against the backdrop of higher mortgage rates and slower activity in the housing market (figure 2.13). New mortgage loans with low

Figure 2.12. Very few homeowners had negative equity in their homes



Source: CoreLogic, Inc., Real Estate Data.

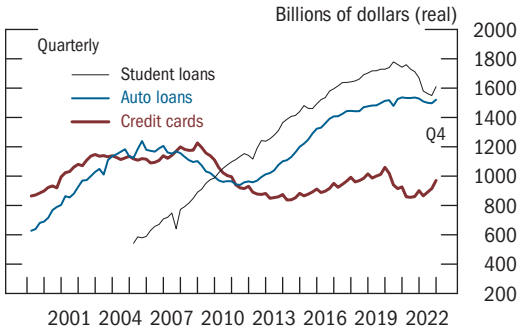
Figure 2.13. New mortgage extensions to nonprime borrowers have been subdued



Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax; consumer price index, Bureau of Labor Statistics via Haver Analytics.

down payments were seen in about half of the newly originated purchase loans in 2022. Such highly leveraged originations, which also tended to have lower average credit scores, remained vulnerable to house price declines, as their equity could quickly become negative. With the share of adjustable-rate mortgages in new home purchases at 10 percent in recent months, the interest rate risk for mortgage borrowers remained limited. That said, the early payment delinquency rate—the share of balances becoming delinquent within one year of mortgage origination—continued to rise.

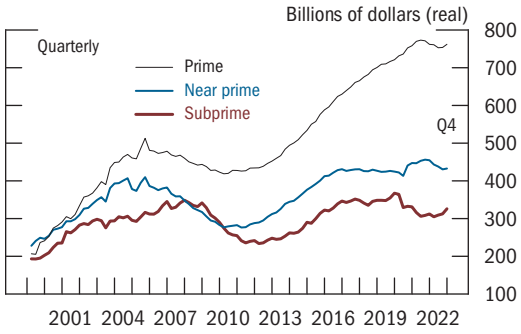
Figure 2.14. Real consumer credit edged up in the second half of 2022



Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax; consumer price index, Bureau of Labor Statistics via Haver Analytics.

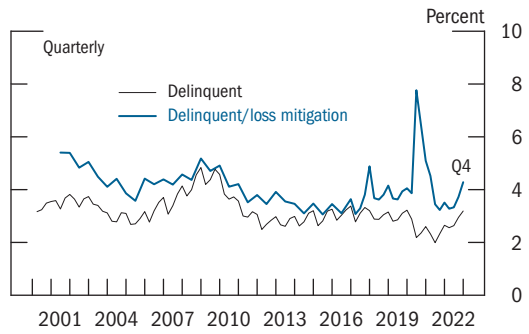
The remaining one-third of household debt was consumer credit, which consisted primarily of student loans, auto loans, and credit card debt (as shown in table 2.1). On net, inflation-adjusted consumer credit growth increased a bit since the November report (figure 2.14), at a slightly higher pace than GDP. Real auto loan balances ticked up that period, mostly driven by prime borrowers, but balances for near-prime and subprime borrowers also increased to a lesser extent (figure 2.15). The share of auto loan balances in loss mitigation continued to decline and stood at a low level at the end of 2022, but those in delinquent status have increased in the past several quarters, returning to a level that is in line with its history over the previous decade (figure 2.16).

Figure 2.15. Real auto loans outstanding ticked up



Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax; consumer price index, Bureau of Labor Statistics via Haver Analytics.

Figure 2.16. Auto loan delinquencies moved up in 2022 but still remained at modest levels

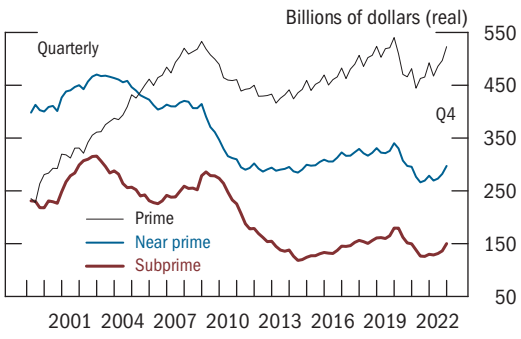


Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax.

Aggregate real credit card balances continued to increase in the second half of last year (figure 2.17). Rates paid on these balances increased in line with short-term rates over the past year. Delinquency rates have also increased over the same period (figure 2.18). The outsized nature of the increase in subprime delinquency rates in large part is because of a compositional change in the pool of borrowers arising from fiscal support and forbearance programs implemented during the pandemic.[7]

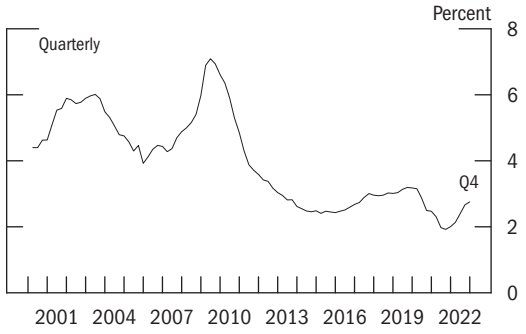
After rising rapidly for more than a decade, real student loan debt declined with the onset of the pandemic. More recently, student loan balances have ticked up.

Figure 2.17. Real credit card balances have increased in 2022, partially reversing earlier declines



Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax; consumer price index, Bureau of Labor Statistics via Haver Analytics.

Figure 2.18. Credit card delinquencies increased but remained at low levels



Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax.

[7] As a result of these programs, many borrowers from the subprime group migrated to the near-prime or prime groups. The remaining subprime borrowers had lower credit scores, on the whole, than the pool of subprime borrowers before the pandemic. See Sarena Goodman, Geng Li, Alvaro Mezza, and Lucas Nathe (2021), "Developments in the Credit Score Distribution over 2020," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, April 30), https://www.federalreserve.gov/econres/notes/feds-notes/developments-in-the-credit-score-distribution-over-2020-20210430.html.

3 | Leverage in the Financial Sector

Poor risk management undermined some banks, while the broader banking system remained sound and resilient; meanwhile, leverage at some types of nonbank financial institutions appeared elevated

Vulnerabilities related to overall financial-sector leverage appeared to remain moderate. In March 2023, poor interest rate and liquidity risk management contributed to runs on SVB and Signature Bank and stresses at some additional banks, subsequently leading to the failure of First Republic Bank on May 1. Actions taken by the official sector reassured depositors, and the broad banking system remained sound and resilient. For the banking system as a whole, aggregate bank capital levels were ample. At potentially vulnerable banks, examiners have increased the frequency and depth of monitoring, with examination activities directed to assessing the current valuation of investment securities, deposit trends, the diversity of funding sources, and the adequacy of contingency funding plans.

Broker-dealer leverage remained low, but vulnerabilities persisted regarding their willingness and ability to intermediate in fixed-income markets during periods of stress. Some types of nonbank financial firms continued to operate with high leverage.

Table 3.1 shows the sizes and growth rates of the types of financial institutions discussed in this section.

Concerns over interest rate risk and declines in the fair value of some assets led to stress in the banking sector and raised concerns about spillovers

Rising interest rates affect banks in several ways. Higher interest rates on floating-rate and newly acquired fixed-rate assets lead to higher interest income for banks. The costs of bank funding also increase, but generally much more slowly than market rates. As a result, the net interest margins of most banks typically increase in a rising rate environment as the rates they receive on their assets outpace their funding costs.[8] Over the past year, interest rates increased considerably as policy rates rose from near-zero levels. The overall banking sector has remained profitable and resilient as rates have risen, with net interest margins reflecting higher interest income on floating-rate loans coupled with interest expense on many deposits staying well below market rates (figure 3.1).

[8] Net interest margin measures a bank's yield on its interest-bearing assets after netting out interest expense.

Table 3.1. Size of selected sectors of the financial system, by types of institutions and vehicles

Item	Total assets (billions of dollars)	Growth, 2021:Q4–2022:Q4 (percent)	Average annual growth, 1997–2022:Q4 (percent)
Banks and credit unions	25,594	-.1	6.1
Mutual funds	17,333	-22.0	8.9
Insurance companies	11,867	-8.5	5.5
Life	8,844	-10.3	5.6
Property and casualty	3,023	-2.5	5.5
Hedge funds*	9,067	-5.7	7.9
Broker-dealers**	4,927	-.7	4.8
	Outstanding (billions of dollars)		
Securitization	13,161	9.1	5.6
Agency	11,698	9.5	6.1
Non-agency***	1,464	5.8	3.6

Note: The data extend through 2022:Q4 unless otherwise noted. Outstanding amounts are in nominal terms. Growth rates are measured from Q4 of the year immediately preceding the period through Q4 of the final year of the period. Life insurance companies' assets include both general and separate account assets.

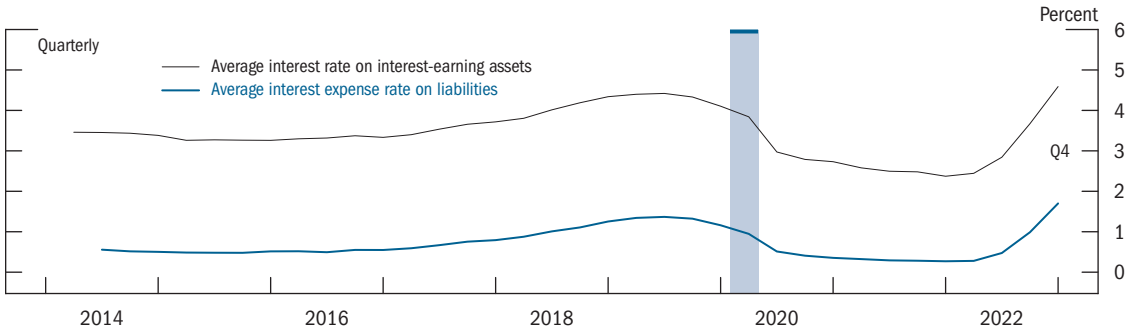
* Hedge fund data start in 2012:Q4 and are updated through 2022:Q3. Growth rates for the hedge fund data are measured from Q3 of the year immediately preceding the period through Q3 of the final year of the period.

** Broker-dealer assets are calculated as unnetted values.

*** Non-agency securitization excludes securitized credit held on balance sheets of banks and finance companies.

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

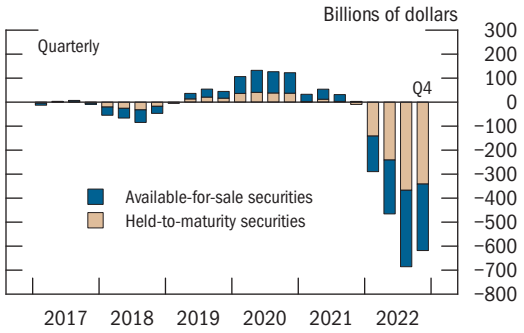
Figure 3.1. Banks' average interest rate on interest-earning assets and average expense rate on liabilities increased



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

In the aggregate, more than 45 percent of bank assets reprice or mature within a year, reducing exposure to legacy fixed-rate assets in the overall banking system. Nonetheless, higher interest rates substantially affected the value of banks' existing holdings of fixed-rate assets in 2022. In 2020 and 2021, banks added nearly $2.3 trillion in securities to their balance sheets, primarily fixed-rate U.S. Treasury securities and agency-guaranteed mortgage-backed securities, most of which were placed in their available-for-sale (AFS) and held-to-maturity (HTM) securities portfolios. By the end of 2022, banks had declines in fair value of $277 billion in AFS portfolios and $341 billion in HTM portfolios (figure 3.2).[9] Additionally, banks have other long-duration fixed-rate assets, such as fixed-rate residential mortgages, whose interest income did not increase with rising interest rates.

Figure 3.2. The fair values of banks' securities portfolios declined in 2022 as interest rates rose



Source: Federal Financial Institutions Examination Council, Call Report Form FFIEC 031, Consolidated Reports of Condition and Income (Call Report); Federal Reserve Board, Form FR Y-9C, Consolidated Financial Statements for Holding Companies.

As discussed in the box "The Bank Stresses since March 2023," SVB did not effectively manage the interest rate risk associated with its securities holdings or develop effective interest rate risk measurement tools, models, and metrics. SVB also had a concentrated business model and failed to manage the liquidity risks of liabilities that were largely composed of uninsured deposits from venture capital firms and the tech sector.

In early March 2023, depositors became increasingly concerned about the health of SVB, and the bank experienced substantial deposit outflows. On March 10, SVB failed. The equity prices of some banks declined sharply, and some banks saw sizable outflows from uninsured depositors. On March 12, Signature Bank failed. Concerns over stresses in the banking sector led the U.S. Department of the Treasury, the Federal Reserve, and the FDIC to intervene on March 12 to assure depositors of the safety of their deposits (see the box "The Federal Reserve's Actions to Protect Bank Depositors and Support the Flow of Credit to Households and Businesses"). Deposit outflows slowed considerably thereafter. Nonetheless, First Republic Bank continued to experience continued stress, leading to its failure and subsequent acquisition on May 1 by JPMorgan Chase Bank with government support. The Federal Reserve will continue to closely monitor conditions in the U.S. banking system, and it is prepared to use all its tools for institutions of any size, as needed, to support the safety and soundness of the U.S. banking system.

[9] In addition, there was a decline in fair value of $28 billion related to securities transferred from AFS to HTM accounts.

Box 3.1. The Bank Stresses since March 2023

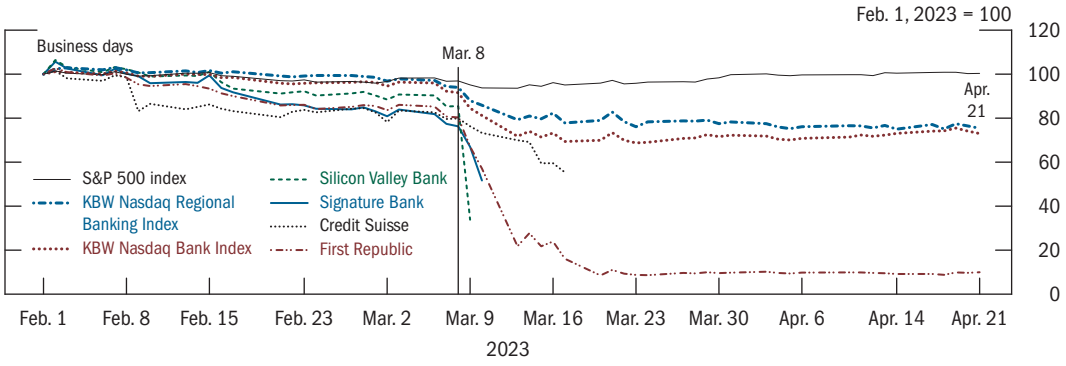
The banking system came under severe stress late in the week of March 6, 2023. On Wednesday, March 8, Silvergate Bank, an institution supervised by the Federal Reserve with $11 billion in assets at the end of 2022, announced its intention to voluntarily wind down its operations and to fully repay all deposits.[1]

On that Wednesday afternoon, SVB, an institution supervised by the Federal Reserve with $209 billion in assets at the end of 2022, announced it had sold $21 billion from its AFS securities portfolio at an after-tax loss of $1.8 billion, was planning to increase nondeposit borrowing from $15 billion to $30 billion, and was commencing a public offering to raise capital by $2.25 billion.[2] The bank also noted that it had been in dialogue with a rating agency that was considering a negative rating action, with the possibility that another agency would follow suit. Later that day, the bank received a one-notch rating downgrade, and its rating outlook was changed from stable to negative. These announcements led to a loss of confidence in the bank, as reflected in the sharp decline in SVB's stock market price, illustrated in figure A, and unprecedented deposit withdrawals from customers, totaling $42 billion in a single business day on Thursday, March 9. As additional deposit withdrawal requests accumulated, the bank informed regulators on the morning of Friday, March 10, that $100 billion in deposit withdrawals were scheduled or expected for that day.[3] The bank was unable to pay those obligations, and, on the morning of Friday, March 10, the Department of Financial Protection and Innovation of the State of California declared SVB insolvent, took possession of the bank, and appointed the FDIC as receiver.

It appeared that contagion from SVB's failure could be far-reaching and cause damage to the broader banking system. The prospect of uninsured depositors not being able to access their funds appeared to raise concerns about the possibility of destabilizing runs at other U.S. commercial banks. This

(continued)

Figure A. Bank stock prices and stock indexes



Source: Center for Research in Security Prices, CRSP/Compustat Merged Database, Wharton Research Data Services; Federal Reserve Bank of St. Louis, Federal Reserve Economic Data.

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[1] See Silvergate Bank (2023), "Silvergate Capital Corporation Announces Intent to Wind Down Operations and Voluntarily Liquidate Silvergate Bank," press release, March 8, https://ir.silvergate.com/news/news-details/2023/Silvergate-Capital-Corporation-Announces-Intent-to-Wind-Down-Operations-and-Voluntarily-Liquidate-Silvergate-Bank/default.aspx. The announcement followed deposit outflows in the fourth quarter of 2022 that reduced deposit balances by more than 50 percent.

[2] See Silicon Valley Bank (2023), "Strategic Actions/Q1'23 Mid-Quarter Update" (Santa Clara, Calif.: SVB, March 8), available at https://ir.svb.com/events-and-presentations/default.aspx.

[3] The $42 billion in deposit withdrawals on March 9 comes from the order taking possession of property and business from the Department of Financial Protection and Innovation of the State of California available on the department's website at https://dfpi.ca.gov/wp-content/uploads/sites/337/2023/03/DFPI-Orders-Silicon-Valley-Bank-03102023.pdf?emrc=bedc09. The $100 billion in scheduled or expected deposit withdrawals for March 10 comes from *Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank* available on the Federal Reserve's website at https://www.federalreserve.gov/publications/files/svb-review-20230428.pdf.

Box 3.1—*continued*

concern over broader contagion led to sizable declines in bank stocks, as reflected by the declines in the KBW bank indexes (as shown in figure A). On March 10, Signature Bank, an institution supervised by the FDIC with $110 billion in assets at the end of 2022, continued experiencing stock price declines and suffered a run, with depositors withdrawing 20 percent of deposit balances.[4] Signature Bank was closed on Sunday, March 12, by the New York State Department of Financial Services, and the FDIC was named receiver.[5] The speed and magnitude of the runs on uninsured deposits at SVB and Signature Bank generated broader concerns about the resilience of banks with a large concentration of uninsured deposits and significant declines in the fair value of fixed-rate assets in a rising rate environment. The bank runs at SVB and Signature Bank contributed to a further deterioration of confidence in banks, amplifying the initial bank stresses. Other banks also saw notable deposit outflows, threatening households' and businesses' ability to access accounts they routinely use to make payments. In contrast, the largest banks saw significant deposit inflows. On Sunday, March 12, the Federal Reserve, together with the FDIC and the U.S. Department of the Treasury, announced decisive actions to protect households and businesses (see the box "The Federal Reserve's Actions to Protect Bank Depositors and Support the Flow of Credit to Households and Businesses").

The runs on SVB and Signature Bank were of unprecedented speed compared with previous runs. During the run on Washington Mutual in 2008—to date, the run that caused the largest failure of an insured depository institution by inflation-adjusted total assets—depositors withdrew about $17 billion over the course of eight business days, with the largest deposit withdrawal in one day reaching just over 2 percent of pre-run deposits.[6] By comparison, the highest one-day withdrawal rate was more than 20 percent in the case of SVB and Signature Bank, at the time the second- and third-largest depository institutions by inflation-adjusted total assets, respectively, that failed due to a bank run (figure B).[7] At SVB, withdrawals would have been even larger had regulators not closed the bank on the morning of March 10. Figure B also compares the speed of the runs on Washington Mutual, SVB, and Signature Bank with the run on Continental Illinois, the fifth-largest depository institution by inflation-adjusted total assets to fail due to a bank run. Continental Illinois sustained sizable withdrawals of uninsured deposits for six consecutive days in May 1984, with a peak one-day withdrawal rate of 7.8 percent of deposits, before a public assistance package was put in place.[8] The unprecedented speed of the run on SVB was likely facilitated by widespread adoption among SVB's tightly networked depositor base of technologies enabling depositors to submit withdrawal requests electronically and to share messages about the bank's perceived problems via messaging apps and on social media. But the faster speed of the run in the Continental Illinois case relative to Washington Mutual also points to the role of the concentration of uninsured deposits.

In international markets, Credit Suisse came under renewed pressure. In recent years, Credit Suisse had experienced a succession of risk-management, corporate-governance, and compliance failures. And in 2022, it reported the largest after-tax loss since the 2007–09 financial crisis and experienced significant deposit outflows in the last quarter of the year. During the week of March 13, the firm published its annual report, which was originally scheduled for publication the previous week, and its

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[4] See Federal Deposit Insurance Corporation (2023), *FDIC's Supervision of Signature Bank* (Washington: FDIC, April), https://www.fdic.gov/news/press-releases/2023/pr23033a.pdf.

[5] See New York State Department of Financial Services (2023), "Superintendent Adrienne A. Harris Announces New York Department of Financial Services Takes Possession of Signature Bank," press release, March 12, https://www.dfs.ny.gov/reports_and_publications/press_releases/pr20230312.

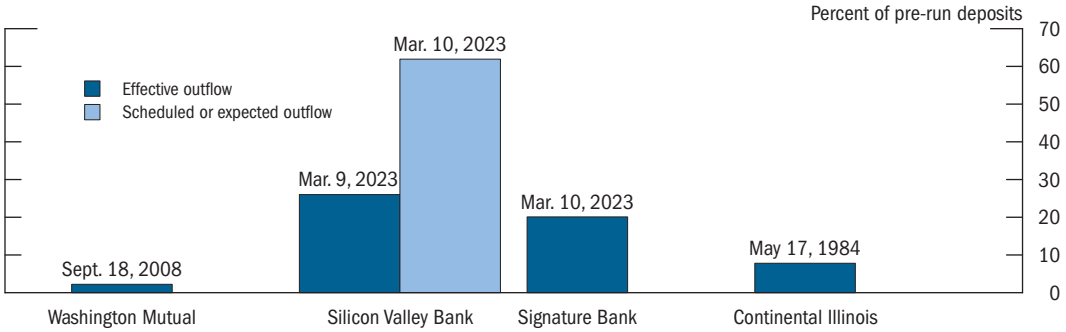
[6] See Office of Thrift Supervision (2008), "OTS Fact Sheet on Washington Mutual Bank," September 25, www.fcic.gov/documents/view/905. The one-day deposit withdrawal rate is estimated using only consumer and small business deposits; see Declaration of Thomas M. Blake to the U.S. Bankruptcy Court, District of Delaware, Chapter 11 Case No. 08-12229 (MFW) and Adversary Proceeding No. 09-50934 (MFW) (2009).

[7] After the data close on April 21, 2023, First Republic Bank failed, making it the second-largest depository institution to fail due to a bank run.

[8] See Mark Carlson and Jonathan Rose (2019), "The incentives of Large Sophisticated Creditors to Run on a Too Big to Fail Financial Institution," *Journal of Financial Stability,* vol. 41 (April), pp. 91–104.

Box 3.1—*continued*

Figure B. Peak 1-day withdrawal rates for runs on the largest banks, by inflation-adjusted total assets



Sources: For Washington Mutual, Jonathan D Rose (2015), "Old-Fashioned Deposit Runs," Finance and Economics Discussion Series 2015-111 (Washington: Board of Governors of the Federal Reserve System, December). For Silicon Valley Bank, Financial Institutions Examination Council, Consolidated Reports of Condition and Income; California Department of Financial Protection and Innovation (2023), "Order Taking Possession of Property and Business" (San Francisco: DFPI, March 10); and Board of Governors of the Federal Reserve System (2023), *Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank* (Washington: Board of Governors, April). For Signature Bank, Federal Deposit Insurance Corporation (2023), *FDIC's Supervision of Signature Bank*, (Washington: FDIC, April). For Continental Illinois, Mark Carlson and Jonathan Rose (2019), "The Incentives of Large Sophisticated Creditors to Run on a Too Big to Fail Financial Institution," *Journal of Financial Stability*, vol. 41 (April), pp. 91–104.

largest shareholder announced it would not buy additional shares in the bank. The bank stock price declined further, and on March 16, Credit Suisse announced its intention to access emergency liquidity support provided by the Swiss National Bank for up to CHF 50 billion. Despite the announcement of this liquidity support, investors' confidence continued to deteriorate, as reflected by the continued price decline of Credit Suisse shares (as shown in figure A). On Sunday, March 19, UBS agreed to merge with Credit Suisse in a deal that involved triggering the write-off of a certain type of Credit Suisse's contingent convertible capital instruments, as well as liquidity support and loss sharing from the Swiss government. In addition, on Sunday, March 19, the Federal Reserve, together with other central banks, announced measures to enhance the provision of liquidity in global funding markets (see the box "The Federal Reserve's Actions to Protect Bank Depositors and Support the Flow of Credit to Households and Businesses"). The spillovers of the stresses related to Credit Suisse to the U.S. have so far been muted.

Following the runs on SVB and Signature Bank, First Republic Bank, an institution supervised by the FDIC with $213 billion in assets at the end of 2022, experienced notable deposit outflows between March 10 and March 16. The bank's equity price declined significantly through the end of March and declined even further following the publication of its first quarter earnings on April 24. The California Department of Financial Protection and Innovation took possession of First Republic Bank before markets opened on Monday, May 1, appointing the FDIC as receiver.[9] At the same time, the FDIC entered into a purchase and assumption agreement with JPMorgan Chase Bank to assume all of the deposits and most of the assets of the failed bank, with the bank and the FDIC entering into a loss-sharing agreement.[10]

[9] See the order taking possession of property and business from the Department of Financial Protection and Innovation of the State of California available on the department's website at https://dfpi.ca.gov/2023/05/01/california-financial-regulator-takes-possession-of-first-republic-bank/.

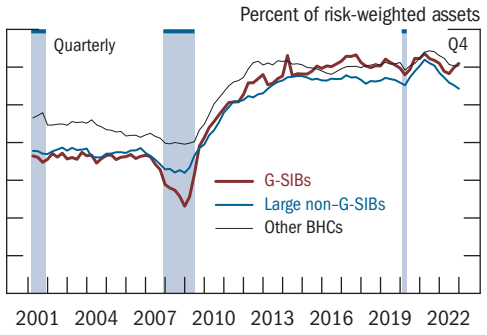
[10] See Federal Deposit Insurance Corporation (2023), "JPMorgan Chase Bank, National Association, Columbus, Ohio Assumes All the Deposits of First Republic Bank, San Francisco, California," press release, May 1, https://www.fdic.gov/news/press-releases/2023/pr23034.html.

On April 28, 2023, the Federal Reserve published a report examining the factors that contributed to the failure of SVB and the role of the Federal Reserve, which was the primary federal supervisor for the bank and its holding company, Silicon Valley Bank Financial Group.[10] That same day, the FDIC published a report examining the failure of Signature Bank, whose primary federal supervisor was the FDIC.[11]

Banks' risk-based capital remained within the range established over the past decade, but tangible common equity declined at non–global systemically important banks

Notwithstanding the banking stress in March, high levels of capital and moderate interest rate risk exposures mean that a large majority of banks are resilient to potential strains from higher interest rates. As of the fourth quarter of 2022, banks in the aggregate were well capitalized, especially U.S. global systemically important banks (G-SIBs). The common equity Tier 1 (CET1) ratio—a regulatory risk-based measure of bank capital adequacy—remained close to the median of its range since the end of the 2007–09 financial crisis (figure 3.3). In the second half of 2022, G-SIBs increased their CET1 ratios by cutting back on stock repurchases and reducing risk-weighted assets to meet higher capital requirements resulting from an increase in their 2023 G-SIB surcharges—that is, the amount of capital G-SIBs must have above their minimum capital requirements and stress capital buffers. In contrast, CET1 ratios decreased at large non-G-SIB and other banks that continued to grow their risk-weighted assets, though their CET1 ratios remained well above requirements.

Figure 3.3. Banks' risk-based capital ratio remained near the median level since the 2007–09 financial crisis



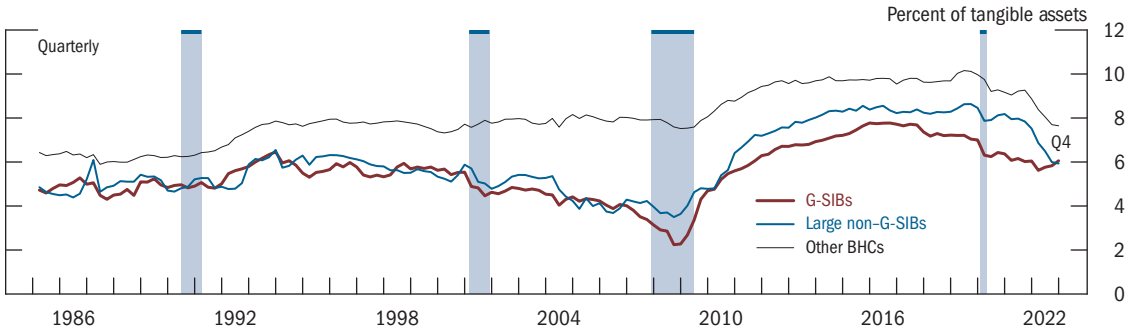
Source: Federal Reserve Board, Form FR Y-9C, Consolidated Financial Statements for Holding Companies.

The ratio of tangible common equity to total tangible assets—a measure of bank capital that does not account for the riskiness of credit exposures and, like CET1, excludes intangible items such as goodwill from capital—edged up at G-SIBs in the fourth quarter of 2022 but continued to decline at large non-G-SIB and other banks (figure 3.4). The decreases in tangible common equity ratios of

[10] See Board of Governors of the Federal Reserve System (2023), *Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank* (Washington: Board of Governors, April), https://www.federalreserve.gov/publications/files/svb-review-20230428.pdf.

[11] See Federal Deposit Insurance Corporation (2023), *FDIC's Supervision of Signature Bank* (Washington: FDIC, April), https://www.fdic.gov/news/press-releases/2023/pr23033a.pdf.

Figure 3.4. The ratio of tangible common equity to tangible assets increased for global systemically important banks but decreased for other banks



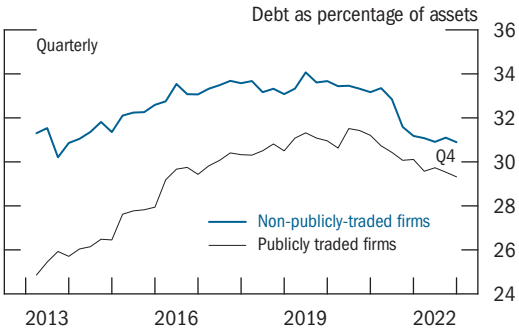
Source: For data through 1996, Federal Financial Institutions Examination Council, Call Report Form FFIEC 031, Consolidated Reports of Condition and Income (Call Report). For data from 1997 onward, Federal Reserve Board, Form FR Y-9C, Consolidated Financial Statements for Holding Companies; and Federal Financial Institutions Examination Council, Call Report Form FFIEC 031, Consolidated Reports of Condition and Income (Call Report).

non–G-SIBs were partly due to a substantial drop in tangible equity from declines in fair value on Treasury and agency-guaranteed mortgage-backed securities in AFS portfolios.

Banks' overall vulnerability to future credit losses appeared moderate

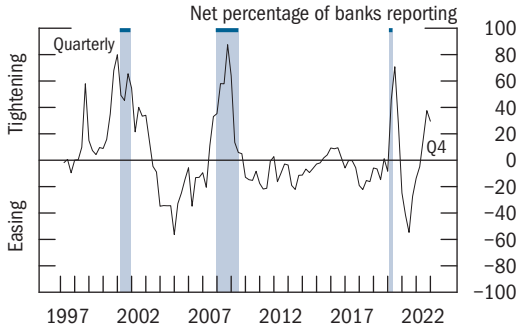
Aggregate credit quality in the nonfinancial sector remained strong even as delinquency rates in certain loan segments—such as auto loans, credit cards, and CRE loans backed by office and retail buildings—have increased. Borrower leverage for bank commercial and industrial (C&I) loans continued to trend downward in the fourth quarter of 2022 relative to the start of the year (figure 3.5). Moreover, according to data from the January 2023 SLOOS, banks continued to tighten lending standards on C&I loans and CRE loans in the second half of 2022 (figure 3.6;

Figure 3.5. Borrower leverage for bank commercial and industrial loans continued to decrease



Source: Federal Reserve Board, Form FR Y-14Q (Schedule H.1), Capital Assessments and Stress Testing.

Figure 3.6. Lending standards for bank commercial and industrial loans have tightened



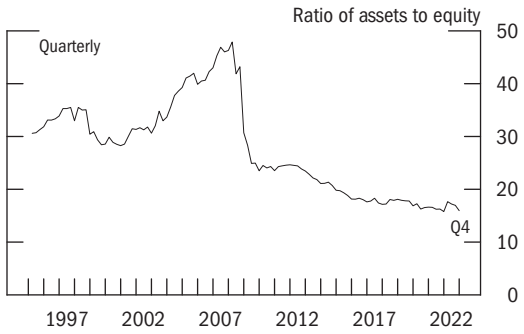
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices; Federal Reserve Board staff calculations.

see also figure 1.16). At the same time, most banks reported weaker loan demand, especially in interest-rate-sensitive segments such as residential real estate and CRE. A material decrease in commercial property prices could lead to credit losses for banks with sizable CRE exposures (see the box "Financial Institutions' Exposure to Commercial Real Estate Debt"). Overall, bank profitability was below its 2021 level but close to its pre-pandemic average.

Leverage at broker-dealers remained low

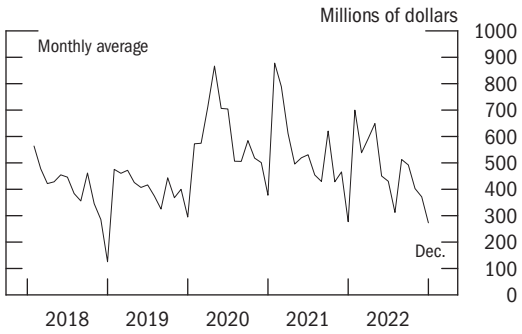
Broker-dealer leverage ratios decreased slightly in 2022:Q4 and remained near their recent historically low levels (figure 3.7). Dealers' equity growth has generally kept up with the growth of their assets, boosted in part by trading profits that have remained strong despite seasonal declines in 2022:Q4 (figures 3.8 and 3.9). Net secured borrowing of primary dealers has increased since

Figure 3.7. Leverage at broker-dealers remained historically low



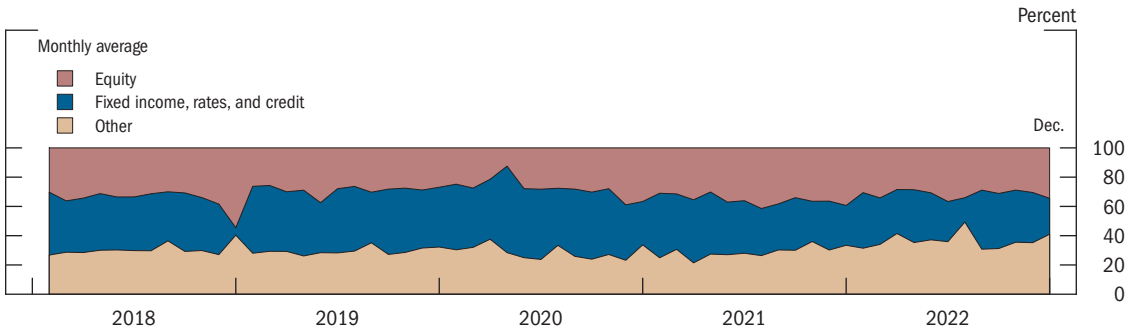
Source: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

Figure 3.8. Trading profits decreased in 2022:Q4, consistent with seasonal patterns



Source: Federal Reserve Board, Reporting, Recordkeeping, and Disclosure Requirements Associated with Regulation VV (Proprietary Trading and Certain Interests in and Relationships with Covered Funds, 12 C.F.R. pt. 248).

Figure 3.9. Shares of trading profits by trading desks



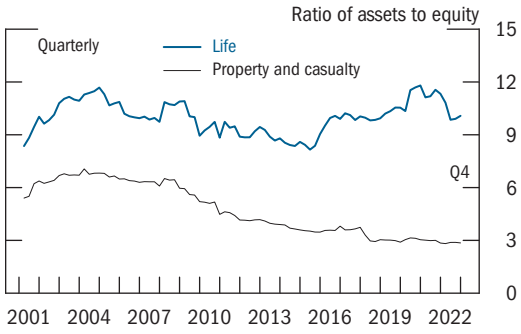
Source: Federal Reserve Board, Reporting, Recordkeeping, and Disclosure Requirements Associated with Regulation VV (Proprietary Trading and Certain Interests in and Relationships with Covered Funds, 12 C.F.R. pt. 248).

the November report but remained near its historical average, while gross financing and borrowing have increased. Primary dealer Treasury market activities, including market making and repo, increased since the November report but did not keep pace with the amount of Treasury securities available to investors. During the volatile period in mid-March, dealers faced elevated client flows that resulted in their inventories of Treasury securities increasing somewhat, suggesting that dealers continued to intermediate in Treasury markets.

In the March 2023 Senior Credit Officer Opinion Survey on Dealer Financing Terms (SCOOS), which covered the period between December 2022 and February 2023, dealers reported that they had, on net, tightened terms associated with securities financing and over-the-counter derivatives transactions offered to REITs and nonfinancial corporations.[12] Respondents also reported that liquidity and market functioning for non-agency residential mortgage-backed securities and consumer asset-backed securities (ABS) had improved. In response to a set of special questions about volatility products referencing interest rates, foreign exchange (FX), and credit spreads, respondents reported that, since January 2021, clients' interest in trading volatility products had increased, driven by increased demand for hedging volatility, and that market liquidity and functioning had improved for FX and credit spread volatility products.

Leverage at life insurers edged up but remained below its pandemic peak

Figure 3.10. Leverage at life insurance companies edged up but remained below its pandemic peak



Source: Generally accepted accounting principles data from 10-Q and 10-K filings accessed via S&P Global, Capital IQ Pro.

Leverage at life insurers increased slightly since the previous report, but it remained near the middle of its historical range and well below its pandemic peak. Meanwhile, leverage at property and casualty insurers stayed low relative to historical levels (figure 3.10). Life insurers continued to allocate a high percentage of assets to instruments with higher credit or liquidity risk, such as high-yield corporate bonds, privately placed corporate bonds, and alternative investments. These assets can suffer sudden increases in default risk, putting pressure on insurer capital positions. Rising interest rates have likely had a positive effect on the profitability of life insurers, as their liabilities generally had longer effective

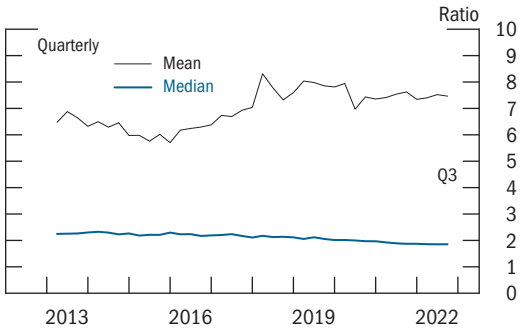
[12] The SCOOS is available on the Federal Reserve's website at https://www.federalreserve.gov/data/scoos.htm.

durations than their assets. However, an unexpected and sharp surge in interest rates may induce policyholders to surrender their contracts at a higher-than-expected rate, potentially causing some funding strains.

Hedge fund leverage remained somewhat elevated, especially at the largest funds

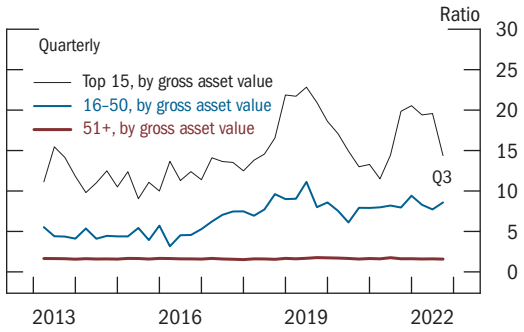
According to comprehensive data collected by the Securities and Exchange Commission (SEC), average on-balance-sheet leverage and average gross leverage of hedge funds, which includes off-balance-sheet derivatives exposures, remained above their historical averages in the third quarter of 2022 (figure 3.11). While average financial leverage was modest, leverage at the largest hedge funds was substantially higher. The average on-balance-sheet leverage of the top 15 hedge funds by gross asset value, which at times has exceeded 20-to-1, decreased in 2022:Q3 to about 14-to-1 (figure 3.12). These high levels of leverage are consistent with the low haircuts on Treasury collateral in the noncentrally cleared bilateral repo market.[13] More recent data from the March 2023 SCOOS suggested that the use of financial leverage by hedge funds had not changed, on net, between December 2022 and February 2023 amid unchanged price and nonprice borrowing terms (figure 3.13).

Figure 3.11. Leverage at hedge funds remained elevated



Source: Securities and Exchange Commission, Form PF, Reporting Form for Investment Advisers to Private Funds and Certain Commodity Pool Operators and Commodity Trading Advisors.

Figure 3.12. Leverage at the largest hedge funds decreased but remained high

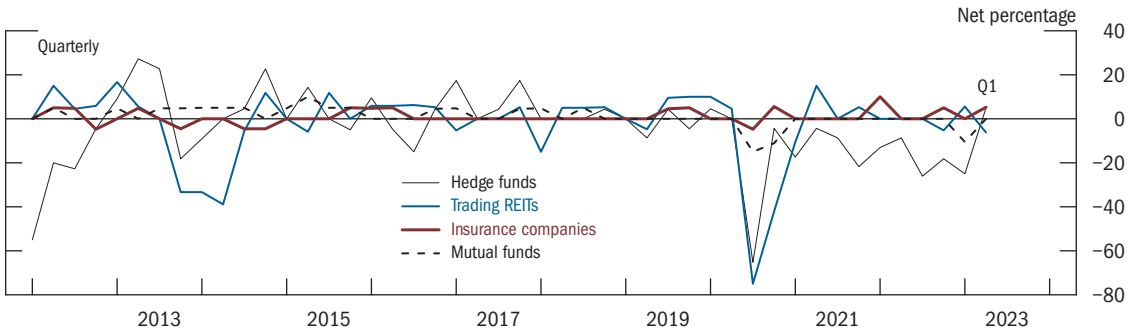


Source: Securities and Exchange Commission, Form PF, Reporting Form for Investment Advisers to Private Funds and Certain Commodity Pool Operators and Commodity Trading Advisors.

Data from the Commodity Futures Trading Commission Traders in Financial Futures report showed that, before the bank stresses of March 2023, leveraged funds' short Treasury futures positions had increased notably since the November report. In the past, high levels of short positions

[13] See Samuel J. Hempel, R. Jay Kahn, Robert Mann, and Mark Paddrik (2022), "OFR's Pilot Provides Unique Window into the Non-centrally Cleared Bilateral Repo Market," *The OFR Blog*, December 5, https://www.financialresearch.gov/the-ofr-blog/2022/12/05/fr-sheds-light-on-dark-corner-of-the-repo-market.

Figure 3.13. Dealers indicated that the use of leverage by hedge funds was unchanged recently



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

in Treasury futures held by leveraged funds coincided with hedge fund activities in Treasury cash-futures basis trades, and that trade may have gained in popularity recently as well. The basis trade is often highly leveraged and involves the sale of a Treasury futures and the purchase of a Treasury security deliverable into the futures contract, usually financed through repo.[14] Amid increased interest rate volatility following the SVB failure, some hedge funds that were short Treasury futures or were engaged in other bets that U.S. short-term rates would continue to rise faced margin calls and partially unwound those positions. The unwinds may have contributed to the large movements and increased volatility in short-term Treasury markets and to volatility in interest rate markets.

Like hedge funds, private credit funds are private pooled investment vehicles about which relatively little is known. The box "Financial Stability Risks from Private Credit Funds Appear Limited" assesses the vulnerabilities posed by private credit funds.

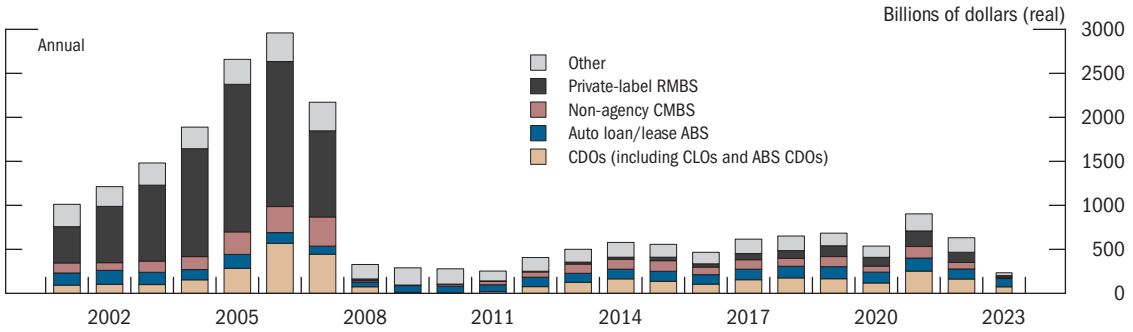
Issuance of non-agency securities by securitization vehicles has slowed

Non-agency securitization issuance—which increases the amount of leverage in the financial system—slowed significantly in 2022 and in the first quarter of 2023 (figure 3.14).[15] In particular,

[14] Between 2018 and March 2020, hedge funds built up large positions in the basis trade, which were then unwound, along with other Treasury trades, in March 2020 and reportedly contributed to Treasury market dislocations at that time. See Ayelen Banegas, Phillip J. Monin, and Lubomir Petrasek (2021), "Sizing Hedge Funds' Treasury Market Activities and Holdings," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, October 6), https://doi.org/10.17016/2380-7172.2979.

[15] Securitization allows financial institutions to bundle loans or other financial assets and sell claims on the cash flows generated by these assets as tradable securities, much like bonds. By funding assets with debt issued by investment funds known as special purpose entities (SPEs), securitization can add leverage to the financial system, in part because SPEs are generally subject to regulatory regimes, such as risk retention rules, that are less stringent than banks' regulatory capital requirements. Examples of the resulting securities include collateralized loan obligations (predominantly backed by leveraged loans), ABS (often backed by credit card and auto debt), CMBS, and residential mortgage-backed securities.

Figure 3.14. Issuance of non-agency securitized products has slowed significantly since 2021



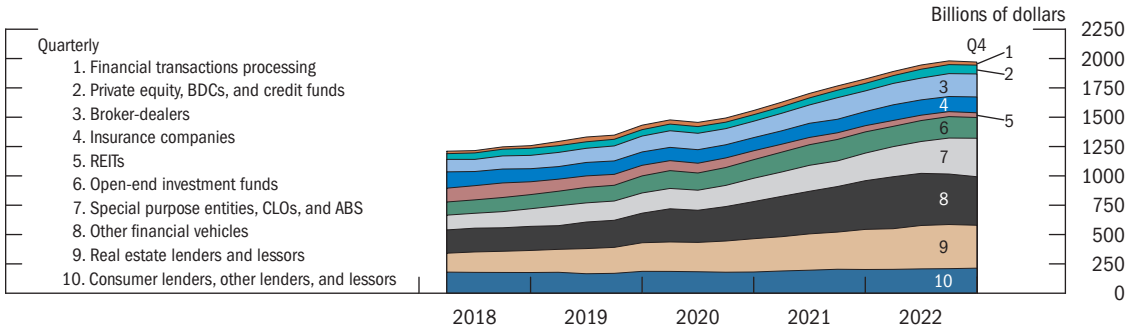
Source: Green Street, Commercial Mortgage Alert's CMBS Database and Asset-Backed Alert's ABS Database; consumer price index, Bureau of Labor Statistics via Haver Analytics.

non-agency CMBS issuance volumes were well below their five-year averages. Credit spreads of non-agency securitized products have narrowed since the November report. However, spreads between senior and junior tranches were higher, particularly for those deal types experiencing weakness in underlying credit, such as subprime consumer ABS deals and CMBS. Most securitization sectors exhibited relatively stable credit performance, indicated by low loan delinquency or default rates compared with historical long-term averages. However, delinquencies in non-agency CMBS backed by CRE remained relatively high.

Bank lending to nonbank financial institutions remained high

The growth in bank lending to NBFIs, which can be informative about the amount of leverage used by NBFIs and shed light on their interconnectedness with the rest of the financial system, slowed significantly since the November report. Banks' credit commitments to NBFIs grew rapidly in recent years and reached about $2 trillion in the fourth quarter of 2022 (figure 3.15). The year-over-year growth rate in committed amounts to special purpose entities and securitization

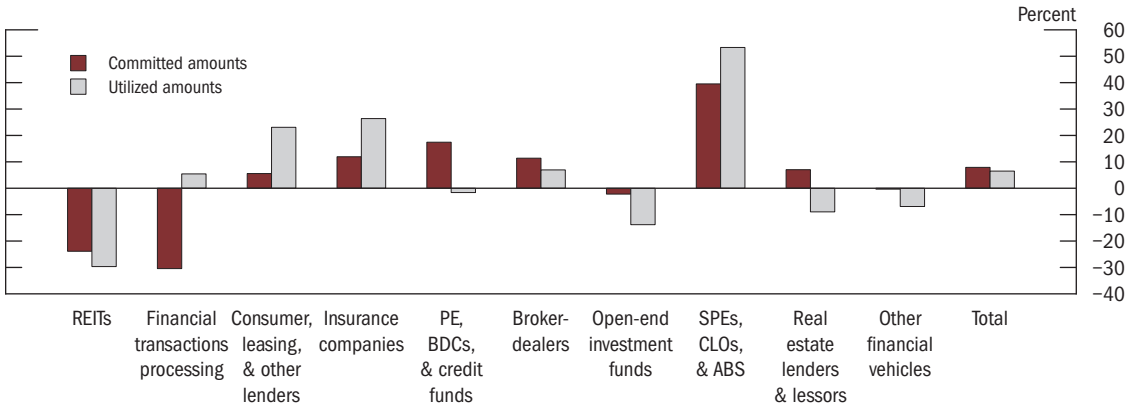
Figure 3.15. Bank credit commitments to nonbank financial institutions remained high



Source: Federal Reserve Board, Form FR Y-14Q (Schedule H.1), Capital Assessments and Stress Testing.

vehicles was about 40 percent at the end of last year, more than double its growth rate in 2021 (figure 3.16). Banks are also important creditors to nonbank mortgage companies. Nonbank mortgage companies' profitability has come under pressure as mortgage originations have declined; should mortgage delinquencies rise, some of these companies could become distressed and see a reduction in their access to credit. Utilization rates on credit lines to NBFIs remained steady and averaged about 50 percent of total committed amounts. Delinquency rates on banks' lending to NBFIs have been lower than delinquency rates for the nonfinancial business sector since the data became available in 2013. However, the limited information available on NBFIs' alternative funding sources, and the extent to which those sources may be fragile, could contribute to increased vulnerabilities in the financial sector.

Figure 3.16. Aggregate loan commitments and utilization rates of nonbank financial institutions increased during 2022 but varied across sectors



Source: Federal Reserve Board, Form FR Y-14Q (Schedule H.1), Capital Assessments and Stress Testing.

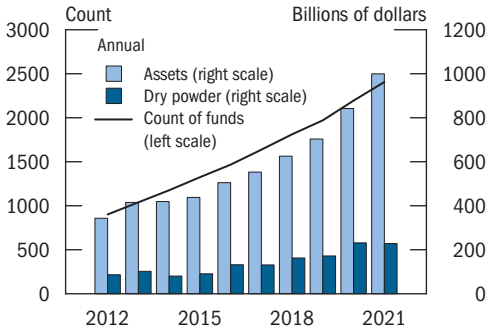
Box 3.2. Financial Stability Risks from Private Credit Funds Appear Limited

Private credit refers to direct lending to businesses by nonbank institutions and is distinct from bank loans, leveraged loans, or corporate bonds that involve lending by banks, by bank-led syndicates, or through public markets, respectively. Within the private credit market, private credit funds are the largest class of lenders and manage over five times more in assets than business development companies, the second-largest class of lenders. Private credit funds are pooled investment vehicles that originate or invest in loans to private—that is, not publicly traded—businesses. Only institutional investors or high-net-worth individuals are eligible to invest in such funds. Despite private credit funds' growing presence, available information about their activities and risks is limited. Using the SEC Form PF data, this discussion examines the financial stability risks that private credit funds can pose through their use of financial leverage or through liquidity transformation.[1] The analysis suggests that such risks are likely limited. While private credit funds have grown rapidly since the 2007–09 financial crisis and the assets they hold are mostly illiquid, the funds typically use little leverage, and investor redemption risks appear low. However, the sector remains opaque, and it is difficult to assess the default risk in private credit portfolios.

Since the 2007–09 financial crisis, private credit funds have experienced substantial growth, as the privately negotiated loans that they extend have become an increasingly important source of credit for some businesses, particularly middle-market companies.[2] As of 2021:Q4, their assets under management (AUM) stood at $1 trillion, and the estimated "dry powder" (committed but uncalled capital) amounted to $228 billion (figure A).[3] The industry grew further in 2022, according to private-sector estimates.[4] Over the past decade, private credit fund assets grew faster than leveraged loans (at annual rates of 13 percent and 10 percent, respectively) and as of 2021:Q4 were similar in size to the volume of outstanding leveraged loans and U.S. high-yield bonds (approximately $1.4 trillion and $1.5 trillion, respectively).

(continued)

Figure A. Private credit fund assets and dry powder



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

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[1] Private credit funds are structured as "private funds"—that is, issuers that would be investment companies according to the Investment Company Act of 1940 but for section 3(c)(1) or 3(c)(7) of that act. SEC-registered investment advisers with $150 million or more in regulatory assets under management in private funds provide information about their private funds on Form PF. Form PF does not break out private credit funds. To identify private credit funds in Form PF, Board staff (1) name-matched a sample of private credit funds from PitchBook; (2) searched fund names for terms commonly included in private credit fund names (for example, "senior credit" and "mezzanine"); (3) included funds filing as hedge funds on Form PF whose reported strategy allocations were mostly to private credit (based on a keyword search of strategy descriptions); and (4) removed collateralized loan obligations (CLOs), collateralized debt obligations (CDOs), and various types of other funds (for example, equity hedge funds) that were erroneously included in the previous steps. The sample does not include business development companies, CLOs or CDOs, registered investment companies pursuing private credit strategies, or private credit funds that are too small or are not required to file Form PF.

[2] Middle-market businesses are defined by the National Center for the Middle Market at Ohio State University's Fisher College of Business as businesses with annual revenues between $10 million and $1 billion.

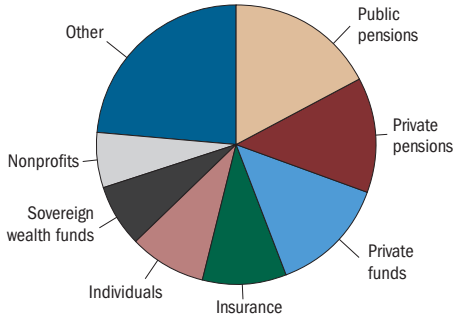
[3] For comparison, business development companies, the second-largest class of lenders, managed about $180 billion in assets.

[4] Preqin estimates that the industry's total AUM grew by 8.9 percent in 2022.

Box 3.2—*continued*

Private credit funds follow a diverse set of investment strategies and invest in loans with varying characteristics. Direct lending funds are the largest category of private credit funds in terms of assets. These funds hold senior secured, unrated, floating-rate loans to middle-market companies. Some private credit funds invest in loans that are categorized under a broad class of credit opportunities. For instance, distressed credit funds lend to businesses experiencing liquidity problems or invest in deeply discounted debt. Regardless of strategy, the loans held by private credit funds appear largely illiquid, with their valuations not based on prices readily available in active markets.[5]

Figure B. Shares of private credit fund assets held by different investors



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

Investors in private credit funds are diversified institutional investors and high-net-worth individuals (figure B). Based on Form PF, as of 2021:Q4, public and private pension funds held about 31 percent ($307 billion) of aggregate private credit fund assets. Other private funds made up the second-largest cohort of investors at 14 percent ($136 billion) of assets, while insurance companies and individual investors each had about 9 percent ($92 billion). Given the rapid growth of private credit funds, these investors are increasingly indirectly exposed to the liquidity and credit risks of assets in private credit fund portfolios.

Financial stability risks associated with investor redemptions from private credit funds appear low. Most private credit funds have a closed-end fund structure and typically lock up the capital of their investors (that is, limited partners) for 5 to 10 years. Those funds that are structured as hedge funds routinely restrict share redemptions of their investors through redemption notice periods, lockups, and gates.[6] Thus, private credit funds engage in limited liquidity and maturity transformation.

Although private credit funds are not runnable themselves, they can pose liquidity demands on their investors in the form of capital calls, the timing of which investors do not control.[7] Generally, investors have 10-day notice periods to provide capital when called, though notice periods may differ across funds. Although most institutional investors would likely be able to manage such capital calls, unanticipated calls may pose a liquidity risk for some investors, potentially forcing them to sell other assets to raise liquidity.

Risks to financial stability from leverage at private credit funds appear low. Indeed, most private credit funds are unlevered, with no borrowings or derivative exposures. A minority of funds, however,

(continued)

[5] The majority of private credit funds' assets rely on values quoted by market participants or estimated by valuation models rather than through real-time transactions; hence, they are classified as Level 2 or 3 under generally accepted accounting principles.

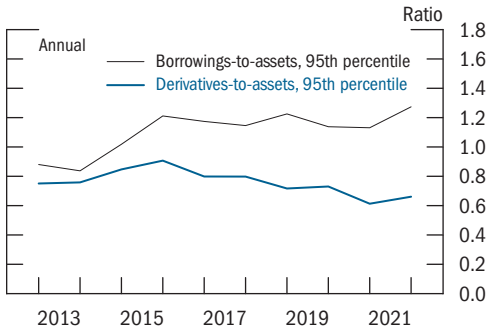
[6] For the purposes of filing Form PF, a private equity fund is a private fund that does not offer investors redemption rights in the ordinary course and is not a hedge fund or one of the other types of funds defined in the form (liquidity fund, real estate fund, securitized asset fund, or venture capital fund). There is no requirement that a private equity fund conduct private equity transactions such as leveraged buyouts. On Form PF, a hedge fund is defined as a private fund whose adviser may be paid a performance fee, can take leverage, and can sell securities short; the definition does not mention investor share restrictions.

[7] It is estimated that, as of 2021:Q4, pensions had $69 billion in uncalled capital commitments to private credit funds, while insurance companies had $23 billion. Uncalled capital (dry powder) is estimated as regulatory AUM (which includes uncalled capital commitments) minus total balance sheet assets.

Box 3.2—*continued*

use modest amounts of financial or synthetic leverage. Figure C shows that the most levered funds (those at the 95th percentile) have borrowings-to-assets ratios of about 1.27 and derivatives-to-assets ratios of about 0.66. In the aggregate, private credit funds borrowed about $200 billion in 2021:Q4, mainly from U.S. financial institutions, and held about $200 billion of derivative gross notional exposure.[8] Risks to lenders of private credit funds, typically banks, appear moderate due to the relatively modest amount of borrowings of private credit funds and their secured nature.

Figure C. Leverage ratios of private credit funds



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

Overall, the financial stability vulnerabilities posed by private credit funds appear limited. Most private credit funds use little leverage and have low redemption risks, making it unlikely that these funds would amplify market stress through asset sales. However, a deterioration in credit quality and investor risk appetite could limit the capacity of private credit funds to provide new financing to firms that rely on private credit. Moreover, despite new insights from Form PF, visibility into the private credit space remains limited. Comprehensive data are lacking on the forms and terms of the financing extended by private credit funds or on the characteristics of their borrowers and the default risk in private credit portfolios.

[8] Form PF has detailed data on derivative exposures for only the relatively small subset of private credit funds filing as qualifying hedge funds. The derivatives exposures of these funds are concentrated in credit default swaps, FX derivatives, and interest rate derivatives.

4 | Funding Risks

Funding strains were notable for some banks, but overall funding risks across the banking system were low; meanwhile, structural vulnerabilities persisted in other sectors that engage in liquidity transformation

The failures of SVB and Signature Bank, along with strains at some other banks, highlighted vulnerabilities associated with high concentrations of uninsured deposits. Uninsured deposits are prone to runs, in part because they lack an explicit government guarantee. From the start of the pandemic in 2020 to the end of 2021—a period when interest rates remained low—banks received $3.7 trillion in domestic deposits, most of which were uninsured. As interest rates increased throughout 2022, bank deposits became less attractive for depositors and banks experienced outflows, led by uninsured deposits. As of the fourth quarter of 2022, aggregate uninsured deposits stood at $7.5 trillion. Although aggregate levels of uninsured deposits in the banking system were high, SVB and Signature Bank were outliers in terms of their heavy reliance on uninsured deposits, as most banks had a much more balanced mix of liabilities.

Overall, estimated runnable money-like financial liabilities decreased 1.6 percent to $19.6 trillion (75 percent of nominal GDP) over the past year. As a share of GDP, runnable liabilities continued their post-pandemic decline but remained above their historical median (table 4.1 and figure 4.1). Large banks that were subject to the liquidity coverage ratio (LCR) continued to maintain levels of high-quality liquid assets (HQLA) that suggested that their liquid resources would be sufficient to withstand expected short-term cash outflows.

Prime MMFs and other cash-investment vehicles remain vulnerable to runs and, hence, contribute to the fragility of short-term funding markets. In addition, some cash management vehicles, including retail prime MMFs, government MMFs, and short-term investment funds, maintain stable net asset values (NAVs) that make them susceptible to sharp increases in interest rates. The market capitalization of the stablecoin sector continued to decline, and the sector remains vulnerable to liquidity risks like those of cash-like vehicles. Some open-end bond mutual funds continued to be susceptible to large redemptions because they must allow shareholders to redeem every day even though the funds hold assets that can face losses and become illiquid amid stress. Liquidity risks at central counterparties (CCPs) remained low, while liquidity risks at life insurers appeared elevated.

Table 4.1. Size of selected instruments and institutions

Item	Outstanding/total assets (billions of dollars)	Growth, 2021:Q4–2022:Q4 (percent)	Average annual growth, 1997–2022:Q4 (percent)
Total runnable money-like liabilities*	19,627	−1.6	4.7
Uninsured deposits	7,506	−6.8	12.0
Domestic money market funds**	4,685	.9	5.4
Government	3,959	−3.6	15.3
Prime	616	37.7	−.7
Tax exempt	111	27.1	−2.2
Repurchase agreements	3,601	−1.6	4.9
Commercial paper	1,261	15.8	2.7
Securities lending***	805	2.8	7.1
Bond mutual funds	4,250	−20.4	8.5

Note: The data extend through 2022:Q4 unless otherwise noted. Outstanding amounts are in nominal terms. Growth rates are measured from Q4 of the year immediately preceding the period through Q4 of the final year of the period. Total runnable money-like liabilities exceed the sum of listed components. Unlisted components of runnable money-like liabilities include variable-rate demand obligations, federal funds, funding-agreement-backed securities, private liquidity funds, offshore money market funds, short-term investment funds, local government investment pools, and stablecoins.

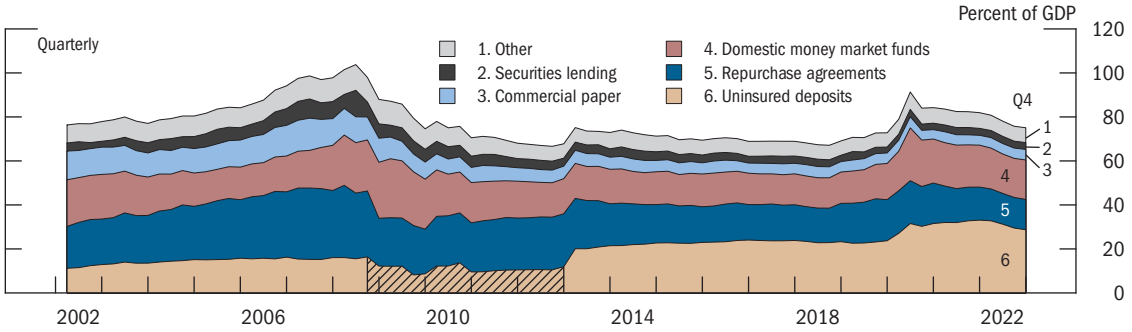
* Average annual growth is from 2003:Q1 to 2022:Q4.

** Average annual growth is from 2001:Q1 to 2022:Q4.

*** Average annual growth is from 2000:Q1 to 2022:Q3. Securities lending includes only lending collateralized by cash.

Source: Securities and Exchange Commission, Private Funds Statistics; iMoneyNet, Inc., Offshore Money Fund Analyzer; Bloomberg Finance L.P.; Securities Industry and Financial Markets Association: U.S. Municipal Variable-Rate Demand Obligation 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 Z.1, "Financial Accounts of the United States"; Federal Financial Institutions Examination Council, Consolidated Reports of Condition and Income (Call Report); Morningstar, Inc., Morningstar Direct; DeFiLlama.

Figure 4.1. Ratios of runnable money-like liabilities to GDP edged down but remained above their historical medians

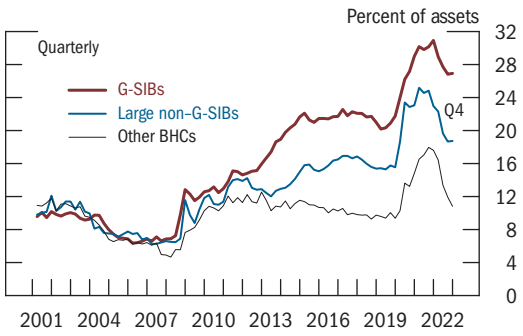


Source: Securities and Exchange Commission, Private Funds Statistics; iMoneyNet, Inc., Offshore Money Fund Analyzer; Bloomberg Finance L.P.; Securities Industry and Financial Markets Association: U.S. Municipal Variable-Rate Demand Obligation Update; Risk Management Association, Securities Lending Report; 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 Z.1, "Financial Accounts of the United States"; Federal Financial Institutions Examination Council, Consolidated Reports of Condition and Income (Call Report); Bureau of Economic Analysis, gross domestic product via Haver Analytics; DeFiLlama.

The amount of high-quality liquid assets decreased for banks but remained high compared with pre-pandemic levels

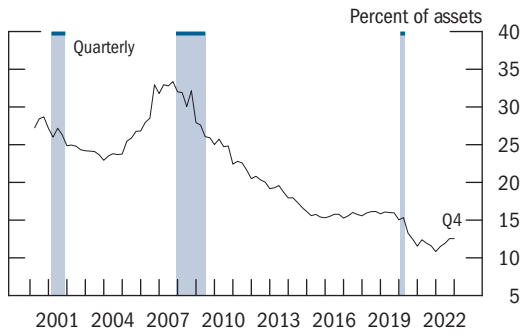
The amount of HQLA decreased across all types of banks over the past year, driven by decreases in reserves and reductions in market values of securities portfolios due to rising interest rates (figure 4.2). Nevertheless, aggregate bank reserves remained above $3 trillion, significantly higher than pre-pandemic levels. Throughout 2022, as interest rates increased, deposit outflows picked up, as higher-paying deposit alternatives became more attractive to businesses and households. Deposits declined in the fourth quarter of 2022 at a 7 percent annual rate, and the pace of outflows had increased somewhat in January and February before the banking sector stress in March 2023. Some banks increased their reliance on wholesale funding sources, though banks' overall reliance on short-term wholesale funding remained near historically low levels (figure 4.3). Even with the declines in HQLA, U.S. G-SIBs' LCRs—the requirement that banks must hold enough HQLA to fund estimated cash outflows during a hypothetical stress event for 30 days—remained well above requirements.

Figure 4.2. The amount of high-quality liquid assets held by banks decreased in 2022



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

Figure 4.3. Banks' reliance on short-term wholesale funding remained low



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

Some banks that relied heavily on uninsured deposits experienced notable funding strains

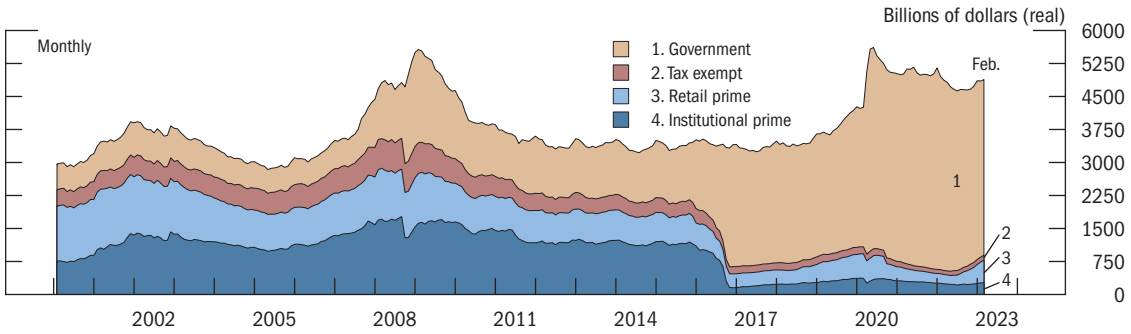
Aggregate liquidity in the banking system appeared ample; nonetheless, some banks experienced significant funding strains following the failures of SVB and Signature Bank (see the box "The Bank Stresses since March 2023"). These banks, including First Republic Bank, which subsequently failed, often shared similar weaknesses—notably, a combination of a heavy reliance on uninsured deposits and excessive exposure to interest rate risk. Data on bank assets and liabilities show that small domestic banks—defined as banks outside the top 25 in terms of domestic

assets—initially experienced rapid deposit outflows in the wake of the SVB and Signature Bank failures. However, these outflows had slowed considerably by the end of March.[16] The Federal Reserve, together with the U.S. Department of the Treasury and the FDIC, took decisive actions to reduce funding strains in the banking system (see the box "The Federal Reserve's Actions to Protect Bank Depositors and Support the Flow of Credit to Households and Businesses"). Banks with funding needs increased borrowing from the Federal Reserve, including a notable increase in discount window borrowing and additional borrowing from the new Bank Term Funding Program (BTFP). In addition, Federal Home Loan Banks' total debt outstanding grew about $250 billion, to $1.5 trillion, during the week ending March 17, 2023, to meet a surge in demand for borrowing by their member banks.

Structural vulnerabilities remained at some money market funds and other cash-management vehicles

Prime MMFs remain a prominent vulnerability due to their susceptibility to large redemptions and the significant role they play in short-term funding markets. Since the November report, AUM in prime MMFs offered to the public increased $270 billion (53 percent), driven by $240 billion in inflows into retail prime funds (figure 4.4).

Figure 4.4. Growth in money market funds was concentrated in retail prime funds



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

In the immediate aftermath of the failures of SVB and Signature Bank, government MMFs had a surge in inflows, but prime MMFs experienced a jump in redemptions. Although outflows from prime MMFs eased after a few days, the episode illustrated again that these funds continue to be at risk of large redemptions during episodes of financial stress.

[16] See Board of Governors of the Federal Reserve System (2023), Statistical Release H.8, "Assets and Liabilities of Commercial Banks in the United States," https://www.federalreserve.gov/releases/h8.

Box 4.1. The Federal Reserve's Actions to Protect Bank Depositors and Support the Flow of Credit to Households and Businesses

In March 2023, the domestic and global banking sector experienced acute stress, following a loss of confidence in SVB and Signature Bank. After experiencing bank runs of unprecedented speed, SVB and Signature Bank failed, and there were broader spillovers to the banking sector. Credit Suisse came under renewed pressure, leading to its acquisition by UBS in a deal that involved liquidity support and loss sharing from the Swiss government as well as the write-off of a certain type of contingent capital instruments (see the box "The Bank Stresses since March 2023"). The fast propagation of these stresses was compounded by novel factors. Social media and messaging apps facilitated the communication of perceived bank concerns among the network of uninsured depositors, and the availability of information technology facilitated the movement of deposits. In response, the Federal Reserve, together with the FDIC and the U.S. Department of the Treasury, took decisive actions to protect bank depositors and support the continued flow of credit to households and businesses. These actions reduced stress across the financial system, supporting financial stability and minimizing the effect on businesses, households, taxpayers, and the broader economy.

On Sunday, March 12, the Federal Reserve, together with the FDIC and the U.S. Department of the Treasury, announced two actions designed to support all bank depositors and the continued flow of credit to households and businesses. After receiving a recommendation from the boards of the FDIC and the Federal Reserve, and consulting with the President, the Treasury Secretary approved a systemic risk exception, enabling the FDIC to complete its resolution of SVB and Signature Bank in a manner that fully protects all depositors. Depositors were given full access to their accounts on the Monday following the announcement. In contrast to depositors, shareholders and certain unsecured debt holders were not protected, and senior management at these banks was removed. The losses associated with these actions, later estimated by the FDIC to be $22.5 billion, will not be borne by taxpayers and instead will be borne by the Deposit Insurance Fund, which will be replenished by special assessments on banks, as required by law.[1]

At the same time, on Sunday, March 12, with approval by the Treasury Secretary, the Federal Reserve Board announced the establishment of the BTFP, making available additional funding to eligible depository institutions. The BTFP offers loans of up to one year in length to federally insured banks, savings associations, and credit unions, and to U.S. branches and agencies of foreign banks. New loans can be requested under the BTFP until at least March 11, 2024. To borrow from the BTFP, eligible institutions can pledge any collateral eligible for purchase by the Federal Reserve in open market operations, such as U.S. Treasury securities, U.S. agency securities, and U.S. agency mortgage-backed securities. The BTFP extends loans against the par value of eligible collateral—that is, the face amount of the securities without giving effect to any declines in fair value. With approval of the Treasury Secretary, the U.S. Department of the Treasury has committed to make available up to $25 billion from the Exchange Stabilization Fund as a backstop for the BTFP. The Federal Reserve does not anticipate that it will be necessary to draw on these backstop funds.

The BTFP will be an additional source of borrowing for depository institutions against high-quality securities, which eliminates an institution's need to quickly sell those securities should a significant fraction

(continued)

[1] The exact cost of the resolution of SVB and Signature Bank will be determined when the FDIC terminates the receiverships. Current estimates from the FDIC about the cost to its Deposit Insurance Fund from the failure of SVB and Signature Bank are approximately $20 billion and $2.5 billion, respectively. See Federal Deposit Insurance Corporation (2023), "Subsidiary of New York Community Bancorp, Inc., to Assume Deposits of Signature Bridge Bank, N.A., from the FDIC," press release, March 19, https://www.fdic.gov/news/press-releases/2023/pr23021.html; and Federal Deposit Insurance Corporation (2023), "First–Citizens Bank & Trust Company, Raleigh, NC, to Assume All Deposits and Loans of Silicon Valley Bridge Bank, N.A., from the FDIC," press release, March 26, https://www.fdic.gov/news/press-releases/2023/pr23023.html.

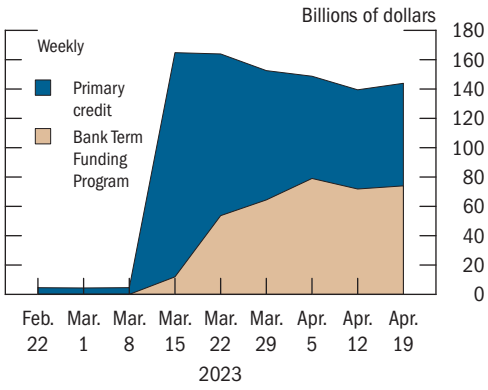
Box 4.1.—*continued*

of depositors withdraw their funding suddenly or the financial system curtail bank funding, helping assure depositors that banks have the ability to meet the needs of all their customers.

In addition, depository institutions may continue to obtain liquidity against a wide range of collateral through the discount window, which remains open and available. Moreover, at the same time as the BTFP was established, it was announced that the discount window will apply the same margins used for the securities eligible for the BTFP.

Following the acute banking stresses in early March and the announcements on March 12, primary credit extended through the discount window increased from less than $5 billion to more than $150 billion during the first week and quickly fell back to about $70 billion, whereas credit extended through the BTFP increased steadily by smaller increments and stabilized in a range between $70 billion and $80 billion (figure A).

Figure A. Outstanding balances of primary credit and Bank Term Funding Program



Source: Federal Reserve Board, Statistical Release H.4.1, "Factors Affecting Reserve Balances."

The Federal Reserve is prepared to address any liquidity pressures that may arise and is committed to ensuring that the U.S. banking system continues to perform its vital roles of ensuring that depositors' savings remain safe and providing access to credit to households and businesses in a manner that promotes strong and sustainable economic growth. These additional funding sources bolster the capacity of the banking system to safeguard deposits and ensure the ongoing provision of money and credit to the economy. The additional funding to eligible depository institutions will continue to serve as an important backstop against further bank stresses and support the flow of credit.

In international markets, Credit Suisse came under renewed pressure, and UBS agreed to merge with the firm on Sunday, March 19, in a deal that involved the write-off of a certain type of contingent convertible capital instruments as well as liquidity support and loss sharing from the Swiss government. On Sunday, March 19, the Federal Reserve, together with the Bank of Canada, the Bank of England, the Bank of Japan, the European Central Bank, and the Swiss National Bank, announced measures to mitigate the effects of strains on global funding markets via the standing U.S. dollar liquidity swap line arrangements. The network of swap lines among these central banks is a set of available standing facilities and serves as an important liquidity backstop to ease strains in global funding markets, thereby helping mitigate the effects of such strains on the supply of credit to U.S. households and businesses (see the box "Transmission of Stress Abroad to the U.S. Financial System"). To improve the swap lines' effectiveness in providing U.S. dollar funding, these central banks agreed to increase the frequency of seven-day maturity operations from weekly to daily and to continue at this frequency. These daily operations commenced on Monday, March 20. Following the announcement on March 19, demand for these swap lines ticked up by slightly over $100 million and then fell back to levels below $500 million observed before the announcement. These central banks announced on April 25 that the frequency of swap line operations will revert from daily back to once a week beginning on May 1.

Other cash-management vehicles, including dollar-denominated offshore MMFs and short-term investment funds, also invest in money market instruments, engage in liquidity transformation, and are vulnerable to runs. Since November, estimated aggregate AUM of these cash-management vehicles has edged up to about $1.7 trillion. Currently, between $600 billion and $1.5 trillion of these vehicles' AUM are in portfolios like those of U.S. prime MMFs, and large redemptions from these vehicles also have the potential to destabilize short-term funding markets.[17]

Many cash-management vehicles—including retail and government MMFs, offshore MMFs, and short-term investment funds—seek to maintain stable NAVs that are typically rounded to $1.00. When short-term interest rates rise sharply or portfolio assets lose value for other reasons, the market values of these funds may fall below their rounded share prices, which can put the funds under strain, particularly if they also have large redemptions.

The market value of many stablecoins declined, and they remain vulnerable to runs

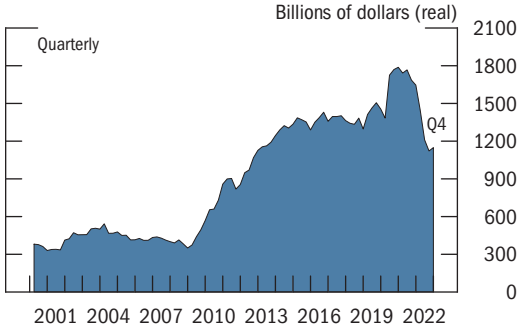
The total market capitalization of stablecoins, which are digital assets designed to maintain a stable value relative to a national currency or another reference asset, has fallen 21 percent since the beginning of 2022 to $130 billion. While not widely used as a cash-management vehicle by institutional and retail investors or for transactions for real economic activity, stablecoins are important for digital asset investors and remain structurally vulnerable to runs. On March 10, 2023, amid reports of large outflows of uninsured deposits at SVB, Circle Internet Financial, which operates the $31 billion stablecoin USD Coin (USDC), disclosed that it had $3.3 billion in dollar reserves held at SVB. This disclosure triggered large redemptions of USDC and caused it to drop temporarily below its target $1 value to as low as 87 cents. Following news of the government interventions assuring depositors of the safety of uninsured deposits at SVB and Signature Bank, USDC's price stabilized near $1.

Bond mutual funds experienced outflows and remained exposed to liquidity risks

Mutual funds that invest substantially in corporate bonds, municipal bonds, and bank loans may be particularly exposed to liquidity transformation risks, given the relative illiquidity of their assets and the requirement that these funds offer redemptions daily. The total outstanding amount of U.S. corporate bonds held by mutual funds fell to its lowest level since 2013 on an inflation-adjusted basis, primarily driven by a drop in valuations (figure 4.5). Mutual fund holdings at the end of 2022 were approximately 13 percent of all U.S. corporate bonds outstanding. Total AUM at high-yield bond and bank-loan mutual funds, which primarily hold riskier and less liquid assets,

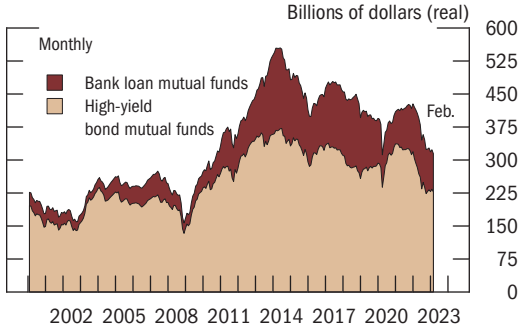
[17] Cash-management vehicles included in this total are dollar-denominated offshore MMFs, short-term investment funds, private liquidity funds, ultrashort bond mutual funds, and local government investment pools.

Figure 4.5. Corporate bonds held by bond mutual funds fell sharply



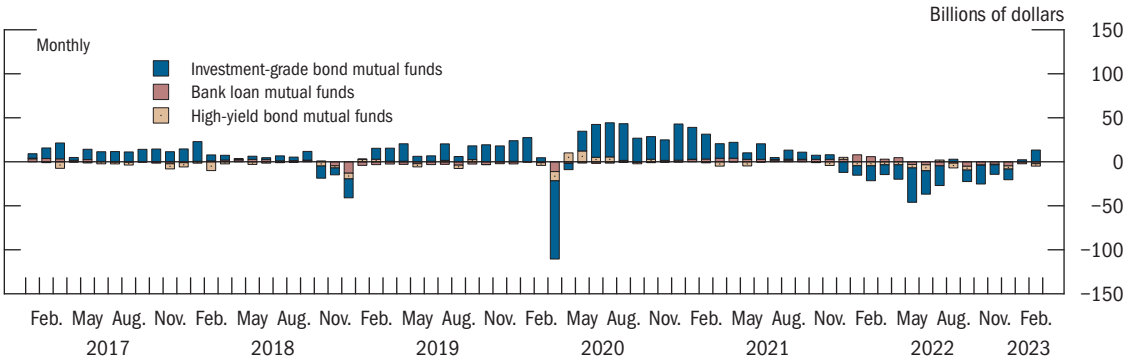
Source: Federal Reserve Board staff estimates based on Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States"; consumer price index, Bureau of Labor Statistics via Haver Analytics.

Figure 4.6. Assets held by high-yield and bank loan mutual funds decreased



Source: Investment Company Institute; consumer price index, Bureau of Labor Statistics via Haver Analytics.

Figure 4.7. Bond and bank loan mutual funds experienced notable outflows during most of the past year



Source: Investment Company Institute.

decreased sharply in real terms in 2022 (figure 4.6). Bond and loan mutual funds experienced negative returns and notable outflows during most of 2022 (figure 4.7).

On November 2, 2022, the SEC proposed reforms to the mutual fund sector. The proposed reforms include making swing pricing mandatory for open-end mutual funds. Swing pricing imposes costs arising from redemptions on the shareholders who redeem by reducing the NAV they receive on days when the mutual fund has net outflows. If properly calibrated, swing pricing could deter redemptions during a stressed market and lessen redeeming shareholders' first-mover advantage. The SEC also proposed to enhance its 2016 liquidity risk-management rule for mutual funds and certain exchange-traded funds. These enhancements include a requirement that funds hold at least 10 percent of their portfolios in "highly liquid assets" as well as tightened liquidity classifications.

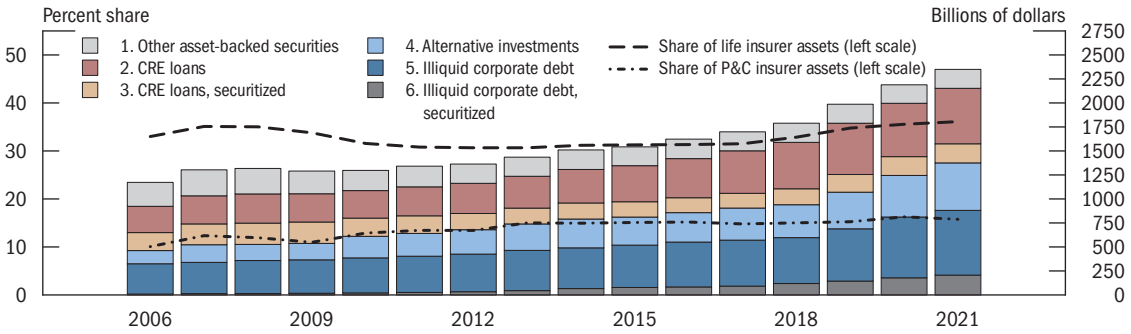
Liquidity risks at central counterparties remained low

Liquidity risks posed by CCPs to clearing members and market participants remained low. CCPs maintained elevated initial margin levels in the third quarter of 2022, the latest quarter for which data are available, even as volatility decreased in most cleared markets, with the notable exception of interest rate markets. In addition, their levels of prefunded resources were stable.[18] Those CCPs that focused on clearing interest rate products faced some difficulties adapting their margin models to the higher rate and volatility environment that began last year. During the second half of 2022, these CCPs experienced more frequent initial margin exceedances, in which some clearing members' mark-to-market losses exceeded their posted initial margin amounts. Large price moves and volatility in rates also resulted in large variation margin calls that were met by clearing members and clients. Finally, client clearing remained concentrated at the largest clearing members, which could make transferring client positions to other clearing members challenging if it were ever necessary.

Liquidity risks at life insurers remained elevated

Over the past decade, the liquidity of life insurers' assets steadily declined, and the liquidity of their liabilities slowly increased, potentially making it more difficult for life insurers to meet a sudden rise in withdrawals and other claims. Life insurers increased the share of illiquid assets—including CRE loans, less liquid corporate debt, and alternative investments—on their balance sheets (figure 4.8). In addition, they have continued to rely on nontraditional liabilities—including

Figure 4.8. Life insurers held more risky, illiquid assets on their balance sheets

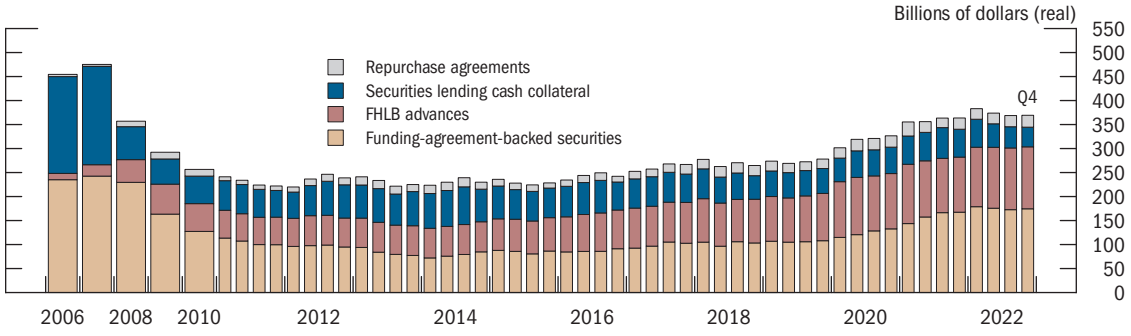


Source: Staff estimates based on data from Bloomberg Finance L.P. and National Association of Insurance Commissioners Annual Statutory Filings.

[18] Prefunded resources represent financial assets, including cash and securities, transferred by the clearing members to the CCP to cover that CCP's potential credit exposure in case of default by one or more clearing members. These prefunded resources are held as initial margin and prefunded mutualized resources.

funding-agreement-backed securities, Federal Home Loan Bank advances, and cash received through repos and securities lending transactions—which offer some investors the opportunity to withdraw funds on short notice (figure 4.9).

Figure 4.9. Life insurers continued to rely on nontraditional liabilities



Source: Consumer price index, Bureau of Labor Statistics via Haver Analytics; Moody's Analytics, Inc., CreditView, Asset-Backed Commercial Paper Program Index; Securities and Exchange Commission, Forms 10-Q and 10-K; National Association of Insurance Commissioners, quarterly and annual statutory filings accessed via S&P Global, Capital IQ Pro; Bloomberg Finance L.P.

5 | Near-Term Risks to the Financial System

The Federal Reserve routinely engages in discussions with domestic and international policymakers, academics, community groups, and others to gauge the issues of greatest concern to these groups. As noted in the box "Survey of Salient Risks to Financial Stability," in recent outreach, contacts were particularly focused on more restrictive policy to address persistent inflation, banking-sector stress, commercial and residential real estate, and geopolitical tensions.

The following discussion considers possible interactions of existing domestic vulnerabilities with several potential near-term risks, including international risks. The box "Transmission of Stress Abroad to the U.S. Financial System" discusses some transmission channels through which shocks originating abroad can transmit to the U.S. financial system.

Ongoing stresses in the banking system could lead to a broader contraction in credit, resulting in a marked slowdown in economic activity

Despite decisive actions by the Federal Reserve, the FDIC, and the U.S. Department of the Treasury, concerns about the economic outlook, credit quality, and funding liquidity could lead banks and other financial institutions to further contract the supply of credit to the economy. A sharp contraction in the availability of credit would drive up the cost of funding for businesses and households, potentially resulting in a slowdown in economic activity. With a decline in profits of nonfinancial businesses, financial stress and defaults at some firms could increase, especially in light of the generally high level of leverage in that sector. Additionally, an associated reduction in investor risk appetite could lead to significant declines in asset prices. Shocks are less likely to propagate to the financial system through the household sector because household borrowing is moderate relative to income, and the majority of household debt is owed by those with higher credit scores.

Further rate increases in the U.S. and other advanced economies could pose risks

If inflationary pressures prove to be more stubborn than anticipated, tighter-than-expected monetary policy could prompt sharp increases in longer-term interest rates and weaken economic growth worldwide. These developments could strain the debt service capacity of governments, households, and businesses abroad, including in emerging market economies (EMEs) that borrow externally. Most business loans and, in some countries, many residential mortgages have floating

interest rates, implying that higher policy interest rates can quickly increase debt service requirements. Declines in property prices could strain the balance sheets of households and reduce recoveries on nonperforming loans backed by residential real estate and CRE. Bank funding costs are likely to increase as deposit rates continue to rise following earlier policy rate hikes and would continue to do so with any additional policy firming. While deposit rates are likely to remain lower than market interest rates, higher funding costs may pressure the profitability of banks with large portfolios of fixed-rate assets that were acquired when interest rates were much lower.

A sharp rise in interest rates could also lead to increased volatility in global financial markets, stresses to market liquidity, and a correction in asset prices. Liquidity pressures could subject banks to outflows of deposits and other forms of short-term funding. Higher rates and liquidity pressures could also lead to losses or liquidity strains for NBFIs that operate with high leverage or provide maturity transformation. Stress in foreign economies could transmit to the U.S. through disruptions in asset markets, reduced credit from foreign lenders to U.S. residents, and effects arising from U.S. financial institutions' interlinkages with foreign financial institutions, including in U.S. dollar funding markets (see the box "Transmission of Stress Abroad to the U.S. Financial System"). These interlinkages could further amplify stresses abroad.

A worsening of global geopolitical tensions could lead to commodity price inflation and broad adverse spillovers

The ongoing war in Ukraine is weighing on many countries in a variety of ways. Escalation of the war or a worsening in other geopolitical tensions could reduce economic activity and boost inflation worldwide. A resurgence in food and energy prices could, in turn, intensify stresses, especially in EMEs. Increased debt levels in some EMEs make these economies more vulnerable to shocks, potentially amplifying adverse effects. China continues to have very high levels of corporate debt, especially in the property sector, and local government debt has been increasing recently.[19] Stresses in China could spill over to other EMEs that rely on trade with China or credit from Chinese entities. Given the importance of EMEs, particularly China, to world trade and activity, stresses in EMEs could exacerbate adverse spillovers to global asset markets and economic activity, further affecting economic and financial conditions in the U.S.

[19] See the box "Stresses in China's Real Estate Sector" in Board of Governors of the Federal Reserve System (2022), *Financial Stability Report* (Washington: Board of Governors, May), pp. 58–60, https://www.federalreserve.gov/publications/files/financial-stability-report-20220509.pdf.

Box 5.1. Survey of Salient Risks to Financial Stability

As part of its market intelligence gathering, staff from the Federal Reserve Bank of New York solicited views from a wide range of contacts on risks to U.S. financial stability. From February to early April, the staff surveyed 25 contacts, including professionals at broker-dealers, investment funds, research and advisory organizations, and universities (figure A). The potential for persistent inflationary pressures to result in more restrictive monetary policy remained a top-cited risk, as it has been since the fall 2021 survey (figure B). Following the closure of SVB on March 10, a large majority of respondents highlighted the risk of additional banks coming under renewed stress. Many noted vulnerabilities in real estate markets, with some highlighting the potential for CRE exposures to trigger further banking sector concerns. Respondents also continued to focus on geopolitical risks, especially the possibility of heightened tensions between the U.S. and China and a further escalation of Russia's war in Ukraine. This discussion summarizes the most cited risks from this round of outreach.

Persistent inflation and monetary tightening

Concern over persistent inflationary pressures driving a highly restrictive monetary policy stance, particularly in the U.S., remained top of mind. Several contacts highlighted that labor and economic activity data remained robust despite the rapid rise in policy rates, suggesting global central banks may need to tighten further to fight inflation, risking a sharper economic slowdown and financial market instability. Some contacts noted that central bank balance sheet reductions in the U.S. and abroad could strain market functioning, particularly in sovereign bond markets.

Stress in the banking sector and nonbank financial institutions

Market participants highlighted the risk of stress in the banking sector, noting that higher funding costs and depressed profitability may render some banks vulnerable to deposit runs. Many respondents noted heightened market scrutiny over deposit stability and declines in fair value of legacy long-duration fixed-rate assets that could trigger further contagion and market volatility. Some contacts highlighted risks stemming from NBFIs in an environment of tightening monetary policy, such as that seen in the U.K. in September 2022.

Commercial real estate

Many contacts saw real estate as a possible trigger for systemic risk, particularly in the commercial sector, where respondents highlighted concerns over higher interest rates, valuations, and shifts in end-user demand. Some market participants associated risks in real estate with the emergence of banking-sector stress, noting some bank exposures to underperforming CRE assets could prompt instability.

Geopolitical risks

Many market participants cited a broad range of geopolitical risks, largely centered on the relationship between the U.S. and China. They noted rising tensions could cause a deterioration in trade and financial flows, with negative implications for global supply chains and investor sentiment. Some also cited the risk of military or political conflict between China and Taiwan, and any subsequent potential intervention by the U.S., as a possible flash point. Elsewhere, respondents highlighted the risk of an escalation of Russia's war in Ukraine as weighing on the economic outlook in Europe and driving higher commodity prices, with some noting that further escalation could increase risks of cyberwarfare.

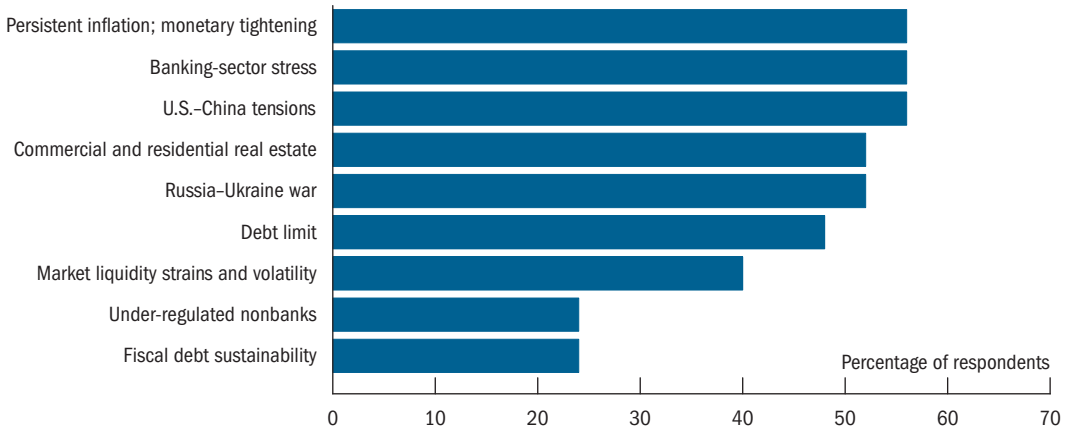
Debt limit

Respondents saw the potential for funding market disruptions and tighter financial conditions if the statutory debt limit is not raised in a timely manner, while noting the adverse ramifications of a technical or outright default, including a sharp rise in Treasury yields, an increase in corporate financing costs, and a deterioration in risk sentiment. Relatedly, some contacts noted the risk of higher government financing costs in an environment where monetary policy remains in restrictive territory for a protracted period.

(continued)

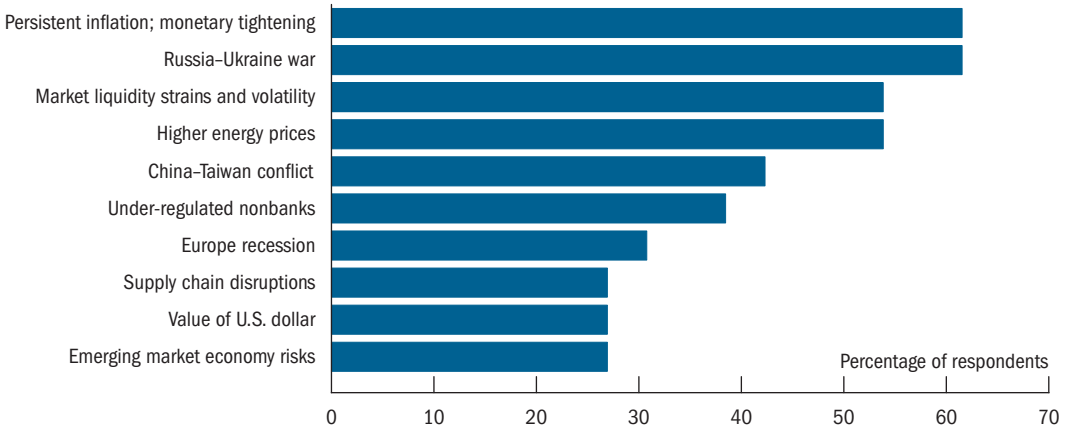
Box 5.1—*continued*

Figure A. Spring 2023: Most cited potential risks over the next 12 to 18 months



Source: Federal Reserve Bank of New York survey of 25 market contacts from February to April.

Figure B. Fall 2022: Most cited potential risks over the next 12 to 18 months



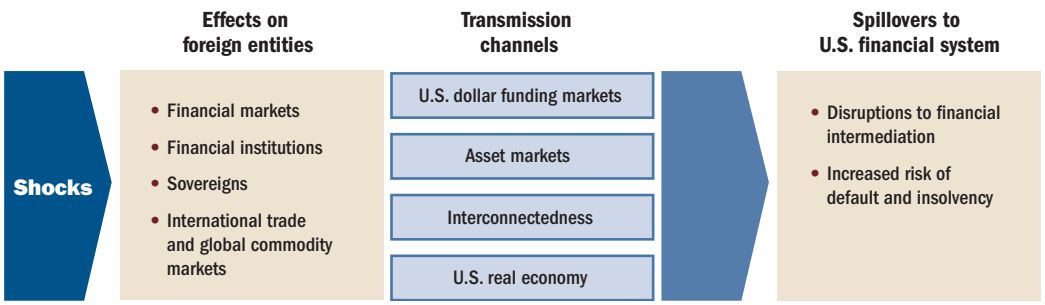
Source: Federal Reserve Bank of New York survey of 26 market contacts from August to October.

Box 5.2. Transmission of Stress Abroad to the U.S. Financial System

The U.S. financial system plays a central role in the global financial system, making it susceptible to spillovers from shocks abroad.[1] This discussion describes four important transmission channels: (1) U.S. dollar funding markets, (2) asset markets, (3) financial institution interconnectedness, and (4) the U.S. real economy.

As illustrated in figure A, shocks may generate stress for foreign financial markets, internationally active financial institutions, sovereigns, and international trade and commodity markets. This stress may be transmitted to the U.S. financial system through the four channels noted earlier, resulting in two types of spillovers: (1) disruptions to financial intermediation, which can reduce credit available to U.S. households and businesses; and (2) increased risks of default and insolvency due to losses on assets held by U.S. financial institutions. The strength of these spillovers largely depends on the extent of cross-border linkages and how existing vulnerabilities in the U.S. financial system interact with the foreign stress.

Figure A. Spillovers of foreign shocks to the U.S. financial system



U.S. dollar funding market channel

The U.S. dollar is the leading currency for global funding and investment—accounting for almost half of outstanding cross-border bank credit and international debt securities—and is widely used for trade and other international transactions.[2] U.S. and foreign financial intermediaries engage in dollar-denominated borrowing, lending, and investment activities within a complex and interconnected network of markets involving a broad set of financial instruments.[3] Disruptions in foreign institutions' ability to borrow U.S. dollars can transmit stress to the U.S. financial system in several ways, listed below.

(continued)

[1] Shocks from abroad can be geopolitical, sovereign, financial, or related to the real economy or other factors. Examples of foreign shocks include the war in Ukraine and the European sovereign debt crisis, as well as the COVID-19 pandemic, which was a global shock.

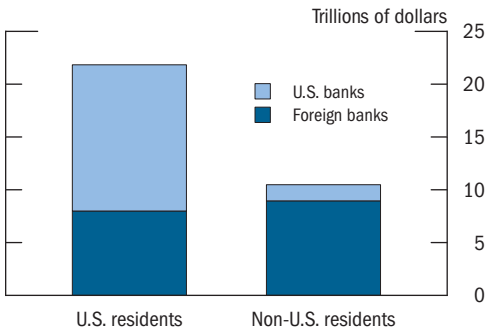
[2] See Bank for International Settlements (2022), BIS Statistics Explorer, Table A1-S: Summary of Locational Statistics, by Currency, Instrument and Residence and Sector of Counterparty, https://stats.bis.org/statx/srs/table/a1?m=S (accessed March 29, 2023); and Bank for International Settlements (2022), BIS Debt Securities Statistics, Table: Outstanding Stock of International Debt Securities by Currency of Denomination, https://www.bis.org/statistics/about_securities_stats.htm?m=6%7C33%7C638 (accessed March 29, 2023).

[3] The financial instruments used by foreign entities to obtain dollar funding include commercial paper, corporate and sovereign bonds, bank deposits, interbank loans, credit lines, FX swaps, repos, and leveraged loans.

Box 5.2—*continued*

Foreign institutions account for a significant share of borrowing in U.S. short-term wholesale funding markets, making up around half of all borrowing done through repos, and issue more than two-thirds of U.S. dollar-denominated commercial paper and negotiable certificates of deposit.[4] Concerns about the solvency or liquidity of foreign borrowers can induce sudden outflows from U.S.-based wholesale lenders, such as prime MMFs, that may then be forced to cut short-term funding provided to a broader set of borrowers that would have been otherwise unaffected by the foreign stress.[5] This could, in turn, reduce credit available for U.S. households and businesses.

Figure B. U.S. dollar-denominated bank claims on U.S. and non-U.S. residents as of 2022:Q3



Source: Bank for International Settlements, consolidated and locational banking statistics; Federal Reserve Board staff estimates.

Stress in U.S. dollar funding markets can also limit the ability of foreign banks to provide U.S. dollar-denominated credit to U.S. and foreign borrowers. Foreign banks supply around one-third of total bank credit to U.S. residents, especially to C&I borrowers, and most of the U.S. dollar-denominated lending to non-U.S. residents (figure B). U.S. branches and agencies of foreign banks tend to rely on short-term U.S. dollar wholesale funding, making their U.S. lending particularly sensitive to funding market disruptions.

Foreign banks are also important counterparties in U.S. dollar-denominated FX swaps, which many foreign NBFIs rely on as a source of U.S. dollars. If foreign banks are unable to borrow U.S. dollars in FX swap markets, other foreign financial institutions that use FX swaps will have limited ability to invest in U.S. markets and to lend to U.S. households and businesses and could be forced to liquidate U.S. assets. U.S. dollar liquidity swap line arrangements between the Federal Reserve and foreign central banks have played a critical role in alleviating U.S. dollar funding stresses when liquidity in private markets, such as the FX swap market, has dried up.[6]

Asset market channel

Stress abroad can cause rapid declines in the prices of both foreign and U.S. assets. When losses on equities and on other risk assets are severe and broad based, investors may respond by rebalancing their portfolios to low-risk assets such as U.S. Treasury securities, potentially triggering a cycle of deteriorating prices for higher-risk assets, heightened volatility and reduced market liquidity, margin calls, and forced asset sales. Spillovers to U.S. institutions may be amplified if substantial leverage is supporting stretched asset valuations.

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[4] See the box "Vulnerabilities in Global U.S. Dollar Funding Markets" in Board of Governors of the Federal Reserve System (2021), *Financial Stability Report* (Washington: Board of Governors, May), pp. 55–58, https://www.federalreserve.gov/publications/files/financial-stability-report-20210506.pdf.

[5] Just over half of all assets held by prime MMFs are claims on foreign entities as of January 31, 2023. See Board of Governors of the Federal Reserve System (2023), Money Market Funds: Investment Holdings Detail, Table 2: U.S. Money Market Fund Investment Holdings by Country of Issuance, Fund Type, Instrument, and Maturity, webpage, March 24, https://www.federalreserve.gov/releases/efa/efa-project-money-market-funds-investment-holdings-detail.htm.

[6] For a discussion of swap line use at the onset of the COVID-19 pandemic, see the box "Federal Reserve Tools to Lessen Strains in Global Dollar Funding Markets" in Board of Governors of the Federal Reserve System (2020), *Financial Stability Report* (Washington: Board of Governors, May), pp. 16–18, https://www.federalreserve.gov/publications/files/financial-stability-report-20200515.pdf.

Box 5.2—*continued*

U.S. Treasury securities are a unique type of asset critical to the functioning of the global financial system. Foreign holdings of U.S. Treasury securities totaled about $7 trillion as of December 31, 2022, or about 30 percent of outstanding marketable U.S. Treasury securities, with holdings split nearly equally between the foreign official—mostly central banks and sovereign wealth funds—and foreign private sectors. At the onset of the COVID-19 pandemic, foreign investors sought to sell U.S. Treasury securities because of an unprecedented surge in the demand for cash—in sharp contrast to typical market dynamics in previous periods of severe global financial stress—amplifying pressures on U.S. Treasury markets that resulted in significant dislocations and strained market functioning.[7] The FIMA (Foreign and International Monetary Authorities) Repo Facility broadens the reach of the Federal Reserve's provision of U.S. dollar liquidity overseas beyond its dollar swap lines. By reducing the incentive of foreign official investors to sell U.S. Treasury securities into stressed markets, the facility contributed to the stabilization of the U.S. Treasury market in the spring of 2020.[8]

Financial institution interconnectedness channel

Many U.S. financial institutions have client and counterparty relationships with foreign financial institutions, exposing them to losses from defaults and credit impairments on the one hand, and to loss of access to credit and important financial services on the other hand.[9] Moreover, a loss of confidence in a group of large foreign financial institutions could spread to large U.S. financial institutions, resulting in higher funding costs and the risk of broad-based pullbacks by depositors and other funding providers. This type of "contagion" is most likely to spread to U.S. institutions that have exposures to distressed foreign institutions or are considered to have similar business models. Regulatory changes following the 2007–09 financial crisis have markedly increased U.S. banks' capital and liquidity positions, providing additional resilience to various types of losses and reducing the likelihood of contagion.

U.S. real economy channel

Global economic shocks can trigger recessions abroad as well as commodity and trade market disruptions, which tend to transmit quickly through the asset market channel, as discussed earlier.[10] However, any effects on U.S. real economic activity—such as higher goods prices, unemployment, and reduced consumer demand and business investment—generally take longer to materialize and are unlikely to cause U.S. borrowers to default at a rate that would generate significant losses across the U.S. financial system.

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[7] See the box "The Role of Foreign Investors in the March 2020 Turmoil in the U.S. Treasury Market" in Board of Governors of the Federal Reserve System (2021), *Financial Stability Report,* (Washington: Board of Governors, November), pp. 22–25, https://www.federalreserve.gov/publications/files/financial-stability-report-20211108.pdf.

[8] A temporary facility was created in March 2020 and was made a standing facility in 2021. For additional details, see Mark Choi, Linda Goldberg, Robert Lerman, and Fabiola Ravazzolo (2022), "The Fed's Central Bank Swap Lines and FIMA Repo Facility," Federal Reserve Bank of New York, *Economic Policy Review,* vol. 28 (June), pp. 93–113, https://www.newyorkfed.org/medialibrary/media/research/epr/2022/epr_2022_fima-repo_choi.pdf.

[9] As of September 30, 2022, U.S. banks had claims on foreign banks and foreign NBFIs totaling $530 billion and $1.6 trillion, respectively, as well as an additional $373 billion in claims on foreign sectors through derivative contracts; see Bank for International Settlements (2023), BIS Statistics Explorer, Table B3-S: Summary of Foreign Claims and Other Potential Exposures (Guarantor Basis), by Nationality of Reporting Bank, https://stats.bis.org/statx/srs/table/b3?m=S&f=pdf (accessed March 29, 2023). U.S. corporations and financial institutions may also receive important financial services—directly or indirectly—from foreign banks, including investment banking, derivatives dealing, and market making, as well as securities clearing and other financial market infrastructure access.

[10] Foreign shocks can also create economic uncertainty, which has been shown to transmit across countries. See Juan M. Londono, Sai Ma, and Beth Anne Wilson (2021), "The Global Transmission of Real Economic Uncertainty," International Finance Discussion Papers 1317 (Washington: Board of Governors of the Federal Reserve System, April), https://doi.org/10.17016/IFDP.2021.1317.

Appendix | Figure Notes

Figure 1.1. Nominal Treasury yields fell in March and April

The 2-year and 10-year Treasury rates are the monthly average of the constant-maturity yields based on the most actively traded securities.

Figure 1.2. An estimate of the nominal Treasury term premium remained low

Term premiums are estimated from a 3-factor term structure model using Treasury yields and Blue Chip interest rate forecasts.

Figure 1.3. Interest rate volatility remained above its long-term median

The data begin in April 2005. Implied volatility on the 10-year swap rate, 1 month ahead, is derived from swaptions. The median value is 78.93 basis points.

Figure 1.4. The price-to-earnings ratio of S&P 500 firms continued to be above its historical median

The figure shows the aggregate forward price-to-earnings ratio of S&P 500 firms, based on expected earnings for 12 months ahead. The median value is 15.5.

Figure 1.5. An estimate of the equity premium fell below its historical median

The figure shows the difference between the aggregate forward earnings-to-price ratio of S&P 500 firms and the expected real Treasury yields, based on expected earnings for 12 months ahead. Expected real Treasury yields are calculated from the 10-year consumer price index inflation forecast, and the smoothed nominal yield curve is estimated from off-the-run securities. The median value is 4.78 percentage points.

Figure 1.6. Volatility in equity markets remained elevated

Realized volatility is computed from an exponentially weighted moving average of 5-minute daily realized variances with 75 percent of weight distributed over the past 20 business days.

Figure 1.7. Treasury market depth remained below historical norms

Market depth is defined as the average top 3 bid and ask quote sizes for on-the-run Treasury securities.

Figure 1.8. On-the-run market depth worsened in March then recovered

The data show the time-weighted average market depth at the best quoted prices to buy and sell, for 2-year and 10-year Treasury notes. OTR is on-the-run.

Figure 1.9. A measure of liquidity in equity markets fell sharply in March

The data show the depth at the best quoted prices to buy and sell, defined as the ask size plus the bid size divided by 2, for E-mini S&P 500 futures.

Figure 1.10. Corporate bond yields fell to near their historical averages

The triple-B series reflects the effective yield of the ICE Bank of America Merrill Lynch (BofAML) triple-B U.S. Corporate Index (C0A4), and the high-yield series reflects the effective yield of the ICE BofAML U.S. High Yield Index (H0A0).

Figure 1.11. Spreads to similar-maturity Treasury securities edged down

The triple-B series reflects the option-adjusted spread of the ICE Bank of America Merrill Lynch (BofAML) triple-B U.S. Corporate Index (C0A4), and the high-yield series reflects the option-adjusted spread of the ICE BofAML U.S. High Yield Index (H0A0).

Figure 1.12. The excess bond premium stayed near its historical average

The data begin in January 1997. The excess bond premium (EBP) is a measure of bond market investors' risk sentiment. It is derived as the residual of a regression that models corporate bond spreads after controlling for expected default losses. By construction, its historical mean is zero. Positive (negative) EBP values indicate that investors' risk appetite is below (above) its historical mean.

Figure 1.13. Spreads in the leveraged loan market fell modestly

The data show secondary-market discounted spreads to maturity. Spreads are the constant spread used to equate discounted loan cash flows to the current market price. B-rated spreads begin in July 1997. The line break represents the data transitioning from monthly to weekly in November 2013.

Figure 1.14. Commercial real estate prices, adjusted for inflation, declined

The data are deflated using the consumer price index and are seasonally adjusted by Federal Reserve Board staff.

Figure 1.15. Income of commercial properties relative to prices turned up but remained near historically low levels

The data are a 12-month moving average of weighted capitalization rates in the industrial, retail, office, and multifamily sectors, based on national square footage in 2009.

Figure 1.16. Banks reported tightening lending standards in commercial real estate loans

Banks' responses are weighted by their commercial real estate loan market shares. The shaded bars with top caps indicate periods of business recession as defined by the National Bureau of Economic Research: March 2001–November 2001, December 2007–June 2009, and February 2020–April 2020. Survey respondents to the Senior Loan Officer Opinion Survey on Bank Lending Practices are asked about the changes over the quarter.

Figure 1.17. Farmland prices reached near historical highs

The data for the U.S. begin in 1997. Midwest index is a weighted average of Corn Belt and Great Plains states derived from staff calculations. Values are given in real terms. The data are annual as of July. The median value is $3,308.32.

Figure 1.18. Farmland prices grew faster than rents

The data for the U.S. begin in 1998. Midwest index is a weighted average of Corn Belt and Great Plains states derived from staff calculations. The data are annual as of July. The median value is 18.1.

Figure 1.19. House price growth decelerated sharply

The Zillow and CoreLogic data extend through February 2023, and the Case-Shiller data extend through January 2023.

Figure 1.20. Model-based measures of house price valuations remained historically high

The owners' equivalent rent value for 2023:Q1 is based on monthly data through February 2023. The data for the market-based rents model begin in 2004:Q1 and extend through 2023:Q1. The value for 2023:Q1 is based on monthly data through January 2023. Valuation is measured as the deviation from the long-run relationship between the price-to-rent ratio and the real 10-year Treasury yield.

Figure 1.21. House price-to-rent ratios remained elevated across geographic areas

The data are seasonally adjusted. Percentiles are based on 19 large metropolitan statistical areas.

Figure 2.1. The total debt of households and businesses relative to GDP declined further

The shaded bars with top caps indicate periods of business recession as defined by the National Bureau of Economic Research: January 1980–July 1980, July 1981–November 1982, July 1990–March 1991, March 2001–November 2001, December 2007–June 2009, and February 2020–April 2020. GDP is gross domestic product.

Figure 2.2. Both business and household debt-to-GDP ratios edged down

The shaded bars with top caps indicate periods of business recession as defined by the National Bureau of Economic Research: January 1980–July 1980, July 1981–November 1982, July 1990–March 1991, March 2001–November 2001, December 2007–June 2009, and February 2020–April 2020. GDP is gross domestic product.

Figure 2.3. Business debt adjusted for inflation declined modestly

Nominal debt growth is seasonally adjusted and is translated into real terms after subtracting the growth rate of the price deflator for the core personal consumption expenditures price index.

Figure 2.4. Net issuance of risky debt remained subdued

The data begin in 2004:Q2. Institutional leveraged loans generally exclude loan commitments held by banks. The key identifies bars in order from top to bottom (except for some bars with at least one negative value).

Figure 2.5. Gross leverage of large businesses remained at high levels

Gross leverage is an asset-weighted average of the ratio of firms' book value of total debt to book value of total assets. The 75th percentile is calculated from a sample of the 2,500 largest firms by assets. The dashed sections of the lines in the first quarter of 2019 reflect the structural break in the series due to the 2019 compliance deadline for Financial Accounting Standards Board rule Accounting Standards Update 2016-02. The accounting standard requires operating leases, previously considered off-balance-sheet activities, to be included in measures of debt and assets.

Figure 2.6. Firms' ability to service their debt, as measured by the interest coverage ratio, was strong

The interest coverage ratio is earnings before interest and taxes divided by interest payments. Firms with leverage less than 5 percent and interest payments less than $500,000 are excluded.

Figure 2.7. Default rates on leveraged loans inched up from historically low levels

The data begin in December 1998. 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 with top caps indicate periods of business recession as defined by the National Bureau of Economic Research: March 2001–November 2001, December 2007–June 2009, and February 2020–April 2020.

Figure 2.8. The majority of new leveraged loans last year have debt multiples greater than 5

Volumes are for large corporations with earnings before interest, taxes, depreciation, and amortization (EBITDA) greater than $50 million and exclude existing tranches of add-ons and amendments as well as restatements with no new money. The key identifies bars in order from top to bottom.

Figure 2.9. Real household debt edged up

Subprime are those with an Equifax Risk Score below 620; near prime are 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 2022 dollars using the consumer price index.

Figure 2.10. A model-based estimate of housing leverage was flat

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

Figure 2.11. Mortgage delinquency rates remained at historically low levels

Loss mitigation includes tradelines that have a narrative code of forbearance, natural disaster, payment deferral (including partial), loan modification (including federal government plans), or loans with no scheduled payment and a nonzero balance. Delinquent includes loans reported to the credit bureau as at least 30 days past due.

Figure 2.13. New mortgage extensions to nonprime borrowers have been subdued

Year-over-year change in balances for the second quarter of each year among those households whose balance increased over this window. Subprime are those with an Equifax Risk Score below 620; near prime are from 620 to 719; prime are greater than 719. Scores were measured 1 year ago. The data are converted to constant 2022 dollars using the consumer price index. The key identifies bars in order from left to right.

Figure 2.14. Real consumer credit edged up in the second half of 2022

The data are converted to constant 2022 dollars using the consumer price index. Student loan data begin in 2005.

Figure 2.15. Real auto loans outstanding ticked up

Subprime are those with an Equifax Risk Score below 620; near prime are from 620 to 719; prime are greater than 719. Scores are measured contemporaneously. The data are converted to constant 2022 dollars using the consumer price index.

Figure 2.16. Auto loan delinquencies moved up in 2022 but still remained at modest levels

Loss mitigation includes tradelines that have a narrative code of forbearance, natural disaster, payment deferral (including partial), loan modification (including federal government plans), or loans with no scheduled payment and a nonzero balance. Delinquent includes loans reported to the credit bureau as at least 30 days past due. The data for auto loans are reported semiannually by the Risk Assessment, Data Analysis, and Research Data Warehouse until 2017, after which they are reported quarterly. The data for delinquent/loss mitigation begin in the first quarter of 2001.

Figure 2.17. Real credit card balances have increased in 2022, partially reversing earlier declines

Subprime are those with an Equifax Risk Score below 620; near prime are from 620 to 719; prime are greater than 719. Scores are measured contemporaneously. The data are converted to constant 2022 dollars using the consumer price index.

Figure 2.18. Credit card delinquencies increased but remained at low levels

Delinquency measures the fraction of balances that are at least 30 days past due, excluding severe derogatory loans.The data are seasonally adjusted.

Figure 3.1. Banks' average interest rate on interest-earning assets and average expense rate on liabilities increased

Average interest rate on interest-earning assets is total interest income divided by total interest-earning assets. Average interest expense rate on liabilities is total interest expense divided by total liabilities. The data for average interest expense rate begin in 2014:Q2. The shaded bar with a top cap indicates a period of business recession as defined by the National Bureau of Economic Research: February 2020–April 2020.

Figure 3.2. The fair values of banks' securities portfolios declined in 2022 as interest rates rose

The figure plots the difference between the fair and amortized cost values of the securities. Sample consists of all bank holding companies and commercial banks.

Figure 3.3. Banks' risk-based capital ratio remained near the median level since the 2007–09 financial crisis

The data are seasonally adjusted by Federal Reserve Board staff. Sample consists of domestic bank holding companies (BHCs) and intermediate holding companies (IHCs) with a substantial U.S. commercial banking presence. G-SIBs are global systemically important banks. Large non–G-SIBs are BHCs and IHCs with greater than $100 billion in total assets that are not G-SIBs. Before 2014:Q1 (advanced-approaches BHCs) or before 2015:Q1 (non-advanced-approaches BHCs), the numerator of the common equity Tier 1 ratio is Tier 1 common capital. Afterward, the numerator is common equity Tier 1 capital. The denominator is risk-weighted assets. The shaded bars with top caps indicate periods of business recession as defined by the National

Bureau of Economic Research: March 2001–November 2001, December 2007–June 2009, and February 2020–April 2020.

Figure 3.4. The ratio of tangible common equity to tangible assets increased for global systemically important banks but decreased for other banks

The data are seasonally adjusted by Federal Reserve Board staff. Sample consists of domestic bank holding companies (BHCs), intermediate holding companies (IHCs) with a substantial U.S. commercial banking presence, and commercial banks. G-SIBs are global systemically important banks. Large non–G-SIBs are BHCs and IHCs with greater than $100 billion in total assets that are not G-SIBs. Bank equity is total equity capital net of preferred equity and intangible assets. Bank assets are total assets net of intangible assets. The shaded bars with top caps indicate periods of business recession as defined by the National Bureau of Economic Research: July 1990–March 1991, March 2001–November 2001, December 2007–June 2009, and February 2020–April 2020.

Figure 3.5. Borrower leverage for bank commercial and industrial loans continued to decrease

The figure shows the weighted median leverage of nonfinancial firms that borrow using commercial and industrial loans from the 24 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.

Figure 3.6. Lending standards for bank commercial and industrial loans have tightened

Banks' responses are weighted by their commercial and industrial loan market shares. Survey respondents to the Senior Loan Officer Opinion Survey on Bank Lending Practices are asked about the changes over the quarter. Results are shown for loans to large and medium-sized firms. The shaded bars with top caps indicate periods of business recession as defined by the National Bureau of Economic Research: March 2001–November 2001, December 2007–June 2009, and February 2020–April 2020.

Figure 3.7. Leverage at broker-dealers remained historically low

Leverage is calculated by dividing total assets by equity.

Figure 3.8. Trading profits decreased in 2022:Q4, consistent with seasonal patterns

Sample includes all trading desks of bank holding companies subject to the Volcker rule reporting requirement.

Figure 3.9. Shares of trading profits by trading desks

Sample includes all trading desks of bank holding companies subject to the Volcker rule reporting requirement. The "other" category comprises desks trading in municipal securities, foreign exchange, and commodities, as well as any unclassified desks. The key identifies series in order from top to bottom.

Figure 3.10. Leverage at life insurance companies edged up but remained below its pandemic peak

Ratio is calculated as (total assets – separate account assets)/(total capital – accumulated other comprehensive income) using generally accepted accounting principles. The largest 10 publicly traded life and property and casualty insurers are represented.

Figure 3.11. Leverage at hedge funds remained elevated

Leverage is computed as the ratio of hedge funds' gross notional exposure to net asset value. Gross notional exposure includes the nominal value of all long and short positions and both on-balance-sheet and off-balance-sheet derivative notional exposures. Options are delta adjusted, and interest rate derivatives are reported at 10-year bond equivalents. The mean is weighted by net asset value. The data are reported on a 2-quarter lag beginning in the first quarter of 2013.

Figure 3.12. Leverage at the largest hedge funds decreased but remained high

Leverage is measured by gross asset value (GAV) divided by net asset value (NAV). Funds are sorted into cohorts based on GAV. Average leverage is computed as the NAV-weighted mean.

Figure 3.13. Dealers indicated that the use of leverage by hedge funds was unchanged recently

Net percentage equals the percentage of institutions that reported increased use of financial leverage over the past 3 months minus the percentage of institutions that reported decreased use of financial leverage over the past 3 months. REIT is real estate investment trust.

Figure 3.14. Issuance of non-agency securitized products has slowed significantly since 2021

The data from the first quarter of 2023 are annualized to create the 2023 bar. 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 other asset-backed securities (ABS) backed by credit card debt, student loans, equipment, floor plans, and miscellaneous receivables; resecuritized real estate mortgage investment conduit (Re-REMIC) RMBS; and Re-REMIC CMBS. The data are converted to constant 2023 dollars using the consumer price index. The key identifies bars in order from top to bottom.

Figure 3.15. Bank credit commitments to nonbank financial institutions remained high

Committed amounts on credit lines and term loans extended to nonbank financial institutions by a balanced panel of 24 bank holding companies that have filed Form FR Y-14Q in every quarter since 2018:Q1. Nonbank financial institutions are identified based on reported North American Industry Classification System (NAICS) codes. In addition to NAICS codes, a name-matching algorithm is applied to identify specific entities such as real estate investment trusts (REITs), special purpose entities, collateralized loan obligations (CLOs), and asset-backed securities (ABS). BDC is business development company. REITs incorporate both mortgage (trading) REITs and equity REITs. Broker-dealers also include commodity contracts dealers and brokerages and other securities and commodity exchanges. Other financial vehicles include closed-end investment and mutual funds.

Figure 3.16. Aggregate loan commitments and utilization rates of nonbank financial institutions increased during 2022 but varied across sectors

2022:Q4-over-2021:Q4 growth rates as of the end of the fourth quarter of 2022. REIT is real estate investment trust; PE is private equity; BDC is business development company; SPE is special purpose entity; CLO is collateralized loan obligation; ABS is asset-backed securities. The key identifies bars in order from left to right.

Box 3.1. The Bank Stresses since March 2023

Figure A. Bank stock prices and stock indexes

Stock prices are not reported on or after the day of bank failure.

Figure B. Peak 1-day withdrawal rates for runs on the largest banks, by inflation-adjusted total assets

Banks are sorted by inflation-adjusted total assets from left to right.

Box 3.2. Financial Stability Risks from Private Credit Funds Appear Limited

Figure A. Private credit fund assets and dry powder

Dry powder is estimated by subtracting balance sheet assets from regulatory assets under management, which include uncalled capital commitments.

Figure B. Shares of private credit fund assets held by different investors

The data are as of 2021:Q4. The "other" category consists of banks, broker-dealers, registered investment companies, government entities (excluding pensions), non-U.S. investors of unknown type, and a residual category that is responsible for most of the reported assets.

Figure 4.1. Ratios of runnable money-like liabilities to GDP edged down but remained above their historical medians

The black striped area denotes the period from 2008:Q4 to 2012:Q4, when insured deposits increased because of the Transaction Account Guarantee program. The "other" category consists of variable-rate demand obligations (VRDOs), federal funds, funding-agreement-backed securities, private liquidity funds, offshore money market funds, short-term investment funds, local government investment pools, and stablecoins. Securities lending includes only lending collateralized by cash. GDP is gross domestic product. Values for VRDOs come from Bloomberg beginning in 2019:Q1. See Jack Bao, Josh David, and Song Han (2015), "The Runnables," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, September 3), https://www.federalreserve.gov/econresdata/notes/feds-notes/2015/the-runnables-20150903.html.

Figure 4.2. The amount of high-quality liquid assets held by banks decreased in 2022

Sample consists of domestic bank holding companies (BHCs) and intermediate holding companies (IHCs) with a substantial U.S. commercial banking presence. G-SIBs are global systemically important banks. Large non–G-SIBs are BHCs and IHCs with greater than $100 billion in total assets that are not G-SIBs. Liquid assets are cash plus estimates of securities that qualify

as high-quality liquid assets as defined by the Liquidity Coverage Ratio requirement. Accordingly, Level 1 assets and discounts and restrictions on Level 2 assets are incorporated into the estimate.

Figure 4.3. Banks' reliance on short-term wholesale funding remained low

Short-term wholesale funding is defined as the sum of large time deposits with maturity less than 1 year, federal funds purchased and securities sold under agreements to repurchase, deposits in foreign offices with maturity less than 1 year, trading liabilities (excluding revaluation losses on derivatives), and other borrowed money with maturity less than 1 year. The shaded bars with top caps indicate periods of business recession as defined by the National Bureau of Economic Research: March 2001–November 2001, December 2007–June 2009, and February 2020–April 2020.

Figure 4.4. Growth in money market funds was concentrated in retail prime funds

The data are converted to constant 2023 dollars using the consumer price index.

Figure 4.5. Corporate bonds held by bond mutual funds fell sharply

The data show holdings of all U.S. corporate bonds by all U.S.-domiciled mutual funds (holdings of foreign bonds are excluded). The data are converted to constant 2022 dollars using the consumer price index.

Figure 4.6. Assets held by high-yield and bank loan mutual funds decreased

The data are converted to constant 2023 dollars using the consumer price index. The key identifies series in order from top to bottom.

Figure 4.7. Bond and bank loan mutual funds experienced notable outflows during most of the past year

Mutual fund assets under management as of February 2023 included $2,173 billion in investment-grade bond mutual funds, $227 billion in high-yield bond mutual funds, and $87 billion in bank loan mutual funds. Bank loan mutual funds, also known as floating-rate bond funds, are excluded from high-yield bond mutual funds.

Figure 4.8. Life insurers held more risky, illiquid assets on their balance sheets

Securitized products include collateralized loan obligations for corporate debt, private-label commercial mortgage-backed securities for commercial real estate (CRE), and private-label residential mortgage-backed securities and asset-backed securities (ABS) backed by autos, credit cards, consumer loans, and student loans for other ABS. Illiquid corporate debt includes private placements, bank and syndicated loans, and high-yield bonds. Alternative investments include assets filed under Schedule BA. P&C is property and casualty. The key identifies bars in order from top to bottom.

Figure 4.9. Life insurers continued to rely on nontraditional liabilities

The data are converted to constant 2022 dollars using the consumer price index. FHLB is Federal Home Loan Bank. The data are annual from 2006 to 2010 and quarterly thereafter. The key identifies bars in order from top to bottom.

Box 5.1. Survey of Salient Risks to Financial Stability

Figure A. Spring 2023: Most cited potential risks over the next 12 to 18 months

Responses are to the following question: "Over the next 12–18 months, which shocks, if realized, do you think would have the greatest negative effect on the functioning of the U.S. financial system?"

Figure B. Fall 2022: Most cited potential risks over the next 12 to 18 months

Responses are to the following question: "Over the next 12–18 months, which shocks, if realized, do you think would have the greatest negative effect on the functioning of the U.S. financial system?"

Box 5.2. Transmission of Stress Abroad to the U.S. Financial System

Figure B. U.S. dollar-denominated bank claims on U.S. and non-U.S. residents as of 2022:Q3

The data exclude intragroup claims.

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