For use at 11:00 a.m. EDT
June 17, 2022

Monetary Policy Report

June 17, 2022

Board of Governors of the Federal Reserve System

Letter of Transmittal

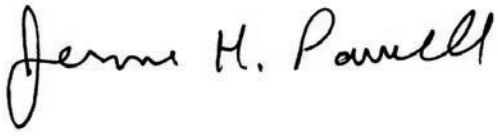
Board of Governors of the
Federal Reserve System

Washington, D.C., June 17, 2022

The President of the Senate
The Speaker of the House of Representatives

The Board of Governors is pleased to submit its *Monetary Policy Report* pursuant to section 2B of the Federal Reserve Act.

Sincerely,



Jerome H. Powell, Chair

Statement on Longer-Run Goals and Monetary Policy Strategy

Adopted effective January 24, 2012; as reaffirmed effective January 25, 2022

The Federal Open Market Committee (FOMC) is firmly committed to fulfilling its statutory mandate from the Congress of promoting maximum employment, stable prices, and moderate long-term interest rates. The Committee seeks to explain its monetary policy decisions to the public as clearly as possible. Such clarity facilitates well-informed decisionmaking by households and businesses, reduces economic and financial uncertainty, increases the effectiveness of monetary policy, and enhances transparency and accountability, which are essential in a democratic society.

Employment, inflation, and long-term interest rates fluctuate over time in response to economic and financial disturbances. Monetary policy plays an important role in stabilizing the economy in response to these disturbances. The Committee's primary means of adjusting the stance of monetary policy is through changes in the target range for the federal funds rate. The Committee judges that the level of the federal funds rate consistent with maximum employment and price stability over the longer run has declined relative to its historical average. Therefore, the federal funds rate is likely to be constrained by its effective lower bound more frequently than in the past. Owing in part to the proximity of interest rates to the effective lower bound, the Committee judges that downward risks to employment and inflation have increased. The Committee is prepared to use its full range of tools to achieve its maximum employment and price stability goals.

The maximum level of employment is a broad-based and inclusive goal that is not directly measurable and changes over time owing largely to nonmonetary factors that affect the structure and dynamics of the labor market. Consequently, it would not be appropriate to specify a fixed goal for employment; rather, the Committee's policy decisions must be informed by assessments of the shortfalls of employment from its maximum level, recognizing that such assessments are necessarily uncertain and subject to revision. The Committee considers a wide range of indicators in making these assessments.

The inflation rate over the longer run is primarily determined by monetary policy, and hence the Committee has the ability to specify a longer-run goal for inflation. The Committee reaffirms its judgment that inflation at the rate of 2 percent, as measured by the annual change in the price index for personal consumption expenditures, is most consistent over the longer run with the Federal Reserve's statutory mandate. The Committee judges that longer-term inflation expectations that are well anchored at 2 percent foster price stability and moderate long-term interest rates and enhance the Committee's ability to promote maximum employment in the face of significant economic disturbances. In order to anchor longer-term inflation expectations at this level, the Committee seeks to achieve inflation that averages 2 percent over time, and therefore judges that, following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time.

Monetary policy actions tend to influence economic activity, employment, and prices with a lag. In setting monetary policy, the Committee seeks over time to mitigate shortfalls of employment from the Committee's assessment of its maximum level and deviations of inflation from its longer-run goal. Moreover, sustainably achieving maximum employment and price stability depends on a stable financial system. Therefore, the Committee's policy decisions reflect its longer-run goals, its medium-term outlook, and its assessments of the balance of risks, including risks to the financial system that could impede the attainment of the Committee's goals.

The Committee's employment and inflation objectives are generally complementary. However, under circumstances in which the Committee judges that the objectives are not complementary, it takes into account the employment shortfalls and inflation deviations and the potentially different time horizons over which employment and inflation are projected to return to levels judged consistent with its mandate.

The Committee intends to review these principles and to make adjustments as appropriate at its annual organizational meeting each January, and to undertake roughly every 5 years a thorough public review of its monetary policy strategy, tools, and communication practices.

Contents

List of Boxes

Note: This report reflects information that was publicly available as of 4 p.m. EDT on June 15, 2022. Unless otherwise stated, the time series in the figures extend through, for daily data, June 14, 2022; for monthly data, May 2022; and, for quarterly data, 2022:Q1. In bar charts, except as noted, the change for a given period is measured to its final quarter from the final quarter of the preceding period.

Summary

In the first part of the year, inflation remained well above the Federal Open Market Committee's (FOMC) longer-run objective of 2 percent, with some inflation measures rising to their highest levels in more than 40 years. These price pressures reflect supply and demand imbalances, higher energy and food prices, and broader price pressures, including those resulting from an extremely tight labor market. In the labor market, demand has remained strong, and supply has increased only modestly. As a result, the unemployment rate fell noticeably below the median of FOMC participants' estimates of its longer-run normal level, and nominal wages continued to rise rapidly. Although overall economic activity edged down in the first quarter, household spending and business fixed investment remained strong. The most recent indicators suggest that private fixed investment may be moderating, but consumer spending remains strong.

In response to sustained inflationary pressures and a strong labor market, the FOMC has been adjusting its policies and communications since last fall. At its March meeting, the FOMC raised the target range for the federal funds rate off the effective lower bound to ¼ to ½ percent. The Committee continued to raise the target range in May and June, bringing it to 1½ to 1¾ percent following the June meeting, and indicated that ongoing increases are likely to be appropriate. The Committee ceased net asset purchases in early March and began reducing its securities holdings in June.

The Committee is acutely aware that high inflation imposes significant hardship, especially on those least able to meet the higher costs of essentials. The Committee's commitment to restoring price stability—which is necessary for sustaining a strong labor market—is unconditional.

Recent Economic and Financial Developments

Inflation. Consumer price inflation, as measured by the 12-month change in the price index for personal consumption expenditures (PCE), rose from 5.8 percent in December 2021 to 6.3 percent in April, its highest level since the early 1980s and well above the FOMC's objective of 2 percent. This increase was driven by an acceleration of retail food and energy prices, reflecting further increases in commodity prices due to Russia's invasion of Ukraine. The 12-month measure of inflation that excludes the volatile food and energy categories (so-called core inflation) rose initially and then fell back to 4.9 percent in April, unchanged from last December. Three-month measures of core inflation have softened since December but remain far above levels consistent with price stability. Measures of near-term inflation expectations continued to rise markedly, while longer-term expectations moved up by less.

The labor market. Demand for labor continued to outstrip available supply across many parts of the economy, and nominal wages continued to increase at a robust pace. While labor demand remained very strong, labor supply increased only modestly. As a result, the labor market tightened further between December and May, with job gains averaging 488,000 per month and the unemployment rate falling from 3.9 percent to 3.6 percent—just above the bottom of its range over the past 50 years.

Economic activity. Real gross domestic product (GDP) is reported to have surged at a 6.9 percent annual rate in the fourth quarter of 2021 and then to have declined at a 1.5 percent annual rate in the first quarter. The large swings in growth rates reflected fluctuations in the volatile expenditure categories of net

exports and inventory investment. Abstracting from these volatile components, growth in private domestic final demand (consumer spending plus residential and business fixed investment—a measure that tends to be more stable and better reflects the strength of overall economic activity) was strong in the first quarter, supported by some unwinding of supply bottlenecks and a further reopening of the economy. The most recent indicators suggest that private fixed investment may be moderating, but consumer spending remains strong. As a result, real GDP appears on track to rise moderately in the second quarter.

Financial conditions. Financial conditions have tightened significantly this year. The expected path of the federal funds rate over the next few years shifted up substantially, and yields on nominal Treasury securities across maturities have risen considerably since late February amid sustained inflationary pressures and associated expectations for further monetary policy tightening. Equity prices were volatile and declined sharply, on net, while corporate bond yields increased substantially and spreads increased notably, partly reflecting some concerns about the future corporate credit outlook. Mortgage rates also rose sharply. In turn, tighter financial conditions may have begun to weigh on some financing activity. On the business side, nonfinancial corporate bond issuance was solid in the first quarter but slowed somewhat in April and May, with speculative-grade bond issuance being particularly weak. That said, the growth of bank loans to businesses picked up, and business credit quality has remained strong thus far. For households, mortgage originations declined materially. Nevertheless, mortgage credit remained broadly available for a wide range of potential borrowers. For other consumer loans (such as auto loans and credit cards), credit standards eased somewhat further or changed little, and credit outstanding grew briskly.

Financial stability. Despite experiencing a series of adverse shocks—higher-than-expected inflation, the ongoing supply disruptions related to COVID-19, and Russia's invasion of Ukraine—the financial system has been resilient, though portions of the commodities markets temporarily experienced elevated levels of stress. The drop in equity prices and rising bond spreads suggest that valuation pressures in corporate securities markets have eased some from their previously elevated levels, but real estate prices have risen further this year. While business and household debt has been growing solidly, the ratio of credit to GDP has decreased to near pre-pandemic levels and most indicators of credit quality remained robust, suggesting that vulnerabilities from nonfinancial leverage are moderate. Large bank capital ratios dipped in the first quarter, but overall leverage in the financial sector appears moderate and little changed this year. Recent strains experienced in markets for stablecoins—digital assets that aim to maintain a stable value relative to a national currency or other reference assets—and other digital assets have highlighted the structural fragilities in that rapidly growing sector. A few signs of funding pressures emerged amid the geopolitical tensions, particularly in commodities markets. However, broad funding markets proved resilient, and with direct exposures of U.S. financial institutions to Russia and Ukraine being small, financial spillovers have been limited to date.

International developments. Economic activity has continued to recover in many foreign economies, albeit with new significant headwinds from Russia's invasion of Ukraine and COVID lockdowns in China. These headwinds have, on net, pushed commodity prices higher, worsened supply disruptions, and lowered household and business confidence, thus damping the rebound in foreign economic activity. As in the United States, consumer price inflation abroad is high and has continued to rise in many economies, boosted by higher energy, food, and other commodity prices as well by supply chain constraints. In response, many foreign central banks have

raised policy rates, and some have started to reduce the size of their balance sheets.

Foreign financial conditions have tightened notably since the beginning of the year, in part reflecting the tightening in foreign monetary policy and concerns about persistently high inflation. Sovereign bond yields in many advanced foreign economies rose. Foreign risky asset prices declined, also driven by downside risks to the growth outlook amid the lockdowns in China and Russia's invasion of Ukraine. The trade-weighted value of the dollar appreciated notably.

Monetary Policy

In response to significant ongoing inflation pressures and the tightening labor market, the Committee has been adjusting its policies and communications since last fall. The Committee wound down net purchases of securities and began reducing those securities holdings more rapidly than expected, and also initiated a swift increase in interest rates. Adjustments to both interest rates and the balance sheet are playing a role in firming the stance of monetary policy in support of the Committee's maximum-employment and price-stability goals.

Interest rate policy. In March, after holding the federal funds rate near zero since the onset of the pandemic, the FOMC raised the target range for that rate to ¼ to ½ percent. The Committee raised the target range again in May and June, bringing it to the current range of 1½ to 1¾ percent, and conveyed its anticipation that ongoing increases in the target range will be appropriate.

Balance sheet policy. The Federal Reserve began reducing its monthly net asset purchases last November and accelerated the reductions in December, bringing net purchases to an end in early March. In January, the FOMC issued a set of principles regarding its planned approach for significantly reducing the size of the Federal Reserve's balance sheet. Consistent with those principles, the Committee announced in May its specific plans for significantly reducing its securities holdings and that these reductions would begin on June 1.[1]

The Committee acutely recognizes the significant hardship caused by elevated inflation, especially on those least able to meet the higher costs of essentials. The Committee is strongly committed to restoring price stability, which is necessary for sustaining a strong labor market.

Special Topics

Labor market disparities. The labor market recovery over the past year and a half has been robust and widespread as the labor market effects of the pandemic have eased, with particularly strong improvement among groups that had suffered the most. As a result, employment and earnings of nearly all major demographic groups are near or above their levels before the pandemic, and employment rates are again near multidecade highs. However, there remain notable differences in employment and earnings across groups that predate the pandemic.

Developments in global supply chains. Supply chain bottlenecks remain a major impediment for domestic and foreign firms. While U.S. manufacturers have been recording solid output growth for more than a year, order backlogs and delivery times remain high, and producer prices have risen rapidly. Further risks to global supply chains abound. In China, COVID-19 lockdowns drove the largest monthly declines in industrial production there since early 2020 while also disrupting internal and international freight transportation. In addition, the war in Ukraine continues to put

1. See the May 4, 2022, press release regarding the Plans for Reducing the Size of the Federal Reserve's Balance Sheet, available at https://www.federalreserve.gov/newsevents/pressreleases/monetary20220504b.htm.

upward pressure on energy and food prices and has raised the risk of disruption in the supply of inputs to some manufacturing industries.

Monetary policy rules. Simple monetary policy rules, which relate a policy interest rate to a small number of other economic variables, can provide useful guidance to policymakers. Many simple policy rules prescribed strongly negative values for the federal funds rate during the pandemic-driven recession. With inflation running well in excess of the Committee's 2 percent longer-run objective, a strong U.S. economy, and tight labor market conditions, the simple monetary policy rules considered here call for raising the target range for the federal funds rate significantly.

Global inflation. Inflation abroad rose rapidly over the past year, reflecting soaring food and commodity prices, pandemic-related supply disruptions, and demand imbalances between goods and services. The price pressures have been amplified by the war in Ukraine and COVID-19 lockdowns in China. Although the recent inflation surge was concentrated in volatile components, such as food and energy, price increases have broadened to core goods and services.

Global monetary policy. With inflation rising sharply across the globe, many central banks have tightened monetary policy. Policy tightening started last year as some emerging market central banks, particularly those in Latin America, were concerned that sharp increases in inflation could become entrenched in inflation expectations. Since fall 2021, many central banks in the advanced foreign economies have also started tightening monetary policy or are expected to do so soon, and several central banks that had expanded their balance sheets over the past two years are now allowing them to shrink.

Developments in the Federal Reserve's balance sheet. Following the conclusion of net asset purchases, the balance sheet remained stable at around $9 trillion. Alongside the removal of policy accommodation—through actual and expected increases in the policy rate—plans for shrinking the size of the balance sheet were announced in May and were initiated in June. Despite the size of the balance sheet remaining steady, reserve balances fell, in large part because of increasingly elevated take-up at the overnight reverse repurchase agreement (ON RRP) facility, which reached a record high of $2.2 trillion. In an environment of ample liquidity, limited Treasury bill supply, and low repurchase agreement rates, the ON RRP facility continued to serve its intended purpose of helping to provide a floor under short-term interest rates and to support effective implementation of monetary policy.

Part 1
Recent Economic and Financial Developments

Domestic Developments

Inflation continued to run high . . .

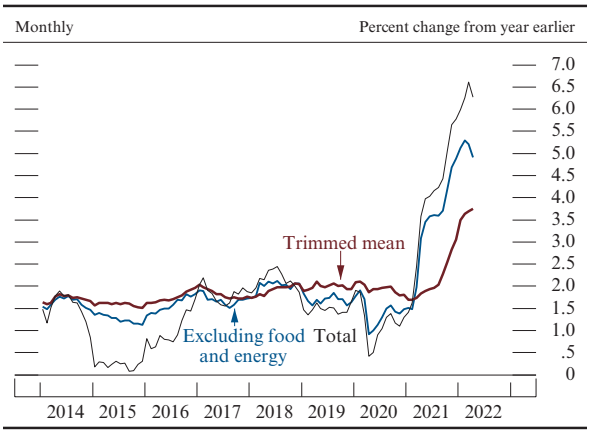
After surging 5.8 percent over 2021—the largest increase since 1981—the price index for personal consumption expenditures (PCE) continued to post notable increases so far this year, and the change over the 12 months ending in April stood at 6.3 percent (figure 1). This pace is well above the FOMC's longer-run objective of 2 percent.

. . . reflecting further large increases in food and energy prices . . .

Grocery prices increased at a very rapid pace of 10 percent over the 12 months ending in April, more than 4 percentage points faster than over the 12 months ending in December and the highest reading since 1981 (figure 2). Food commodity prices (such as wheat and corn), which had already increased last year, have risen further since Russia's invasion of Ukraine. At the same time, high fuel costs, supply chain bottlenecks, and high wage growth have also pushed up processing, packaging, and transportation costs for food.

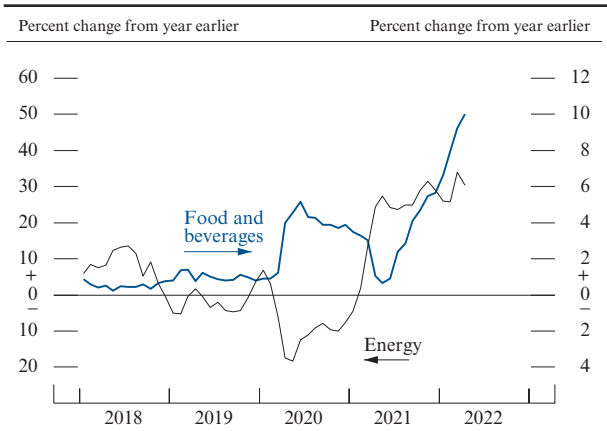
The PCE price index for energy increased 30 percent over the 12 months ending in April,

1. Change in the price index for personal consumption expenditures

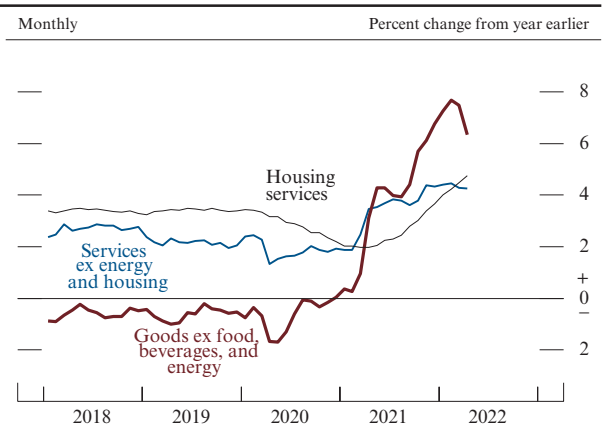


NOTE: The data extend through April 2022.
SOURCE: For trimmed mean, Federal Reserve Bank of Dallas; for all else, Bureau of Economic Analysis; all via Haver Analytics.

2. Personal consumption expenditures price indexes

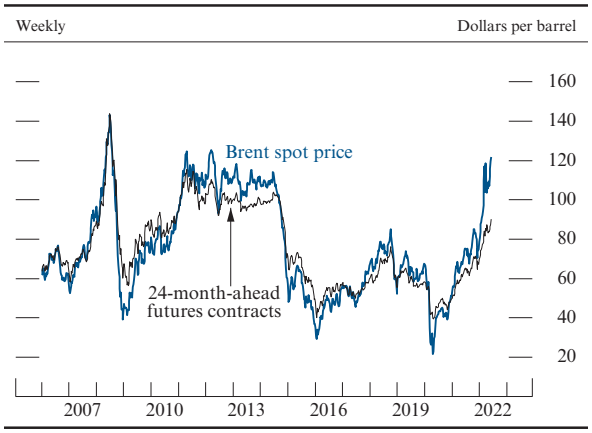


NOTE: The data are monthly and extend through April 2022.
SOURCE: Bureau of Economic Analysis via Haver Analytics.



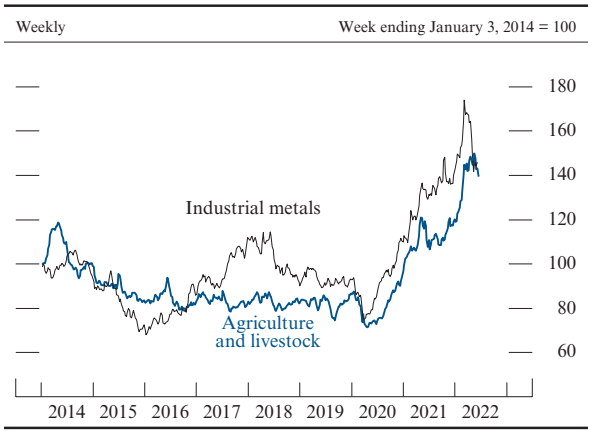
NOTE: The data extend through April 2022.
SOURCE: Bureau of Economic Analysis via Haver Analytics.

3. Spot and futures prices for crude oil



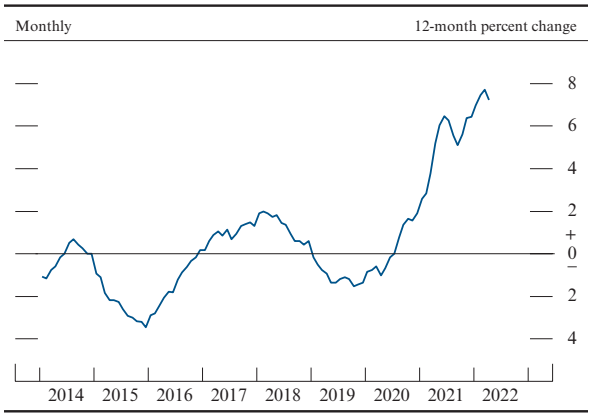
NOTE: The data are weekly averages of daily data and extend through June 10, 2022.
SOURCE: ICE Brent Futures via Bloomberg.

4. Spot prices for commodities



NOTE: The data are weekly averages of daily data and extend through June 10, 2022.
SOURCE: For industrial metals, S&P GSCI Industrial Metals Index Spot; for agriculture and livestock, S&P GSCI Agriculture & Livestock Spot Index; both via Haver Analytics.

5. Nonfuel import price index



NOTE: The data extend through April 2022.
SOURCE: Bureau of Labor Statistics via Haver Analytics.

about the same pace as over the 12 months ending in December. Large increases in crude oil and natural gas commodity prices have boosted consumer prices for gasoline and natural gas.

. . . which, in turn, partly reflected rising prices of commodities and imports

Because of Russia's invasion of Ukraine, oil prices rose sharply in early March, reaching eight-year highs (figure 3). Prices remain elevated and volatile, boosted by a European Union embargo of Russian oil imports but weighed down at times by concerns about global economic growth. In addition, producers in other countries are struggling to ramp up oil production.

Nonfuel commodity prices also surged after the invasion, with large increases in the prices of both agricultural commodities and industrial metals (figure 4). Although the price of industrial metals has declined recently, agricultural prices remain elevated. Ukraine and Russia are notable exporters of wheat, Russia is a major exporter of fertilizer, and higher energy prices are spilling over into the agricultural sector. Export restrictions and unfavorable weather conditions in several countries have also boosted agricultural prices. (See the box "Developments in Global Supply Chains.")

With commodity prices surging and foreign goods prices on the rise, import prices increased significantly (figure 5).

Excluding food and energy prices, monthly inflation readings have softened since the turn of the year but remain far above levels consistent with price stability

Supply chain issues, hiring difficulties, and other capacity constraints have prevented the supply of products from rising quickly enough to satisfy continued strong demand, resulting in large price increases for many goods and services over the past year. After excluding consumer food and energy prices,

the 12-month measure of core PCE inflation rose initially and then fell back to 4.9 percent in April, unchanged from December.

That said, monthly core inflation readings have softened noticeably since the start of the year, with the three-month measure of core PCE inflation falling from an annual rate of 6.0 percent last December to 4.0 percent in April. In particular, inflation stepped down for durable goods, likely reflecting some easing in supply constraints.

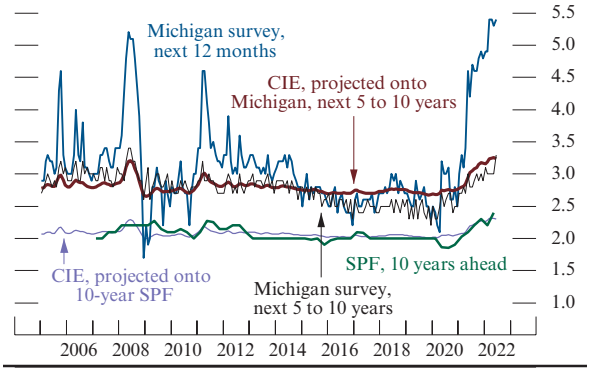
Nevertheless, the recent inflation readings have been mixed, remain far above levels consistent with price stability, and are far from conclusive evidence on the direction of inflation. Unlike durable goods price inflation, core services inflation has not declined significantly. Housing service prices continue to rise at a brisk pace, and increased demand for travel is markedly pushing up inflation rates for lodging and airfares. More generally, rapid growth of labor costs is putting upward pressure on the prices of all labor-intensive services.

Measures of near-term inflation expectations continued to rise markedly, while longer-term expectations moved up by less

The first half of 2022 saw further increases in expectations of inflation for the year ahead in surveys of both consumers and professional forecasters (figure 6). In the University of Michigan Surveys of Consumers, the median value for inflation expectations over the next year jumped to 5.4 percent in March, its highest level since November 1981, and has moved sideways since then. A portion of the upward movement so far this year likely reflects the war in Ukraine and the accompanying increases in the prices of commodities, especially those related to energy and food.

Longer-term expectations, which are more likely to influence actual inflation over time, moved up by less and remained above pre-pandemic levels. The Michigan survey's median inflation expectation for the next

6. Measures of inflation expectations



NOTE: The Survey of Professional Forecasters (SPF) data are quarterly, begin in 2007:Q1, and extend through 2022:Q2. The data for the Index of Common Inflation Expectations (CIE) and the Michigan survey are monthly and extend through June 2022; the June data for the Michigan survey and the CIE are preliminary.

SOURCE: University of Michigan Surveys of Consumers; Federal Reserve Bank of Philadelphia, SPF; Federal Reserve Board, CIE; Federal Reserve Board staff calculations.

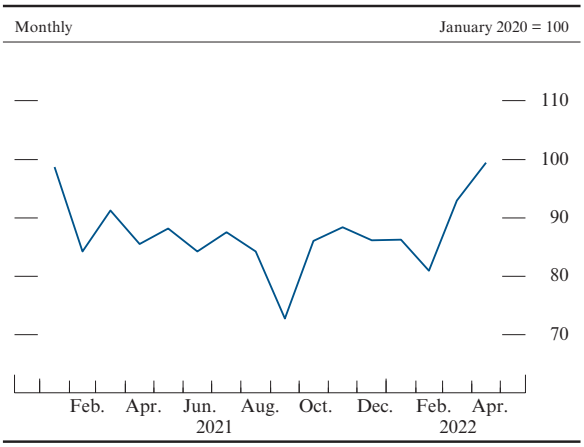
Developments in Global Supply Chains

Bottlenecks in global production and transportation remain a major impediment for both domestic and foreign firms. Russia's invasion of Ukraine and the widespread COVID-19 lockdowns in China have exacerbated strains in global supply networks and have led to greater uncertainty about the timing of improvement in supply conditions.

Despite this turbulence in the global supply network, U.S. manufacturers have been recording solid output growth for more than a year. There have been gains in domestic motor vehicle production, as the supply of semiconductors has recovered somewhat (figure A). In addition, survey results suggest shorter supplier delivery times and lower order backlogs relative to their late 2021 levels (figure B). Notwithstanding these improvements, backlogs and delivery times for the sector remain elevated, and light vehicle assemblies are still a bit below pre-pandemic levels, with low dealer inventories continuing to constrain sales. For some materials that had previously been in short supply—such as lumber and steel—prices have declined from notable highs. Even so, the overall producer price index for manufacturing in April was more than 18 percent above its year-earlier level (figure C). Progress has been similarly mixed for bottlenecks in the transportation of goods. The number of ships waiting for berths at West Coast ports has declined noticeably, as port throughput has remained high, although manufacturers continue to cite logistics and transportation constraints as reasons for lower output.

(continued)

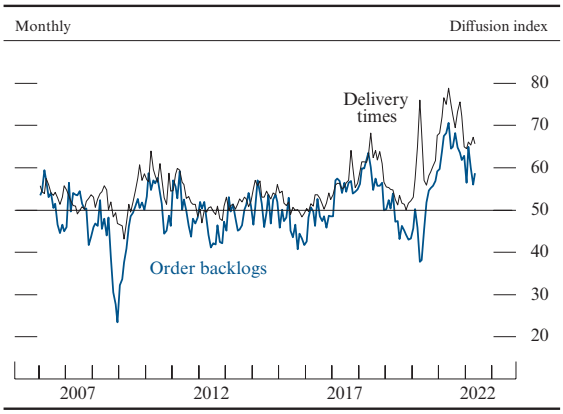
A. U.S. light motor vehicle production



NOTE: The data extend through April 2022. The data are adjusted using Federal Reserve Board seasonal factors.

SOURCE: Ward's Automotive Group, AutoInfoBank and Intelligence Data Query; Chrysler Group LLC, North American Production Data; General Motors Corporation, GM Motor Vehicle Assembly Production Data.

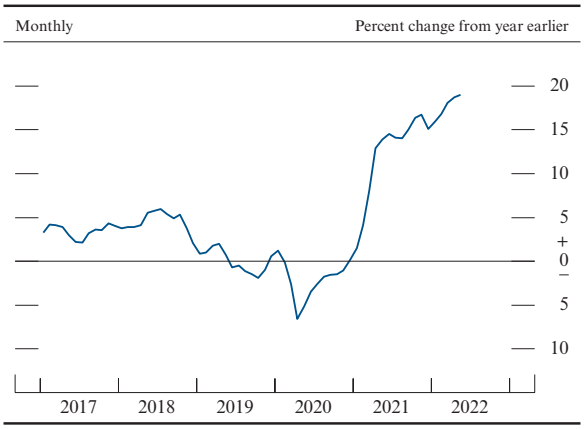
B. Suppliers' delivery times and order backlogs



NOTE: Values greater than 50 indicate that more respondents reported longer delivery times or order backlogs relative to a month earlier than reported shorter delivery times or order backlogs.

SOURCE: Institute for Supply Management, ISM Manufacturing *Report on Business.*

C. Producer price index for manufacturing



SOURCE: Bureau of Labor Statistics via Haver Analytics.

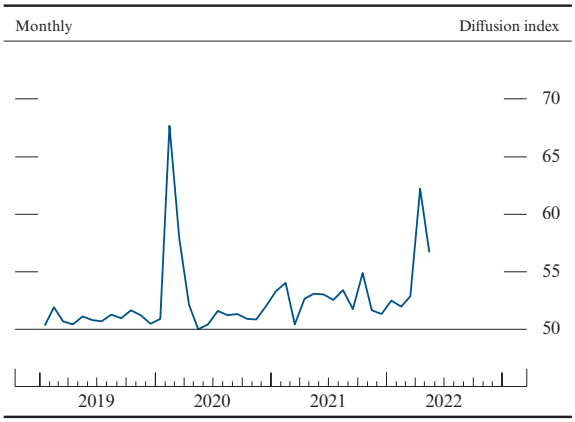
Risks to supply chain conditions abound, including those arising from COVID-19 lockdowns in China beginning in mid-March and the ongoing war in Ukraine.[1] Committed to their zero-COVID strategy, Chinese authorities ratcheted up restrictions quickly in the face of rising cases of the Omicron variant, which included a complete lockdown of Shanghai. The containment strategy managed to reduce case counts, allowing authorities to begin relaxing some citywide restrictions in late April. The lockdowns drove the largest monthly declines in Chinese activity since early 2020, with industrial production dropping about 13 percent between February and April (figure D) before recovering some in May. With severely disrupted domestic logistics, supplier delivery times increased sharply in April and continued increasing in May, but not as strongly (figure E). Chinese international trade was also hit, contracting in the three months before April (figure F). As Chinese production continues to recover, the associated rebound in trade flows may further strain international transportation networks.

1. The July 1 expiration of the contract between dockworkers and West Coast port operators poses an additional risk for shipping-related disruption.

The invasion of Ukraine by Russia is causing economic hardship. For instance, the conflict has disrupted global commodity markets in which Ukraine and Russia account for significant shares of global exports. Notably, energy prices have soared, as

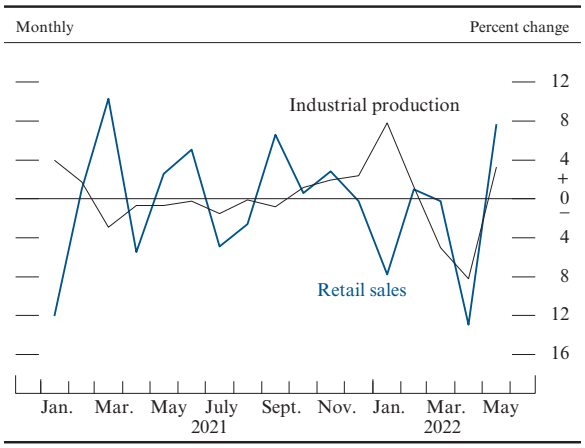
(continued on next page)

E. China's purchasing managers index: Supplier delivery times



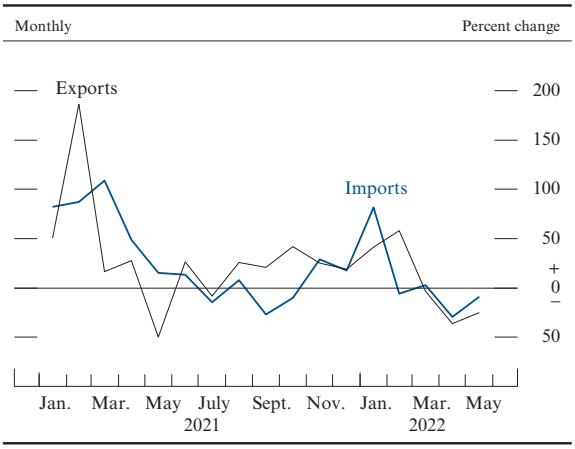
NOTE: The series is seasonally adjusted. Values greater than 50 indicate that more respondents reported longer delivery times relative to a month earlier than reported shorter delivery times.
SOURCE: Caixin; S&P Global; both via Haver Analytics.

D. Chinese industrial production and retail sales



NOTE: Industrial production data are adjusted using Federal Reserve Board seasonal factors. Retail sales data are seasonally adjusted by the National Bureau of Statistics of China.
SOURCE: National Bureau of Statistics of China via Haver Analytics; Federal Reserve Board staff calculations.

F. Nominal trade growth in China



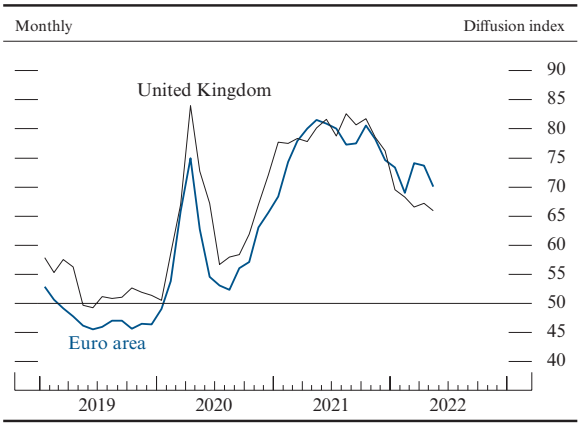
NOTE: All series are seasonally adjusted at an annual rate using Federal Reserve Board seasonal factors. The data are 3-month moving averages.
SOURCE: General Administration of Customs, China, via Haver Analytics.

Developments in Global Supply Chains *(continued)*

increasing geopolitical tensions have put the supply of Russian oil and gas to Europe at risk. Indeed, Russian energy exports have already been falling amid embargos on Russian oil, self-sanctioning by some companies, transportation difficulties, and Russia's decision to halt gas deliveries to several European countries. The prices of several nonfuel commodities that are vital inputs to some manufacturing industries jumped in the early days of the conflict, including neon gas (an input in semiconductor chip production), palladium (an input in semiconductors and catalytic converters), nickel (an input in electric vehicles' batteries), and platinum. However, prices have since retreated to near pre-invasion levels as major disruptions have failed to materialize thus far. Finally, blocked shipping routes in the Black Sea have severed the region's agricultural exports, disrupting global food markets. As a result, prices of corn, wheat, sunflower oil, and fertilizer have climbed to record-high levels, raising concerns of food insecurity across the globe. Further aggravating the situation, a number of countries introduced export bans on some food commodities to contain rising domestic food prices.

Thus far, the war appears to have had more limited effects on other aspects of global supply chains. The effect on supplier delivery times across Europe has been muted, suggesting that the repercussions for manufacturers in the region have been relatively modest so far outside of the shifts in commodity prices (figure G). The global transportation system has also proved mostly resilient to the war, with signs of further strain in only a couple of sectors. Oil tanker charter rates spiked, boosted by a rise in demand as oil started to move to new markets, while truck transportation prices rose further, reflecting higher diesel fuel costs.

G. Purchasing managers index: Supplier delivery times



NOTE: The series are seasonally adjusted. Values greater than 50 indicate that more respondents reported longer delivery times relative to a month earlier than reported shorter delivery times.

SOURCE: For the United Kingdom, S&P Global and the Chartered Institute of Procurement & Supply; for the euro area, S&P Global; all via Haver Analytics.

5 to 10 years rose to 3.3 percent in the June preliminary reading. If confirmed, this reading would be near the top of the range from the past 25 years. Nevertheless, it remains well below the corresponding measure of 1-year-ahead inflation expectations. In the second-quarter Survey of Professional Forecasters, the median expectation for 10-year PCE inflation edged up to 2.4 percent, reflecting noticeable upward revisions to expected inflation this year and next but little change thereafter; the median expectation for 6 to 10 years ahead held steady at 2 percent.

Market-based measures of longer-term inflation compensation, which are based on financial instruments linked to inflation, are sending a similar message. A measure of consumer price index (CPI) inflation compensation 5 to 10 years ahead implied by Treasury Inflation-Protected Securities is little changed (on balance) since late 2021 and remains well below the corresponding measure of inflation compensation over the next 5 years (figure 7).

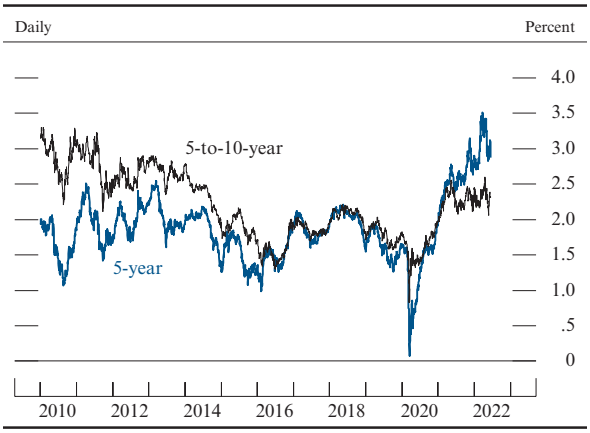
The Index of Common Inflation Expectations, which is produced by Federal Reserve Board staff and synthesizes information from a large range of near-term as well as longer-term expectation measures, edged up in the first half of this year and now stands at the high end of the range from the past 20 years.

The labor market continued to tighten

Payroll employment expanded an average of 488,000 per month in the first five months of the year (figure 8). Payroll gains so far this year have been broad based across industries, with the leisure and hospitality sector continuing to see the largest gains as people continued their return to activities that had been cut back by the pandemic.

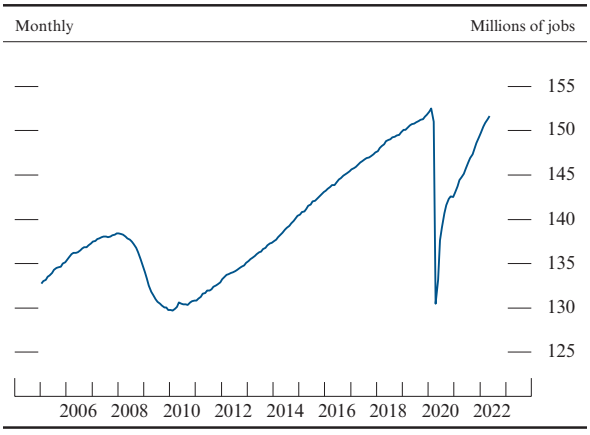
The increase in payrolls was accompanied by further declines in the unemployment rate, which fell 0.3 percentage point over the first five months of the year to 3.6 percent in May, just above the bottom of its range

7. Inflation compensation implied by Treasury Inflation-Protected Securities



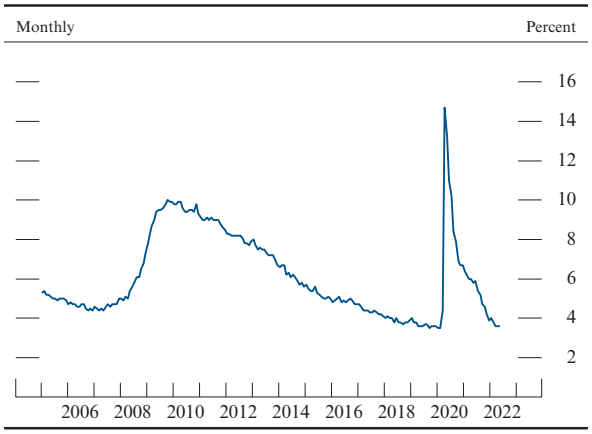
NOTE: The data are at a business-day frequency and are estimated from smoothed nominal and inflation-indexed Treasury yield curves.
SOURCE: Federal Reserve Bank of New York; Federal Reserve Board staff calculations.

8. Nonfarm payroll employment



SOURCE: Bureau of Labor Statistics via Haver Analytics.

9. Civilian unemployment rate



SOURCE: Bureau of Labor Statistics via Haver Analytics.

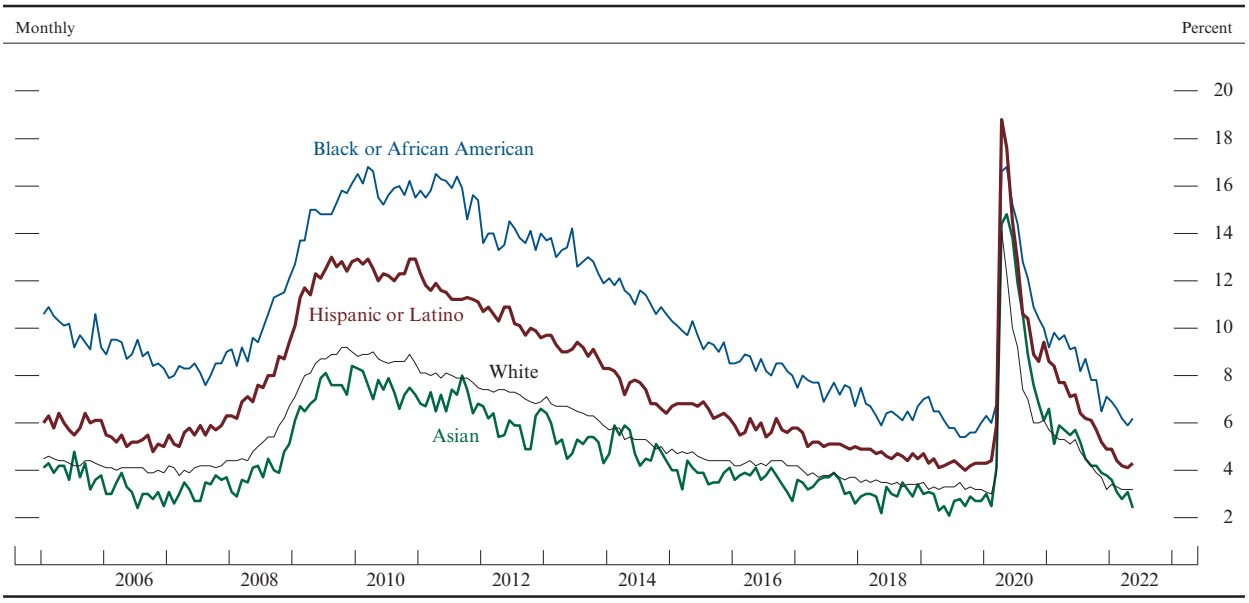
over the past 50 years (figure 9). The decline in the unemployment rate has been fairly broad based across age, educational attainment, gender, and ethnic and racial groups (figure 10). These declines have helped employment of nearly all major demographic groups recover to near or above their levels before the pandemic. (See the box "Developments in Employment and Earnings across Groups.")

While labor demand remained very strong, labor supply increased only modestly and stayed below pre-pandemic levels

Demand for labor continued to be very strong in the first half of the year. At the end of April, there were 11.4 million job openings—60 percent above pre-pandemic levels and down a bit from the all-time high recorded in March.

Meanwhile, the supply of labor rose only gradually and remained below pre-pandemic levels. The labor force participation rate (LFPR), which measures the share of people

10. Unemployment rate, by race and ethnicity



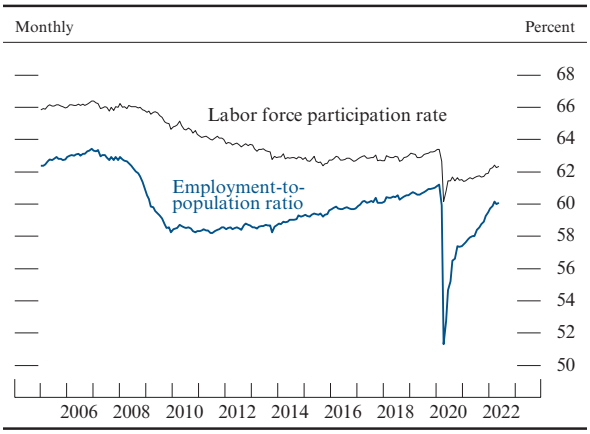
NOTE: Unemployment rate measures total unemployed as a percentage of the labor force. Persons whose ethnicity is identified as Hispanic or Latino may be of any race. Small sample sizes preclude reliable estimates for Native Americans and other groups for which monthly data are not reported by the Bureau of Labor Statistics.
SOURCE: Bureau of Labor Statistics via Haver Analytics.

either working or actively seeking work, edged up just 0.1 percentage point in the first five months of the year—following a 0.4 percentage point improvement last year—to 62.3 percent in May (figure 11).[2]

Despite these improvements, the LFPR remains 1.1 percentage points below its February 2020 level.[3] About one-half of this decline in the participation rate was to be expected even in the absence of the pandemic, as additional members of the large baby-boom generation have reached retirement age. In addition, several pandemic-related factors appear to be continuing to hold down the participation rate, including a pandemic-induced surge in retirements (beyond that implied by the aging of the baby boomers) and, to a diminishing extent, increased caregiving responsibilities and some continuing concerns about contracting COVID-19.

In addition to subdued participation, a second factor constraining the size of the labor force has been a marked slowing in population growth since the start of the pandemic. Over 2020 and 2021, the working-age (16 and over) population grew by 0.4 percent per year on average—notably less than the 0.9 percent

11. Labor force participation rate and employment-to-population ratio



NOTE: The labor force participation rate and the employment-to-population ratio are percentages of the population aged 16 and over.
SOURCE: Bureau of Labor Statistics via Haver Analytics.

2. The Bureau of Labor Statistics incorporated new population estimates beginning with the January 2022 employment report. This development resulted in a one-time jump in the estimate of the aggregate LFPR of about 0.3 percentage point due to a change in the age distribution of the population. Accordingly, the 0.4 percentage point increase in the published measure from December to May overstates the improvement in the LFPR by about 0.3 percentage point.

3. This shortfall in the LFPR corresponds to a shortfall in the labor force of about 2.8 million persons. (This calculation holds the LFPR constant at its February 2020 level and assumes population growth equal to the actual growth observed since February 2020.)

Developments in Employment and Earnings across Groups

Labor market gains have been robust over the past year and a half as the economy continues to recover from the effects of the pandemic. Historically, economic downturns have tended to exacerbate long-standing differences in employment and earnings across demographic groups, especially for minorities and for those with less education, and this pattern was especially true early on in the pandemic. However, as pandemic-related factors have eased and the labor market has recovered, groups with larger employment declines early in the pandemic have had especially large increases lately. Now employment and real earnings of nearly all major demographic groups are near or above their levels before the pandemic, and employment rates are again near multidecade highs.

Different age groups have had very different employment experiences over the course of the pandemic.[1] Early in the pandemic, the employment-to-population (EPOP) ratio for people aged 16 to 24 not only declined by much more than that for people of prime age (25 to 54) and those aged 55 to 64, but also recovered much more quickly (see figure A, upper-left panel).[2] Conversely, employment recovered more slowly for prime-age people throughout 2020 and nearly all of 2021. But in late 2021 and early 2022, the prime-age EPOP rose quickly, such that now all three of these age groups' EPOP ratios have essentially recovered to their pre-pandemic levels. The EPOP ratio for those aged 65 and over, however, remains about 1 percentage point below its pre-pandemic level—a level it has maintained through much of the pandemic. The lower EPOP ratio for that group is entirely attributable to a lower labor force participation rate, which in turn largely reflects an increase in retirements since the onset of the pandemic.

A closer look at the prime-age group shows that there has been considerable heterogeneity in the pace of the employment recovery across race and ethnicity, educational attainment, and parental status. Employment for Blacks and Hispanics not only declined by more than that for whites and Asians early in the pandemic, but also recovered more quickly since the end of last year (figure A, upper-right panel). In addition, men and women with high school degrees or less saw larger declines and a faster recovery (figure A, lower-left panel). Similarly, gaps in employment between prime-age mothers and non-mothers that widened through 2020 have essentially closed (figure A, lower-right panel). By April 2022, employment for all of those groups was near or above its pre-pandemic level.

These differences in the timing of the employment recovery across different demographic groups partly reflect the evolution of the pandemic's effect on the labor market. For instance, social-distancing restrictions and concerns about contracting or spreading COVID-19 had likely inhibited employment in in-person services. As these restrictions and concerns have waned, employment of groups more commonly employed in in-person services, such as those with less education and some minority groups, has recovered quickly.[3] Further, the closing of many schools and childcare facilities for the 2020–21 school year due to elevated levels of COVID cases likely held back the employment recovery of parents, as many families faced uncertainties about the consistent availability of in-person education for school-age children and childcare for younger children. The effects appear to have been particularly acute for mothers, especially Black and Hispanic mothers, as well as those with less

(continued)

1. The January 2022 employment report incorporates population controls that showed that the working-age population was both larger and younger over the past decade than the Census Bureau had previously estimated. Those population controls had meaningful effects on the aggregate EPOP ratio, but much smaller effects at the levels of disaggregation examined in this discussion.

2. This discussion defines the pre-pandemic baseline EPOP ratio for each group as that group's average EPOP ratio over 2019.

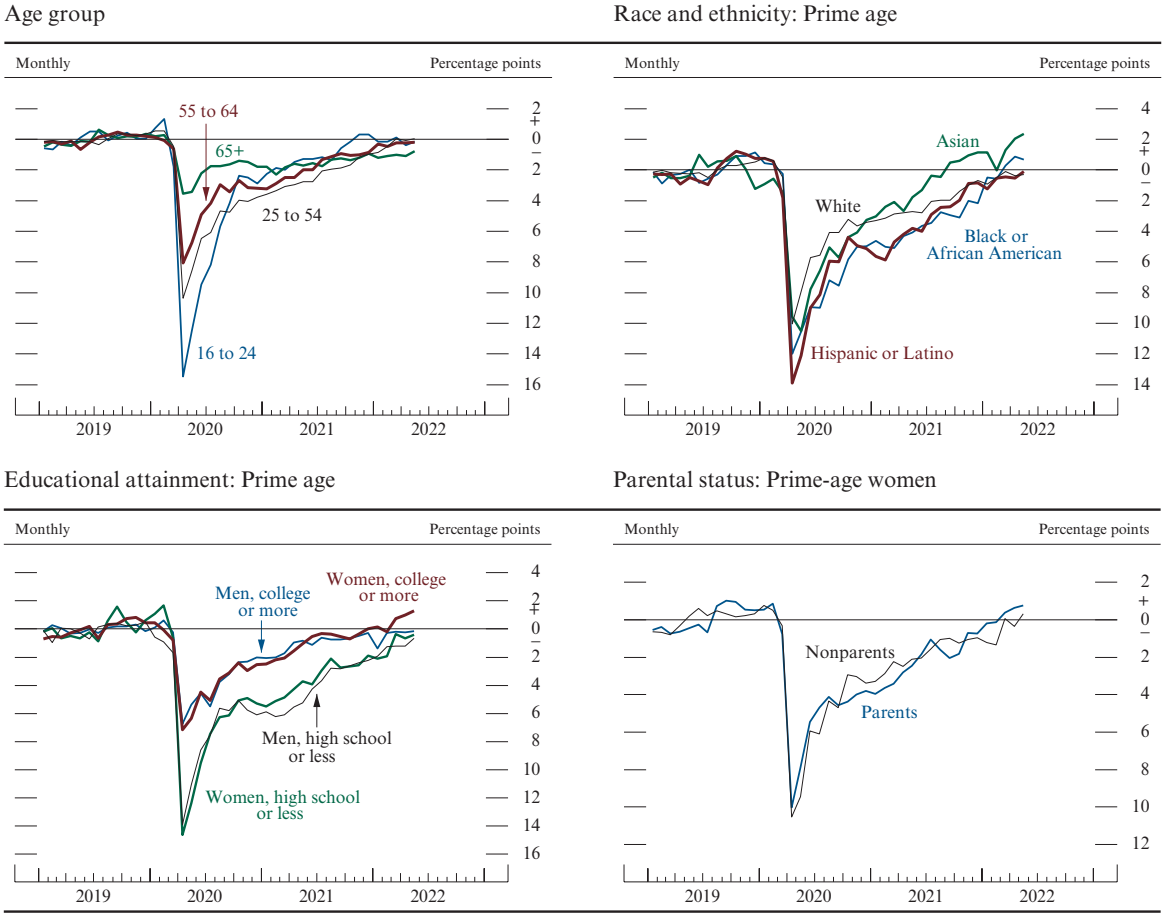
3. Before the pandemic, Blacks and Hispanics were less likely to be employed in jobs that could be performed remotely, and women and Blacks were more likely to be employed in occupations that involved greater face-to-face interactions; for example, see Laura Montenovo, Xuan Jiang, Felipe Lozano Rojas, Ian M. Schmutte, Kosali I. Simon, Bruce A. Weinberg, and Coady Wing (2020), "Determinants of Disparities in COVID-19 Job Losses," NBER Working Paper Series 27132 (Cambridge, Mass.: National Bureau of Economic Research, May; revised June 2021), https://www.nber.org/system/files/working_papers/w27132/w27132.pdf. Other research shows that even after accounting for workers' job characteristics, Hispanic and nonwhite workers experienced a higher rate of job loss relative to other workers; see Guido Matias Cortes and Eliza Forsythe (2021), "The Heterogeneous Labor Market Impacts of the Covid-19 Pandemic," unpublished paper, August, http://publish.illinois.edu/elizaforsythe/files/2021/08/Cortes_Forsythe_Covid-demo_revision_8_1_2021.pdf.

education.[4] However, with schools having generally provided in-person education for the 2021–22 school year, these childcare burdens likely eased, allowing many parents to reenter the workforce.

(continued on next page)

4. The increase in the share of mothers of school-age children who reported being out of the labor force due to caregiving closely tracked the degree to which schools were fully closed to in-person learning over the 2020–21 school year, and districts that serve more Blacks and Hispanics were less likely to provide fully in-person education during the 2020–21 school year, which may account for some of the larger and more persistent declines in labor force attachment for Black and Hispanic mothers over this period. See Joshua Montes, Christopher Smith, and Isabel Leigh (2021), "Caregiving for Children and Parental Labor Force Participation during the Pandemic," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, November 5), https://www.federalreserve.gov/econres/notes/feds-notes/caregiving-for-children-and-parental-labor-force-participation-during-the-pandemic-20211105.htm.

A. Changes in employment-to-population ratio compared with the 2019 average ratio, by group



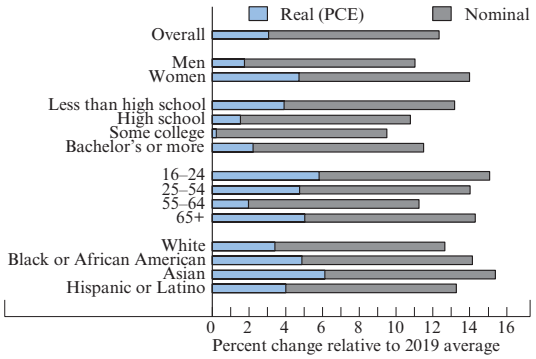
NOTE: Prime age is 25 to 54. The age groups 16 to 24 and prime age show seasonally adjusted data published by the Bureau of Labor Statistics, whereas all other groups' data are seasonally adjusted by the Federal Reserve Board staff.
SOURCE: Bureau of Labor Statistics; Federal Reserve Board staff calculations from Current Population Survey microdata.

Developments in Employment and Earnings across Groups *(continued)*

Although the gaps in employment outcomes across groups that widened during the pandemic have diminished, the considerable gaps that existed before the pandemic remain. For example, the EPOP ratio for whites of prime age remains more than 3 percentage points above those for prime-age Black and Hispanic people; the EPOP ratio of college-educated, prime-age people is about 15 percentage points higher than that of prime-age people with high school degrees or less; and the EPOP ratio for prime-age mothers is about 5 percentage points below that of non-mothers—all similar in size to the gaps that existed before the pandemic.

The broad-based nature of the labor market recovery is also apparent in workers' earnings, which have grown rapidly as employment surged in 2021 and early 2022. As of 2022:Q1, the median full-time worker's usual weekly earnings had grown 12.3 percent relative to pre-pandemic levels—implying real earnings growth of 3.1 percent (figure B).[5] Although this earnings growth has been widespread, it has been largest for women, minorities, young workers, and workers with less than a high school education. The growth in earnings for some demographic groups has been sufficiently robust to shrink some pre-pandemic disparities in real earnings between groups. For instance, the gap in median full-time real earnings for women versus men is slightly smaller in 2022:Q1 than it was in 2019, as is the gap in median real earnings between Black and white full-time workers.[6]

B. Growth in median full-time usual weekly earnings from 2019 to 2022:Q1



NOTE: The percent change as of 2022:Q1 is relative to the 2019 average of the median usual weekly earnings for full-time workers in each group. Real earnings growth deflates the nominal earnings growth by the average growth in the personal consumption expenditures (PCE) price index as of 2022:Q1 relative to its 2019 average level. The overall earnings, as well as those for men and women, use seasonally adjusted data, but the other groups' earnings are not seasonally adjusted. The key identifies bars in order from left to right.

SOURCE: For median usual weekly earnings, Bureau of Labor Statistics; for the PCE price index, Bureau of Economic Analysis.

5. Just as with the change in the EPOP ratio, each group's pre-pandemic baseline is defined as the group's average median usual weekly earnings in 2019. The reported growth in real usual weekly earnings deflates nominal earnings growth by total PCE (personal consumption expenditures) inflation. If, instead, the CPI were used to deflate nominal earnings, then reported real earnings growth since 2019 would be 2 percentage points lower—but even when using the CPI to deflate nominal earnings, real earnings have risen for most groups since 2019.

6. Some of a group's earnings growth relative to 2019 may reflect lingering pandemic-related compositional shifts in the group's full-time workers. Additionally, real earnings growth accounts for aggregate inflation, but some demographic groups may be disproportionately exposed to inflation due to differences in groups' consumption patterns—implying lower real earnings growth for groups with greater exposure to inflation.

average rate over the previous five years.[4] The slowing in population growth over 2020–21 was due to both a sharp decline in net immigration and a spike in COVID-related deaths.[5] Had the population increased over 2020–21 at the same rate as over the previous five years, the labor force would have been about 1¾ million larger as of the second quarter of this year.[6]

As a result, labor markets remained extremely tight . . .

Reflecting very strong demand for workers alongside still-subdued supply, a wide range of indicators have continued to point to an extremely tight labor market despite the fact that the level of payroll employment in May remained about 820,000 below the level in February 2020.[7] The number of total available jobs, measured by total employment plus posted job openings, continued to far exceed the number of available workers, measured by the size of the labor force.[8] The gap was

4. Population forecasts just before the onset of the pandemic also projected faster population growth for 2021–22 than has been realized. For example, the Congressional Budget Office projected 0.8 percent growth per year in 2021–22 in its January 2020 budget and economic projections; see Congressional Budget Office (2020), *The Budget and Economic Outlook: 2020 to 2030* (Washington: CBO, January), https://www.cbo.gov/publication/56020. Before 2015, population growth was even higher. For example, the average growth rate in the working-age population between 1980 and 2014 was 1.2 percent per year.

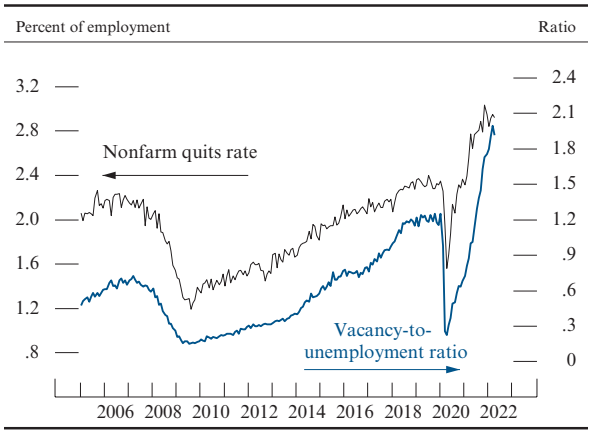
5. The effect of COVID-related deaths on the labor force, however, was relatively smaller, because these deaths have been concentrated among older individuals, who tend to have low LFPRs.

6. This calculation uses the actual LFPR in May 2022 and multiplies it by the level of the population that would have been realized in that month had population growth over 2020–21 been the same as the growth observed over 2015–19.

7. After adjusting for population growth since the beginning of the pandemic, the shortfall in payrolls relative to their pre-pandemic level was about 2.3 million in May.

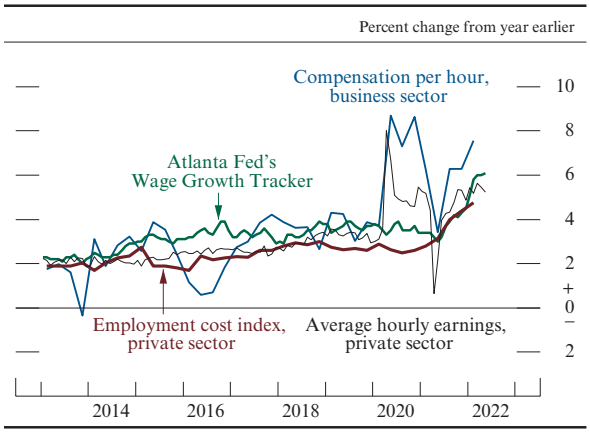
8. The labor force includes all people aged 16 and older who are classified as either employed or unemployed.

12. Ratio of job openings to job seekers and quits rate



NOTE: The data are monthly and extend through April 2022. The vacancy-to-unemployment ratio data are the ratio of job openings to unemployed.
SOURCE: Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

13. Measures of change in hourly compensation



NOTE: Business-sector compensation is on a 4-quarter percent change basis. For the private-sector employment cost index, change is over the 12 months ending in the last month of each quarter; for private-sector average hourly earnings, the data are 12-month percent changes; for the Atlanta Fed's Wage Growth Tracker, the data are shown as a 3-month moving average of the 12-month percent change.
SOURCE: Bureau of Labor Statistics; Federal Reserve Bank of Atlanta, Wage Growth Tracker; all via Haver Analytics.

about 5½ million at the end of April, near the highest level on record.[9] The share of workers quitting jobs each month, an indicator of the availability of attractive job prospects, was 2.9 percent at the end of April, near the all-time high reported in November (figure 12). Initial claims for unemployment benefits remain near the lowest levels observed in the past 50 years. Households' and small businesses' perceptions of labor market tightness were near or above the highest levels observed in the history of these series. And, finally, employers continued to report widespread hiring difficulties.

That said, some possible signs of modest easing of labor market tightness have recently appeared. For example, as noted in the next section, some measures of wage growth appear to have moderated. And in the June 2022 Beige Book, employers in some Federal Reserve Districts reported some signs of modest improvement in worker availability.

. . . and nominal wages continued to increase at a robust pace

Reflecting very tight labor market conditions, nominal wages continued to rise at historically rapid rates. For example, the employment cost index (ECI) of total compensation rose 4.8 percent over the 12 months ending in March, well above 2.8 percent from a year earlier (figure 13). The most recent readings include a surge in bonuses, which may reflect the challenges of retaining and hiring workers. In addition, wage growth as computed by the Federal Reserve Bank of Atlanta, which tracks the median 12-month wage growth of individuals responding to the Current Population Survey, picked up markedly this year and rose more than 6 percent in May, well above the 3 to 4 percent pace reported over the previous few years.

9. Another usual indicator of the gap between available jobs and available workers is the ratio of job openings to unemployment. At the end of April, this indicator showed that there were 1.9 job openings per unemployed person.

That said, there are some signs that nominal wage growth may be leveling off or moderating. The growth of wages and salaries as measured by the ECI moderated from 5.6 percent at an annual rate in the second half of last year to 5.2 percent early this year. And even as payroll employment continued to grow rapidly and the unemployment rate continued to fall, the three-month change in average hourly earnings declined from about 6 percent at an annual rate late last year to 4.5 percent in May, with the moderation in earnings growth particularly notable for employees in the sectors that experienced especially strong wage growth last year, such as leisure and hospitality.

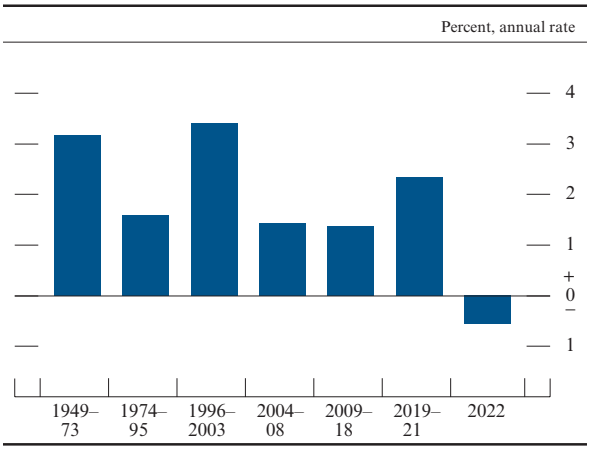
Following a period of solid growth, labor productivity softened

The extent to which sizable wage gains raise firms' unit costs and act as a source of inflation pressure depends importantly on the pace of productivity growth. Considerable uncertainty remains around the ultimate effects of the pandemic on productivity.

From 2019 through 2021, productivity growth in the business sector picked up (albeit by less than compensation growth), averaging about 2¼ percent at an annual rate—about 1 percentage point faster than the average pace of growth over the previous decade (figure 14). Some of this pickup in productivity growth might reflect persistent factors. For example, the pandemic resulted in a high rate of new business formation, the widespread adoption of remote work technology, and a wave of labor-saving investments.

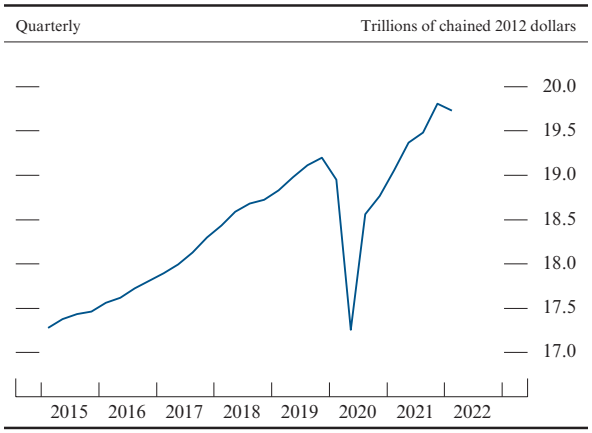
The latest reading, however, showed a decline in business-sector productivity in the first quarter of this year. While quarterly productivity data are notoriously volatile, this decline nevertheless highlights the possibility that some of the earlier productivity gains could prove transitory, perhaps reflecting worker effort initially surging in response to employment shortages and hiring difficulties

14. Change in business-sector output per hour



NOTE: Changes are measured from Q4 of the year immediately preceding the period through Q4 of the final year of the period, except 2022 changes, which are calculated from 2021:Q1 to 2022:Q1.
SOURCE: Bureau of Labor Statistics via Haver Analytics.

15. Real gross domestic product



SOURCE: Bureau of Economic Analysis via Haver Analytics.

and then subsequently returning to more normal levels.[10] If the gap between wage growth and productivity growth remains comparably wide in the future, the result will be significant upward pressure on firms' labor costs.

Gross domestic product declined in the first quarter of 2022 after having surged in the fourth quarter of 2021 . . .

Real gross domestic product (GDP) is reported to have surged at a 6.9 percent annual rate in the fourth quarter of 2021—and then to have declined at a 1.5 percent annual rate in the first quarter—because of fluctuations in net exports and inventory investment (figure 15). These two categories of expenditures are volatile even in normal times, and they have been even more so in recent quarters. Some improvement in supply chain conditions late last year appears to have enabled firms to rebuild depleted inventories; inventory investment surged in the fourth quarter and then moderated to a still-elevated pace in the first quarter, thereby weighing on GDP growth. Other measures of activity, including employment, industrial production, and gross domestic income, indicate continued growth in the first quarter.

. . . while growth in consumer spending and business investment was solid in the first quarter

After abstracting from these volatile components, growth in private domestic final demand (consumer spending plus residential and business fixed investment—a measure that tends to be more stable and better reflects the strength of overall economic activity) was solid in the first quarter, supported by some unwinding of supply bottlenecks and a further reopening of the economy. The most recent spending data and other indicators suggest that private fixed investment may be

10. The November 2021 Beige Book reported that many employers were planning to increase hiring because of concerns that their current workforce was being overworked.

moderating, but consumer spending remains strong and drag from inventory investment and net exports may be dissipating. As a result, private domestic final demand and real GDP appear on track to rise moderately in the second quarter.

Real consumer spending growth remained strong . . .

Real consumer spending—that is, spending after adjusting for inflation—continued to grow briskly, supported by a partial unwinding of supply bottlenecks and continued normalization of spending patterns as the pandemic fades. For example, spending on motor vehicles grew markedly in the first quarter, reflecting improvements in both domestic and foreign production, and spending on services (especially at restaurants) grew briskly.

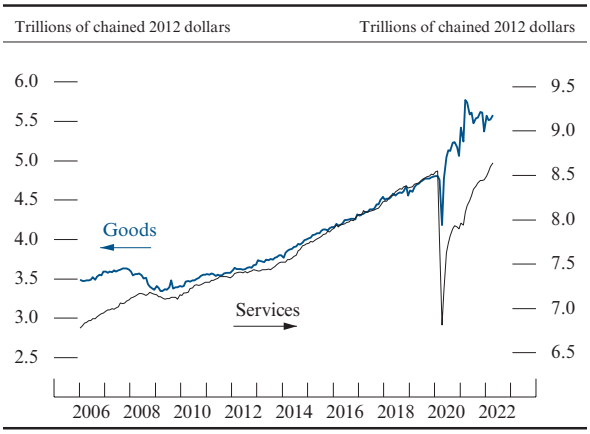
That said, consumer spending growth has moderated from its very rapid pace from early 2021 as fiscal support has declined from historical highs, some households have likely depleted excess savings accumulated during the pandemic, and inflation has eroded households' purchasing power.

The composition of spending remains more tilted toward goods and away from services than it was before the pandemic. Real goods spending is still well above its trend, while real spending on services remains below trend (figure 16). Nevertheless, the composition continued to shift back toward services. While goods spending was only modestly higher in April compared with its average from late last year, services spending rose significantly.

. . . supported by high levels of wealth

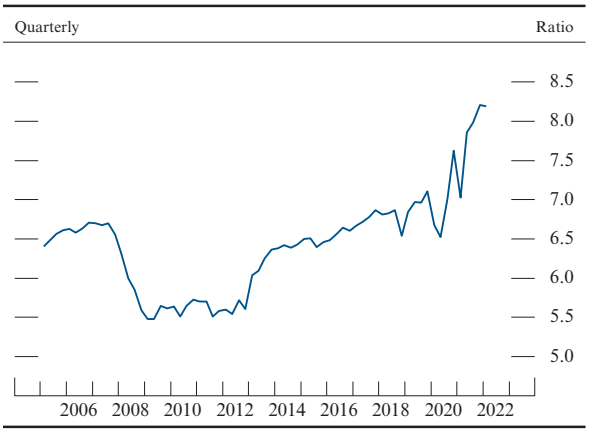
Household wealth grew by roughly $30 trillion between late 2019 and late 2021 because of rises in equity and house prices along with the elevated rate of saving in 2020 and 2021 (figures 17 and 18). Since the beginning of the year, wealth has declined because of the drop in equity prices. Nevertheless, wealth remains

16. Real personal consumption expenditures



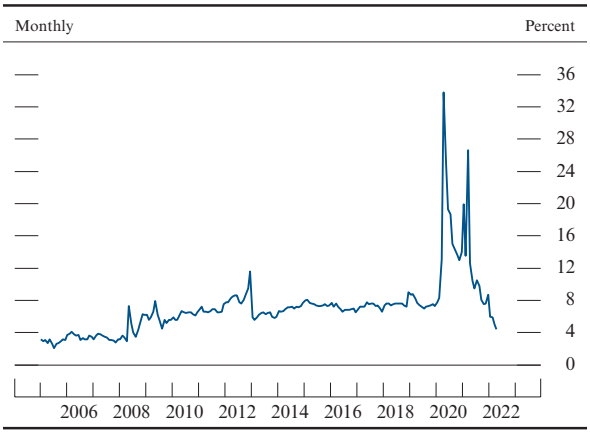
NOTE: The data are monthly and extend through April 2022.
SOURCE: Bureau of Economic Analysis via Haver Analytics.

17. Wealth-to-income ratio



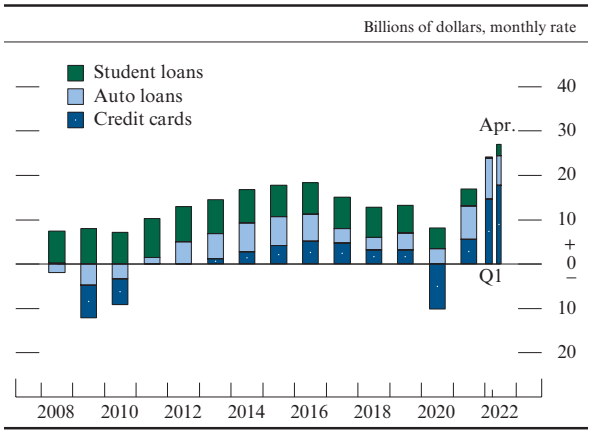
NOTE: The series is the ratio of household net worth to disposable personal income.
SOURCE: For net worth, Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States"; for income, Bureau of Economic Analysis via Haver Analytics.

18. Personal saving rate



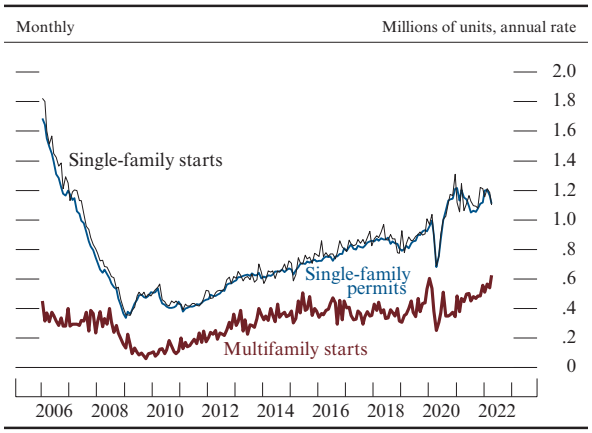
NOTE: The data extend through April 2022.
SOURCE: Bureau of Economic Analysis via Haver Analytics.

19. Consumer credit flows



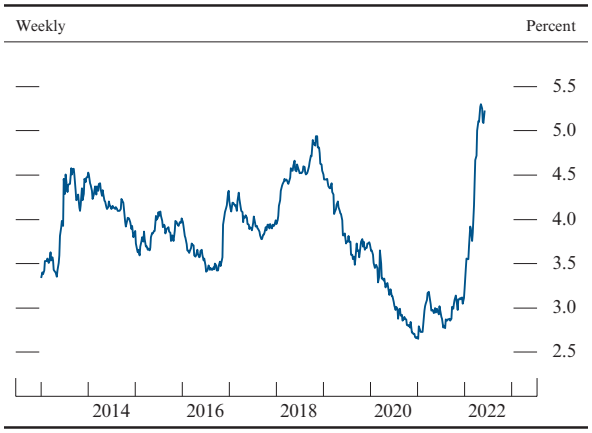
SOURCE: Federal Reserve Board, Statistical Release G.19, "Consumer Credit."

20. Private housing starts and permits



NOTE: The data extend through April 2022.
SOURCE: U.S. Census Bureau via Haver Analytics.

21. Mortgage rates



NOTE: The data are contract rates on 30-year, fixed-rate conventional home mortgage commitments and extend through June 9, 2022.
SOURCE: Freddie Mac Primary Mortgage Market Survey.

well above pre-pandemic levels, providing continuing support for consumer spending.

Consumer financing conditions were generally accommodative, especially for borrowers with stronger credit scores

Financing has been generally available to support consumer spending. Following a period of widespread reported easing last year, standards on credit card loans eased somewhat further in the first quarter, whereas those on auto and other consumer loans changed little. Partly reflecting higher credit card purchase volumes, credit card balances grew rapidly in recent months (figure 19). Even so, many credit card users still have ample unused credit. Auto loans grew briskly during the first quarter, consistent with the concurrent rebound in auto sales.

Meanwhile, borrowing costs rose. However, they remain below pre-pandemic levels for credit cards and auto loans, partly reflecting strong consumer credit quality. Indeed, delinquency rates on consumer loans remain low relative to historical averages despite some recent increases among nonprime borrowers.

Housing construction remained high but may be moderating . . .

New single-family construction has remained well above pre-pandemic levels. However, new construction may be softening, with single-family permits turning down some in March and April (figure 20). As in the past year, still-tight supplies of materials, labor, and other inputs may still be restraining new construction. Also, builders have become distinctly less optimistic about prospects for housing sales, perhaps owing to the sharp rise in mortgage rates (figure 21).

. . . while home sales fell amid low inventories and rising mortgage rates

Home sales stepped down substantially from the very high levels prevailing late last year and are now close to pre-pandemic levels

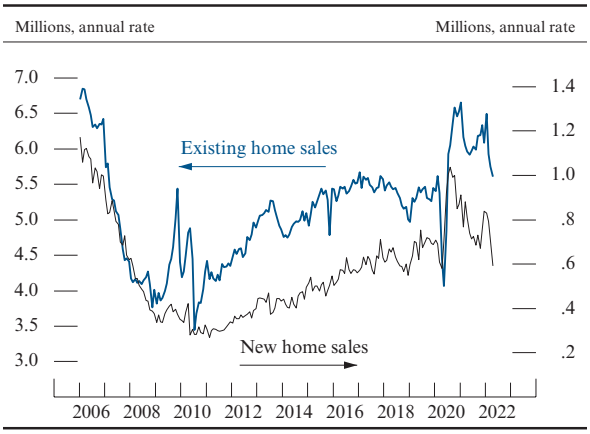
(figure 22). Some of this decline may have reflected further reductions in inventories of existing homes to historically low levels early in the year. In addition, the sharp increases in mortgage rates may have begun to moderate housing demand. Even so, financing conditions in the residential mortgage market remained accommodative for borrowers who met standard loan criteria, and the terms of mortgage credit for households with lower credit scores continued to ease toward pre-pandemic levels. Listings, sales, and price data suggest that so far, demand remains strong relative to the pace at which homes are being made available for sale. For example, the share of homes off market within two weeks remains elevated, and as of April, several measures of national house prices were up about 20 percent from a year earlier, though less in real terms (figure 23).

Business fixed investment rose strongly in the first quarter but may now be moderating

Investment in equipment and intangibles surged at a 12½ percent annual rate in the first quarter (figure 24). Investment demand remained strong, as worker shortages and high-capacity utilization in manufacturing likely maintained strong incentives for firms to automate production and boost capital expenditures. In turn, strong investment demand continued to boost equipment prices in an environment of constrained supply, but there have been initial signs that supply constraints may have begun to ease. In particular, since late last year, shipments of capital goods have begun to catch up with orders. The most recent indicators suggest that the growth of investment in equipment and intangibles will slow significantly in the second quarter, possibly reflecting drag from tighter financial conditions.

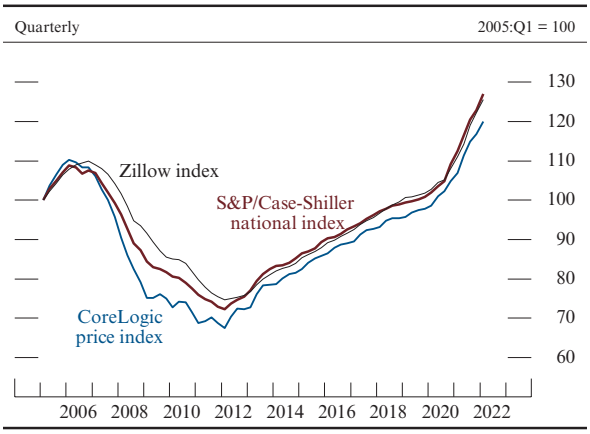
Investment in nonresidential structures declined moderately in the first quarter after falling more rapidly over the second half of

22. New and existing home sales



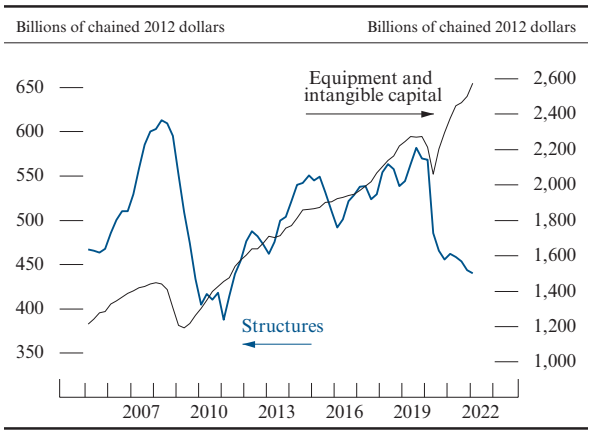
NOTE: The data are monthly and extend through April 2022. New home sales include only single-family sales. Existing home sales include single-family, condo, and co-op sales.
SOURCE: For new home sales, U.S. Census Bureau; for existing home sales, National Association of Realtors; all via Haver Analytics.

23. Real prices of existing single-family houses



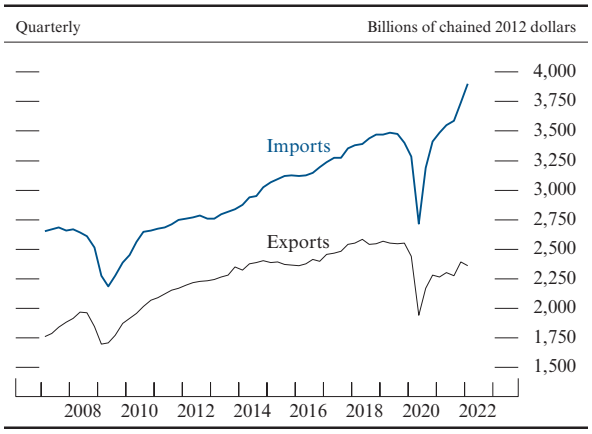
NOTE: Series are deflated by the personal consumption expenditures price index.
SOURCE: Bureau of Economic Analysis via Haver Analytics; CoreLogic Home Price Index; Zillow, Inc., Real Estate Data; S&P/Case-Shiller U.S. National Home Price Index. The S&P/Case-Shiller index is a product of S&P Dow Jones Indices LLC and/or its affiliates. (For Dow Jones Indices licensing information, see the note on the Contents page.)

24. Real business fixed investment



NOTE: Business fixed investment is known as "private nonresidential fixed investment" in the national income and product accounts. The data are quarterly.
SOURCE: Bureau of Economic Analysis via Haver Analytics.

25. Real imports and exports of goods and services



SOURCE: Bureau of Economic Analysis via Haver Analytics.

2021, and it appears on track to decline again in the second quarter. Declines in spending on nondrilling structures have been only partly offset by rapid increases in drilling investment, which reflect the recent rise in energy prices.

Business financing conditions tightened somewhat but remained generally accommodative

Credit remained available to most nonfinancial corporations, but financing conditions tightened somewhat, especially for lower-rated firms. Gross nonfinancial corporate bond issuance was solid in the first quarter but slowed somewhat in April and May, with speculative-grade bond issuance particularly weak. Leveraged loan issuance also declined notably in May, partly reflecting weakening demand from retail investors. The growth of business loans at banks picked up from the subdued pace of last year, reflecting stronger loan originations as well as a moderation in loan forgiveness associated with the Paycheck Protection Program.

Credit also remained broadly available to small businesses. The share of small firms reporting that it was more difficult to obtain loans (compared with three months earlier) remained low by historical standards. Loan origination data through April were consistent with credit availability being comparable with pre-pandemic levels amid gradually recovering demand for small business credit. Most measures of loan performance remained largely stable; through April, default and delinquency rates remained below their pre-pandemic levels.

The strong U.S. demand has partly been met through a rapid rise in imports

Driven by the continued strength in domestic economic activity, including still-strong demand for goods consumption, U.S. imports continued to grow at a rapid pace, surging well above their pre-pandemic trend (figure 25). High levels of imported goods have kept international logistics channels operating

under high pressure, which has continued to impair the timely delivery of goods to U.S. customers. Real goods exports have only recovered to pre-pandemic levels. Real exports and imports of services remain subdued, reflecting a slow recovery of international travel. Given the recent strength of imports relative to the milder recovery in exports, the nominal trade deficit widened further as a share of GDP (figure 26).

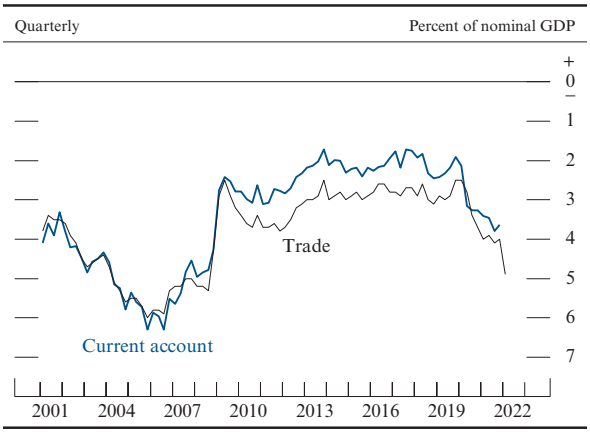
The support to economic activity provided by federal fiscal actions continued to diminish . . .

In response to the pandemic, the federal government enacted fiscal policies to address the economic consequences of the pandemic. Because the boost to spending from these policies ended last year, the effects on demand are likely waning this year and weighing on GDP growth.

. . . and, in turn, the budget deficit has fallen sharply from pandemic highs, and the growth of federal debt has moderated

The Congressional Budget Office estimates that fiscal policies enacted since the start of the pandemic will increase federal deficits roughly $5.4 trillion by the end of fiscal year 2030, with the largest deficit effects having occurred in fiscal 2020 and 2021.[11] These policies, combined with the effects of the automatic stabilizers—the reduction in tax receipts and increase in transfers that occur as a consequence of depressed economic

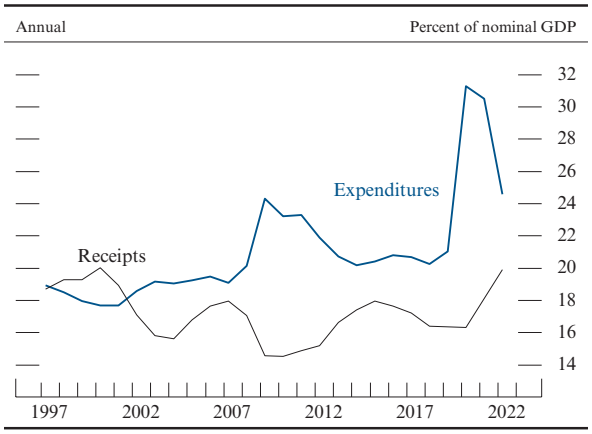
26. U.S. trade and current account balances



NOTE: GDP is gross domestic product. Current account balance data extend through 2021:Q4.
SOURCE: Bureau of Economic Analysis via Haver Analytics.

11. For more information, see Congressional Budget Office (2020), "The Budgetary Effects of Laws Enacted in Response to the 2020 Coronavirus Pandemic, March and April 2020," June, https://www.cbo.gov/system/files/2020-06/56403-CBO-covid-legislation.pdf; Congressional Budget Office (2021), "The Budgetary Effects of Major Laws Enacted in Response to the 2020–21 Coronavirus Pandemic, December 2020 and March 2021," September, https://www.cbo.gov/system/files/2021-09/57343-Pandemic.pdf; and Congressional Budget Office (2021), "Senate Amendment 2137 to H.R. 3684, the Infrastructure Investment and Jobs Act, as Proposed on August 1, 2021," August 9, https://www.cbo.gov/system/files/2021-08/hr3684_infrastructure.pdf.

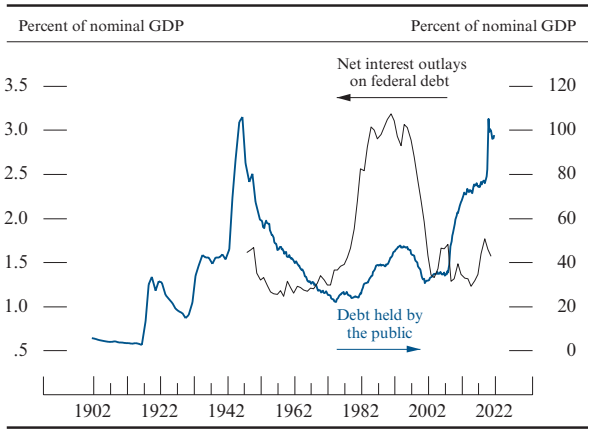
27. Federal receipts and expenditures



NOTE: Through 2021, the receipts and expenditures data are on a unified-budget basis and are for fiscal years (October to September); gross domestic product (GDP) is for the 4 quarters ending in Q3. For 2022, receipts and expenditures are for the 12 months ending in May; GDP is the average of 2021:Q4 and 2022:Q1.

SOURCE: Department of the Treasury, Financial Management Service; Office of Management and Budget and Bureau of Economic Analysis via Haver Analytics.

28. Federal government debt and net interest outlays



NOTE: The data for net interest outlays are annual, begin in 1948, and extend through 2021. Net interest outlays are the cost of servicing the debt held by the public. Federal debt held by the public equals federal debt less Treasury securities held in federal employee defined-benefit retirement accounts, evaluated at the end of the quarter. The data for federal debt are annual from 1901 to 1951 and quarterly thereafter. GDP is gross domestic product.

SOURCE: For GDP, Bureau of Economic Analysis; for federal debt, Congressional Budget Office and Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

activity—caused the federal deficit to surge to 15 percent of nominal GDP in fiscal 2020 and remain elevated at 12½ percent in fiscal 2021. But with pandemic fiscal programs having largely ended and receipts surging, the deficit has fallen sharply thus far in fiscal 2022 relative to fiscal 2021 and, by the end of the fiscal year, is expected to be close to the deficits prevailing just before the pandemic (figure 27).

As a result of the fiscal support enacted during the pandemic, federal debt held by the public jumped to around 100 percent of nominal GDP in fiscal 2020—the highest debt-to-GDP ratio since 1947 (figure 28). But with deficits falling and economic growth having rebounded, the debt-to-GDP ratio has since receded slightly from its recent peak.

State and local government budget positions are remarkably strong . . .

Federal policymakers provided a historic level of fiscal support to state and local governments during the pandemic, with aid totaling about $1 trillion. This aid has more than covered pandemic-related budget shortfalls in the aggregate. Moreover, following the pandemic-induced slump, total state tax collections—pushed up by the economic expansion—rose appreciably in 2021 and continued to grow rapidly in early 2022 (figure 29). In turn, this recovery in revenues has led some state governments to enact or consider enacting tax cuts. At the local level, property taxes have continued to rise apace, and the typically long lags between changes in the market value of real estate and changes in tax collections suggest that property tax revenues will rise quite substantially going forward, given the rise in house prices.

. . . but hiring and construction outlays have continued to lag

Despite the return to in-person schooling and the strong fiscal position of state and local governments, state and local government payrolls continued to expand only modestly in the first half of 2022. Employment levels

have regained about 60 percent of their sizable pandemic losses, falling well short of the recovery in private payrolls (figure 30). One reason for this disparity appears to be that public-sector wages have not kept pace with the rapid gains in the private sector, which may be inhibiting the ability of these governments to staff back up to pre-pandemic levels. Meanwhile, real construction outlays by state and local governments continued to decline in the first half of the year and are currently about 15 percent below pre-pandemic levels.

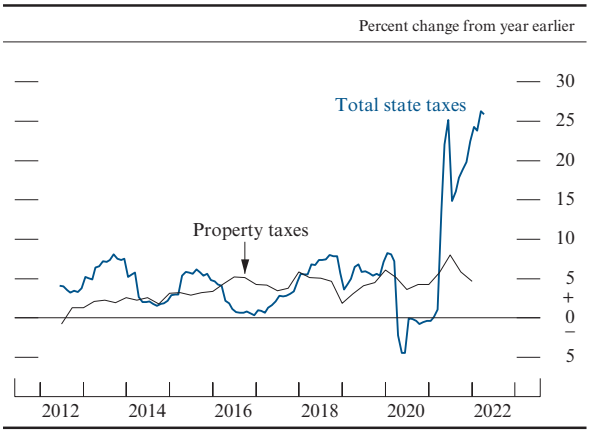
Financial Developments

The expected level of the federal funds rate over the next few years shifted up substantially

In March, May, and June, the FOMC raised the target range for the federal funds rate a total of 1½ percentage points. The expected path of the federal funds rate over the next few years also shifted up substantially since late February (figure 31). Economic data releases and FOMC communications were viewed by market participants as implying tighter monetary policy than previously expected. Market-based measures suggest that investors anticipate the federal funds rate to exceed 3.6 percent by the end of this year, which is about 2 percentage points higher than the level expected in late February. The same measures suggest that the federal funds rate is expected to peak at about 4 percent in mid-2023 before gradually declining to about 3.1 percent by the end of 2025, which is about 1.4 percentage points higher than the end-2025 rate expected in late February.

Similarly, according to the results of the Survey of Primary Dealers and the Survey of Market Participants, both conducted by the Federal Reserve Bank of New York in April, the median of respondents' projections for

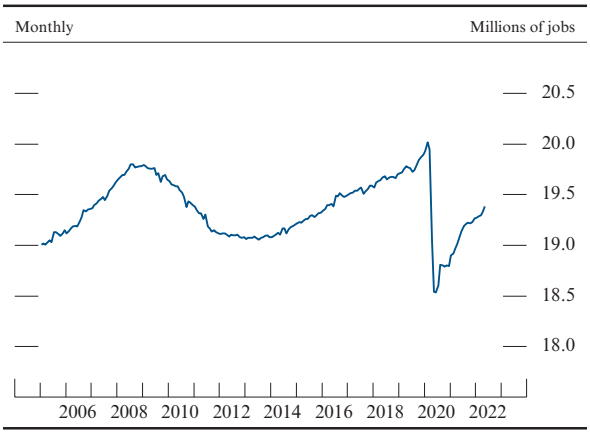
29. State and local tax receipts



NOTE: State tax data are year-over-year percent changes of 12-month moving averages, begin in June 2012, extend through April 2022, and are aggregated over all states except Wyoming, for which data are not available. Revenues from Washington, D.C., are also excluded. Data are missing for March 2022 to April 2022 for New Mexico and Oregon and April 2022 for Nevada, as these states have longer reporting lags than others. Property tax data are year-over-year percent changes of 4-quarter moving averages, begin in 2012:Q2, extend through 2021:Q4, and are primarily collected by local governments.

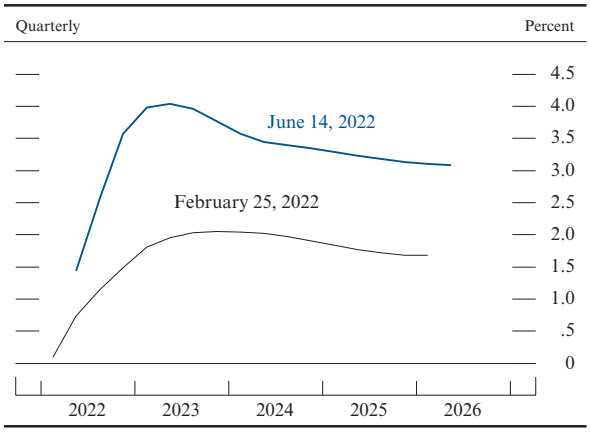
SOURCE: Monthly State Government Tax Revenue Data via Urban Institute; U.S. Census Bureau, Quarterly Summary of State and Local Government Tax Revenue.

30. State and local government payroll employment



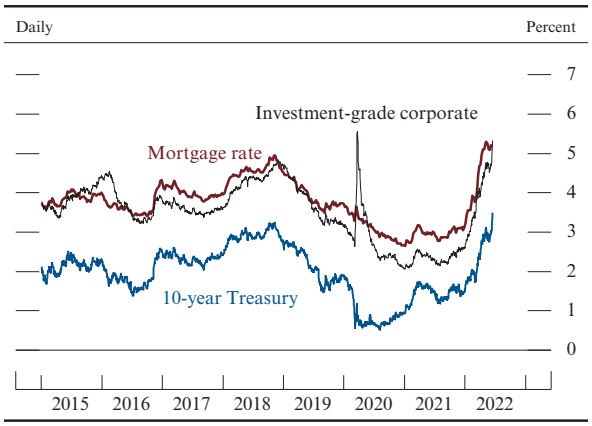
SOURCE: Bureau of Labor Statistics via Haver Analytics.

31. Market-implied federal funds rate path



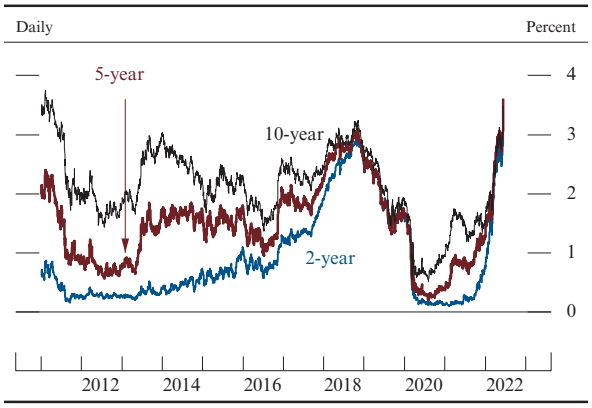
NOTE: The federal funds rate path is implied by quotes on overnight index swaps—a derivative contract tied to the effective federal funds rate. The implied path as of February 25, 2022, is compared with that as of June 14, 2022. The path is estimated with a spline approach, assuming a term premium of 0 basis points. The February 25, 2022, path extends through 2026:Q1 and the June 14, 2022, path through 2026:Q2.
SOURCE: Bloomberg; Federal Reserve Board staff estimates.

32. Financial market indicators



NOTE: Investment-grade corporate reflects the effective yield of the ICE Bank of America Merrill Lynch triple-B U.S. Corporate Index (C0A4). The mortgage rate is contract rates on 30-year, fixed-rate conventional home mortgage commitments. Mortgage rate data extend through June 9, 2022.
SOURCE: Department of the Treasury via Haver Analytics; Freddie Mac Primary Mortgage Market Survey; ICE Data Indices, LLC, used with permission.

33. Yields on nominal Treasury securities



SOURCE: Department of the Treasury via Haver Analytics.

the most likely path of the federal funds rate shifted up significantly since January.[12]

Before late February, the expected path of the federal funds rate had started to increase notably in the third quarter of last year, in anticipation of increases in the target range. Consistent with the rise in the expected path of the federal funds rate, yields on Treasury securities and corporate bonds, as well as mortgage rates, all started to increase materially at a similar time. Meanwhile, broad equity price indexes have declined on net. Overall, these moves in asset prices suggest tightening of financial conditions even before the initial increase in the target range of the federal funds rate occurred in March (figure 32).

Yields on U.S. nominal Treasury securities also rose considerably

Yields on nominal Treasury securities across maturities have risen considerably since late February (figure 33). After a brief dip in late February, following Russia's invasion of Ukraine, yields rose steadily amid higher inflationary pressures and associated expectations for monetary policy tightening. The increases in nominal Treasury yields were primarily accounted for by rising real yields. Uncertainty about longer-term interest rates—as measured by the implied volatility embedded in the prices of near-term options on 10-year interest rate swaps—also increased significantly, reportedly reflecting, in part, an increase in uncertainty about the policy outlook.

Yields on other long-term debt increased substantially

Across credit categories, corporate bond yields have increased substantially and

12. The results of the Survey of Primary Dealers and the Survey of Market Participants are available on the Federal Reserve Bank of New York's website at https://www.newyorkfed.org/markets/primarydealer_survey_questions.html and https://www.newyorkfed.org/markets/survey_market_participants, respectively.

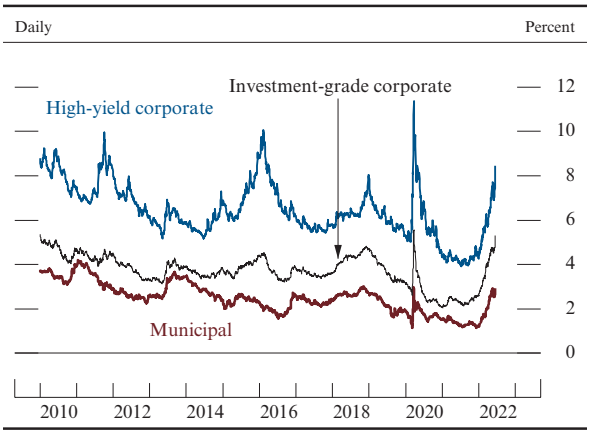
spreads over yields on comparable-maturity Treasury securities have increased notably since late February. Corporate bond yields and spreads are somewhat above the historical median values of their respective historical distributions since the mid-1990s (figure 34). Municipal bond yields also increased significantly while spreads increased somewhat since late February. Spreads on municipal bonds are now moderately above their historical medians. On net, corporate bond spreads are moderately above their pre-pandemic levels, and municipal bond spreads are near levels prevailing shortly before the pandemic. While the widening of corporate bond spreads since late February appears to partly reflect a deterioration in market expectations of future credit quality, corporate and municipal credit quality thus far in 2022 have remained strong. So far this year, defaults have been low, and upgrades of bond ratings have outpaced downgrades in both markets.

Since late February, yields on agency mortgage-backed securities (MBS)—an important pricing factor for home mortgage rates—increased significantly, as longer-term Treasury yields increased and spreads over comparable-maturity Treasury securities widened (figure 35). MBS spreads increased as market participants' expectations of a gradual reduction in the Federal Reserve's balance sheet shifted to a faster reduction.

Broad equity price indexes declined sharply, on net, amid substantial volatility

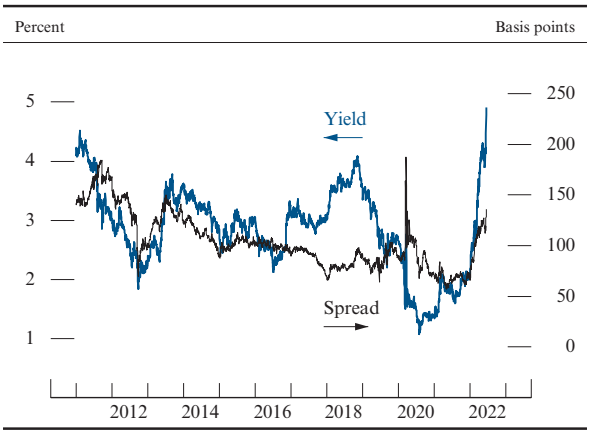
Broad equity price indexes were volatile and declined sharply, on net, amid sustained inflation pressures and expectations of monetary policy tightening, as well as heightened uncertainty regarding Russia's invasion of Ukraine and the economic outlook (figure 36). Bank stock prices also declined on net. One-month option-implied volatility on the S&P 500 index—the VIX—rose notably to elevated levels in the days following Russia's invasion of Ukraine. The VIX trended down for some time only to increase again and

34. Corporate bond yields, by securities rating, and municipal bond yield



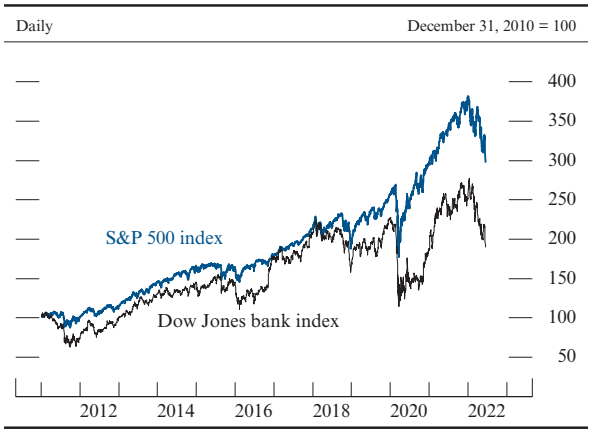
NOTE: Investment-grade corporate reflects the effective yield of the ICE Bank of America Merrill Lynch (BofAML) triple-B U.S. Corporate Index (C0A4). High-yield corporate reflects the effective yield of the ICE BofAML High Yield Index (H0A0). Municipal reflects the yield to worst of the ICE BofAML U.S. Municipal Securities Index (U0A0).
SOURCE: ICE Data Indices, LLC, used with permission.

35. Yield and spread on agency mortgage-backed securities



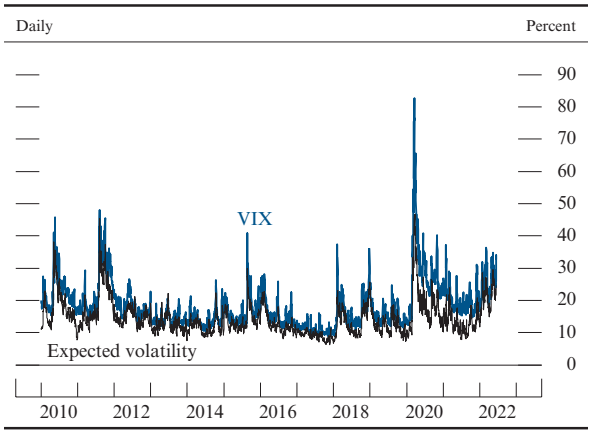
NOTE: The data are daily. Yield shown is for the uniform mortgage-backed securities 30-year current coupon, the coupon rate at which new mortgage-backed securities would be priced at par, or face, value, for dates after May 31, 2019; for earlier dates, the yield shown is for the Fannie Mae 30-year current coupon. Spread shown is to the average of the 5-year and 10-year nominal Treasury yields.
SOURCE: Department of the Treasury; J.P. Morgan. Courtesy of J.P. Morgan Chase & Co., Copyright 2022.

36. Equity prices



SOURCE: S&P Dow Jones Indices LLC via Bloomberg. (For Dow Jones Indices licensing information, see the note on the Contents page.)

37. S&P 500 volatility



NOTE: The VIX is a measure of implied volatility that represents the expected annualized change in the S&P 500 index over the following 30 days. The expected volatility series shows a forecast of 1-month realized volatility, using a heterogeneous autoregressive model based on 5-minute S&P 500 returns.

SOURCE: Cboe Volatility Index® (VIX®) via Bloomberg; Refinitiv DataScope; Federal Reserve Board staff estimates.

remain elevated since late April amid a notable deterioration in risk sentiment (figure 37). (For a discussion of financial stability issues, see the box "Developments Related to Financial Stability.")

Markets for Treasury securities, mortgage-backed securities, corporate and municipal bonds, and equities generally functioned in an orderly way, but some measures of liquidity deteriorated

Liquidity conditions in the market for Treasury securities, which had deteriorated somewhat since late 2021, in part as a result of heightened interest rate risk, worsened further in late February following Russia's invasion of Ukraine. Market depth—a gauge of the ability to transact in large volumes at quotes posted by market makers—for Treasury securities fell and remains at historically low levels. Bid-ask spreads increased somewhat. However, trading volumes remained within normal ranges, suggesting that market functioning was not materially impaired. The decreases in depth were the greatest for bonds with shorter maturities because the prices of those securities are more sensitive to expectations for monetary policy over the near term. The market for MBS has functioned in an orderly way since late February, even as some measures of liquidity conditions deteriorated. Measures of market functioning in corporate and municipal bond markets indicated that the markets have remained liquid and trading conditions have stayed stable since late February without substantive disruptions around the time of Russia's invasion of Ukraine. Transaction costs in the corporate bond market and in the municipal bond market have both picked up somewhat since late February, and in the corporate bond market, bid-ask spreads are modestly above pre-pandemic levels. Transaction costs remain fairly low by historical standards.. Liquidity in equity markets has declined since late 2021 in part because of rising uncertainty about the outlook for monetary policy as well as Russia's invasion of Ukraine and has remained

Developments Related to Financial Stability

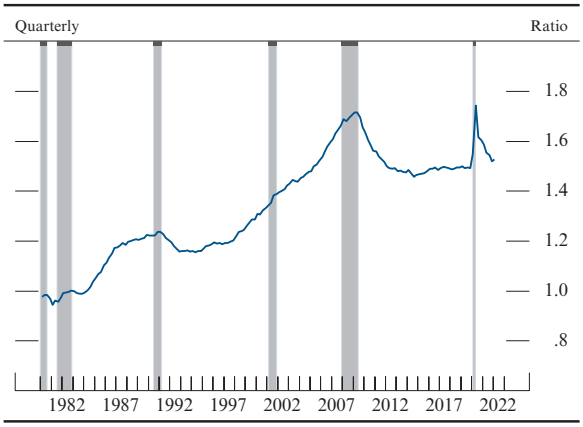
This discussion reviews vulnerabilities in the U.S. financial system. The framework used by the Federal Reserve Board for assessing the resilience of the U.S. financial system focuses on financial vulnerabilities in four broad areas: asset valuations, business and household debt, leverage in the financial sector, and funding risks. With inflation running higher than expected, the invasion of Ukraine, and the pandemic's continued effects on supply chains and consumer demand patterns, uncertainty about the economic outlook increased, and prices of some financial assets fluctuated widely. Treasury yields increased markedly, and valuation pressures in corporate securities markets eased, but real estate prices have risen further this year despite a rise in mortgage rates. While business and household debt has been growing solidly, the ratio of private nonfinancial credit to gross domestic product (GDP) decreased to near pre-pandemic levels and most indicators of credit quality remained robust. Large bank capital ratios dipped in the first quarter, but overall leverage in the financial sector appears moderate and little changed this year. A few signs of funding pressures emerged amid the escalation of geopolitical tensions. However, broad funding markets proved resilient, and with direct exposures of U.S. financial institutions to Russia and Ukraine being small, financial spillovers have been limited to date. Nevertheless, the effect of high inflation, supply chain disruptions, and the ongoing geopolitical tensions remain substantial sources of uncertainty with the potential to further stress the financial system.

Valuation measures based on current expectations of cash flows decreased in some markets but continued to be high relative to historical norms. Reflecting a less accommodative monetary policy stance associated with elevated inflation and a tight labor market, yields on Treasury securities increased markedly and reached somewhat above their pre-pandemic levels. Broad equity prices fluctuated widely and declined sharply. Prices relative to earnings forecasts declined from previously very elevated levels but were still above their historical median. Corporate-to-Treasury spreads widened but remained below their historical median. Spreads on leveraged loans were little changed, and leveraged loan issuance remained solid. House prices continued to rise at a rapid pace that further outstripped rent growth. Commercial real estate prices also rose further, with some price indexes surpassing their 2006 peaks.

The rapid growth of nominal GDP outpaced the growth of total debt of nonfinancial businesses and households. The ratio of the aggregate debt owed by the private nonfinancial sector to nominal GDP further declined to near pre-pandemic levels (figure A). Net leverage of large nonfinancial businesses held stable at

(continued on next page)

A. Private nonfinancial-sector credit-to-GDP ratio



NOTE: The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research: 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.

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

Developments Related to Financial Stability *(continued)*

below pre-pandemic levels, supported by ample cash holdings. Fueled by strong earnings and low borrowing costs, the ratio of earnings to interest expenses for the median firm among public nonfinancial businesses rose to its highest level in two decades, indicating that large firms were better able to service debt. However, for firms in industries hit hardest by the pandemic, leverage remains elevated and interest coverage ratios are lower. The financial position of many households continued to improve. Household debt relative to nominal GDP as well as mortgage, auto, and credit card delinquencies were in the bottom range of the levels observed over the past 20 years. Household credit growth has been almost exclusively among prime-rated borrowers, including for residential mortgages. Nonetheless, some households remained financially strained and vulnerable to adverse shocks during this period of heightened uncertainty.

Vulnerabilities from financial-sector leverage are well within their historical range. Risk-based capital ratios at domestic bank holding companies declined some in the first quarter of 2022 but remained well above regulatory requirements. Banks increased loan loss provisions to reflect higher uncertainty about the economic outlook and continued to report that rising interest rates will support their profitability going forward. However, higher interest rates cause losses in the market value of banks' long-term fixed-rate assets. Leverage remained high at life insurance companies and was likely somewhat elevated at hedge funds, though the most comprehensive data for hedge funds are considerably lagged. Vulnerabilities of most U.S. financial institutions to the Russian invasion of Ukraine appear to be limited. Some nonbank financial intermediaries—such as commodity trading firms—have been directly affected by the Russia–Ukraine conflict, but loan exposures of large U.S. banks to these firms and borrowers in Ukraine and Russia are small. However, several indirect channels—heightened volatility in asset markets; new disruptions in payment, clearing, or settlement systems; and interconnections with large European banks—could adversely affect the U.S. economy and financial system.

Funding risks at domestic banks and broker-dealers are low, but structural vulnerabilities persist at some money market funds (MMFs), bond funds, and stablecoins. Banks relied only modestly on short-term wholesale funding, and the share of high-quality liquid assets at banks remained historically high. Assets under management at prime and tax-exempt MMFs have continued to decline, but these funds remain a structural vulnerability due to their susceptibility to runs. In December 2021, the Securities and Exchange Commission proposed reforms to MMFs, including the adoption of swing pricing for certain fund types, increased liquidity requirements, and other measures meant to make them more resilient to redemptions. The Russian invasion of Ukraine does not appear to have left a material imprint on broader short-term funding markets. Trading conditions in those markets have been stable, issuance continued, and spreads remained well below the levels reached in March 2020. Although depth in markets for Treasury securities and some commodity and equity derivatives has been low by historical standards, those markets have functioned normally after the initial shock to the nickel market. Elevated market volatility—particularly in commodity markets—caused central counterparties (CCPs) to make larger margin calls. To date, clearing members have

(continued)

been able to meet these margin calls, and, in general, CCPs effectively managed the increased risks and higher trading volumes.

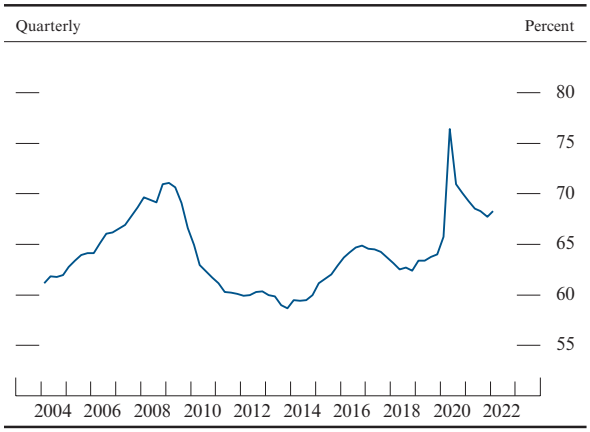
The aggregate value of stablecoins—digital assets that aim to maintain a stable value relative to a national currency or other reference assets—grew rapidly over the past year to more than $180 billion in March 2022. The stablecoin sector remained highly concentrated, with the three largest stablecoin issuers—Tether, USD Coin, and Binance USD—constituting more than 80 percent of the total market value. The collapse in the value of certain stablecoins and recent strains experienced in markets for other digital assets demonstrate the fragility of such structures. More generally, stablecoins that are not backed by safe and sufficiently liquid assets and are not subject to appropriate regulatory standards create risks to investors and potentially to the financial system, including susceptibility to potentially destabilizing runs. These vulnerabilities may be exacerbated by a lack of transparency regarding the riskiness and liquidity of assets backing stablecoins. In addition, the increasing use of stablecoins to meet margin requirements for levered trading in other cryptocurrencies may amplify volatility in demand for stablecoins and heighten redemption risks. The President's Working Group on Financial Markets, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency have made recommendations to address prudential risks posed by stablecoins.

A routine survey of market contacts on salient shocks to financial stability highlights several important risks. Stresses in Europe related to Russia's invasion of Ukraine or in emerging markets could spill over to the United States. In addition, higher or more persistent inflation and greater-than-expected increases in interest rates could negatively affect domestic economic activity, asset prices, credit quality, and financial conditions more generally. As concerns over cyber risk have increased, U.S. government agencies and their private-sector partners have been stepping up their efforts to protect the financial system and other critical infrastructures. These risks, if realized, could interact with financial vulnerabilities and pose additional risks to the U.S. financial system.

Invasion of Ukraine and Commodity Markets

Russia's invasion of Ukraine and subsequent international sanctions disrupted global trade in commodities, leading to surging prices and heightened volatility in agriculture, energy, and metals markets. These markets include spot and forward markets for physical commodities as well as futures, options, and swaps markets that involve an array of financial intermediaries and infrastructures. Stresses in financial markets linked to commodities could disrupt the efficient production, processing, and transportation of commodities by interfering with the ability of commodity producers, consumers, and traders to hedge risks. Such stresses can also increase liquidity and credit risks for financial institutions that are active in commodity markets. To date, however, financial market stresses do not appear to have exacerbated the negative effects on broader economic activity or created substantial pressure on key financial intermediaries, including banks. Since the invasion, for most commodities, futures trading volumes and open interest—the number of contracts outstanding at the end of the day—have remained in normal ranges.

38. Ratio of total commercial bank credit to nominal gross domestic product



SOURCE: Federal Reserve Board, Statistical Release H.8, "Assets and Liabilities of Commercial Banks in the United States"; Bureau of Economic Analysis via Haver Analytics.

at low levels since then. Market depth based on the S&P 500 futures is below pre-pandemic levels and currently in the bottom decile of its historical distribution since 2018.

Short-term funding market conditions remained stable . . .

Conditions in money markets have been stable and orderly. Increases in the target range for the federal funds rate fully passed through to market overnight rates. The effective federal funds rate and other unsecured overnight rates have been a few basis points below the interest rate on reserve balances since late February. The Secured Overnight Financing Rate has been at or below the offering rate at the overnight reverse repurchase agreement (ON RRP) facility, given ample liquidity and a limited supply of Treasury bills. Softness in repurchase agreement rates contributed to ongoing increases in ON RRP take-up, which reached an average of around $2.1 trillion per day in June. Russia's invasion of Ukraine does not appear to have left a material imprint in the broad U.S. dollar funding markets to date. In late February and early March, spreads on some longer-tenor commercial paper and negotiable certificates of deposit increased notably amid uncertainties around monetary policy tightening and Russia's invasion of Ukraine. These spreads have broadly narrowed since mid-March.

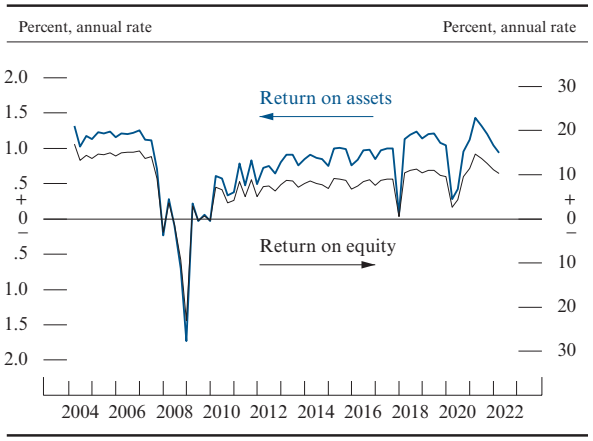
Weighted average maturities for money market funds (MMFs) stand at low levels, as MMFs tend to adjust their portfolios toward shorter-tenor instruments to position for rising interest rates around monetary policy tightening cycles.

Bank credit expanded in the first quarter amid strong loan demand

Strong loan growth pushed the ratio of bank credit to GDP higher in the first quarter (figure 38). The acceleration in growth was broad based, with balance growth accelerating for most major loan categories. Growth was particularly strong for commercial and industrial and credit card loans, for which

demand continued to strengthen in the first quarter according to the April 2022 Senior Loan Officer Opinion Survey on Bank Lending Practices. More recently, loan growth moderated somewhat in May amid higher rates and a more uncertain economic outlook but remained strong. Bank profitability also remained strong but fell somewhat in the first quarter, in part as a result of declines in investment banking revenue and the fading boost to profitability from the release in previous quarters of loan loss reserves accumulated in 2020 (figure 39). Nevertheless, higher interest rates and strong loan demand are expected to support bank profitability in the near term. Delinquency rates on bank loans remained low.

39. Profitability of bank holding companies



NOTE: The data are quarterly.
SOURCE: Federal Reserve Board, Form FR Y-9C, Consolidated Financial Statements for Holding Companies.

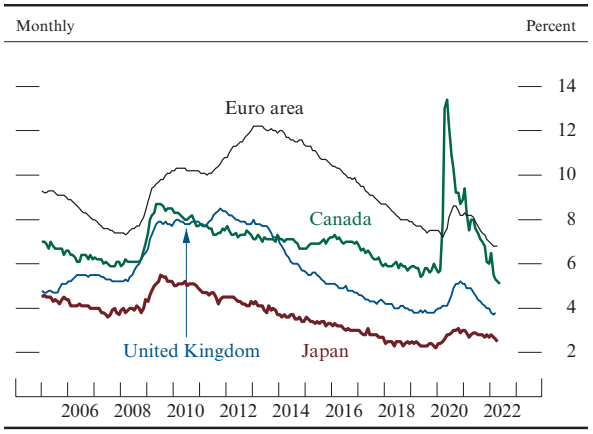
International Developments

Economic activity continued to recover abroad . . .

Economic activity continued to recover in many foreign economies in the first quarter, albeit at a slower pace than last year's strong performance. The still-robust growth in many foreign economies reflected the recovery in many parts of the world from previous pandemic shocks amid progress on vaccinations and a greater ability to cope with outbreaks without extensive lockdowns. Moreover, unemployment rates in many advanced foreign economies (AFEs) continued to decline and are now below their pre-pandemic levels (figure 40).

More recently, headwinds from the war in Ukraine and COVID-19 lockdowns in China weighed on the foreign recovery. The slowing of activity has been particularly sharp in China, with recent indicators plunging amid COVID-related mobility restrictions. In Europe, recent indicators also show a sharp slowing, reflecting lower real incomes, reduced confidence of households and businesses in the economy, and continued supply chain disruptions.

40. Unemployment rate in selected advanced foreign economies



NOTE: The data for the United Kingdom extend through March 2022 and are centered 3-month averages of monthly data. The data for the euro area and Japan extend through April 2022.
SOURCE: For the United Kingdom, Office for National Statistics; for Japan, Ministry of Health, Labour and Welfare; for the euro area, Statistical Office of the European Communities; for Canada, Statistics Canada; all via Haver Analytics.

. . . while foreign inflation remained on the rise in most economies . . .

As in the United States, inflation in many foreign economies has continued to rise. Soaring energy prices have remained a major driver of higher inflation in AFEs, and rising food prices accounted for most of the increase in inflation in emerging market economies (EMEs). Food and energy price rises have made up the bulk of the increase, though supply chain disruptions have contributed as well, and inflationary pressures have broadened as elevated input costs are increasingly passed through to prices of goods and services. (See the box "Global Inflation.")

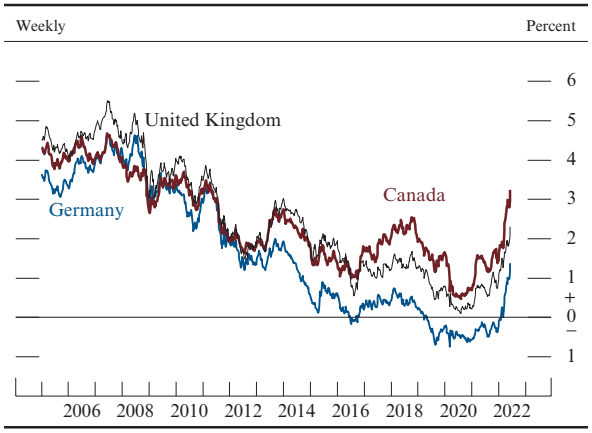
. . . and many foreign central banks are tightening monetary policy

In response to elevated inflation and broadening price pressures, many AFE central banks increased policy rates, and some started to reduce the size of their balance sheets. Concerns over the persistence of inflationary pressures led several EME central banks, primarily those in Latin America, to raise their policy rates further. Several central banks in emerging Asia, where inflation had been more subdued but has recently begun to rise, also started to raise policy rates. (See the box "Monetary Policy in Foreign Economies.")

Financial conditions abroad tightened since the beginning of the year . . .

As central banks raised interest rates or signaled that they would do so soon, market-based policy expectations and sovereign bond yields rose significantly in many AFEs (figure 41). The rise in sovereign bond yields reflects increases in both real yields, arising from less accommodative central bank communications, and inflation compensation. Since the start of the year, short- and medium-term inflation compensation measures in the euro area rose more than in many other AFEs, reflecting the region's larger exposure to the inflationary pressures stemming from Russia's invasion of Ukraine. Sovereign bond

41. Nominal 10-year government bond yields in selected advanced foreign economies

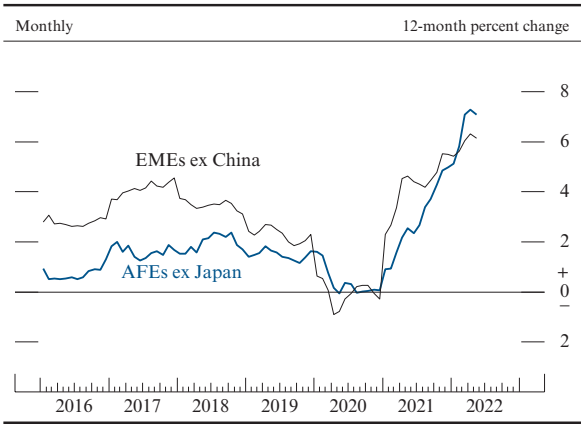


NOTE: The data are weekly averages of daily benchmark yields and extend through June 10, 2022.
SOURCE: Bloomberg.

Global Inflation

Over the past year, inflation increased rapidly in many foreign economies, reflecting soaring commodity prices, pandemic-related supply disruptions, and imbalances between demand for goods and services (figure A). More recently, the war in Ukraine and the renewals of COVID-19 lockdowns in China have amplified inflationary pressures, particularly through higher food and energy prices.

A. Consumer price inflation in foreign economies



NOTE: The advanced foreign economy (AFE) aggregate is the average of Canada, the euro area, and the United Kingdom, weighted by U.S. goods imports. The emerging market economy (EME) aggregate is the average of Brazil, Chile, Colombia, Hong Kong, India, Indonesia, Malaysia, Mexico, Philippines, Singapore, South Korea, Taiwan, and Thailand, weighted by U.S. goods imports. The inflation measure is the Harmonised Index of Consumer Prices for the euro area and the consumer price index for other economies.
SOURCE: Haver Analytics.

The recent surge in foreign inflation was mainly concentrated in volatile components, such as food and energy prices, with these components contributing much more to inflation in recent months than in pre-pandemic years (figure B). In particular, energy prices accounted for almost half of the 12-month headline inflation rate for the advanced foreign economies (AFEs) in April. Meanwhile, food prices are driving inflation in emerging market economies, largely due to the war and its threat to already fragile food security in these economies.

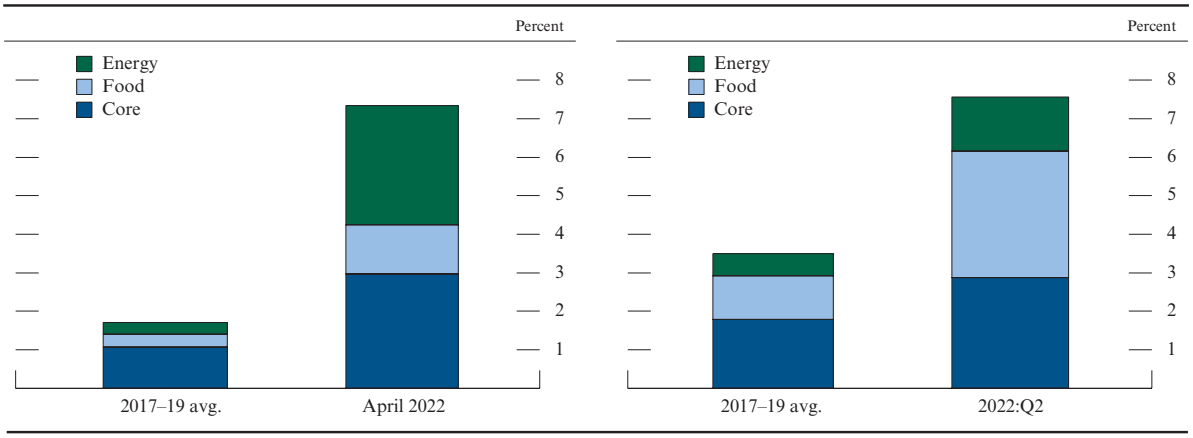
Price pressures have recently broadened to core inflation, as elevated input costs have been increasingly passed through to prices of goods and services that have not been directly affected by supply disruptions and soaring commodity prices. This broadening of inflationary pressure is reflected in increases in the share of categories of core goods and services prices rising more than 3 percent in most major AFEs (figure C). Furthermore, the rebalancing of demand away from goods toward services—which would have reduced upward pressures on prices of goods—has been slower than expected so far, contributing to the persistence of inflation pressures.

Persistent and widening price pressures are also evident in increases in market- and survey-based inflation expectations, although these expectations generally remain anchored in historical ranges (figure D). Even though such increases in inflation expectations might be a welcome development for economies such as Japan and the euro area that have experienced persistently below-target inflation in recent decades, many foreign central banks have been tightening monetary policy amid broadened price pressures and tight labor markets.

(continued on next page)

Global Inflation *(continued)*

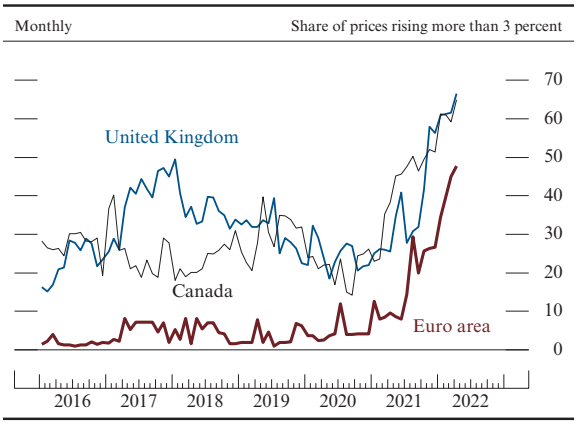
B. Foreign consumer price inflation components



NOTE: The advanced foreign economy (AFE) aggregate is the average of Canada, the euro area, and the United Kingdom, weighted by U.S. goods imports. The emerging market economy (EME) aggregate is the average of Argentina, Brazil, Chile, Colombia, Hong Kong, India, Israel, Mexico, Russia, Saudi Arabia, Singapore, South Korea, and the 5 original member countries of the Association of Southeast Asian Nations, weighted by U.S. goods imports. The inflation measure is the Harmonised Index of Consumer Prices for the euro area and the consumer price index for other economies. The key identifies bars in order from top to bottom. The data are 12-month percent changes for AFEs and 4-quarter percent changes for EMEs.

SOURCE: Haver Analytics.

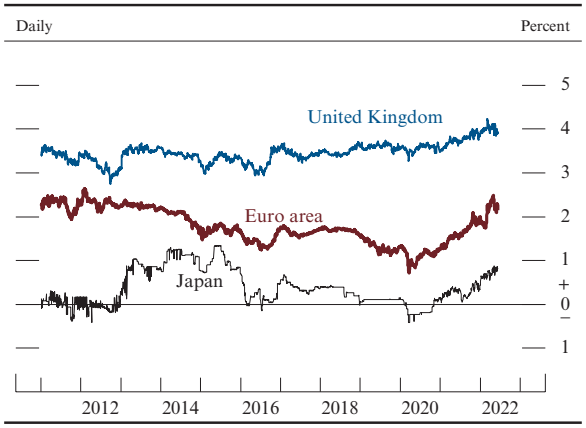
C. Diffusion index for foreign core prices



NOTE: The data use the 12-month rise in prices. The prices of items are weighted according to their usual weights in the consumer price index and the Harmonised Index of Consumer Prices. The data extend through April 2022.

SOURCE: Haver Analytics; Federal Reserve Board staff calculations.

D. 5-to-10-year inflation swaps



NOTE: The euro-area and United Kingdom data have been adjusted using an interpolated price index to mitigate rollover jumps at month-ends. The United Kingdom's inflation swaps are based on the retail price index (RPI). RPI inflation is, on average, 75 to 100 basis points higher than consumer price index inflation. The data are at a business-day frequency.

SOURCE: Bloomberg; Haver Analytics; Federal Reserve Board staff calculations.

Monetary Policy in Foreign Economies

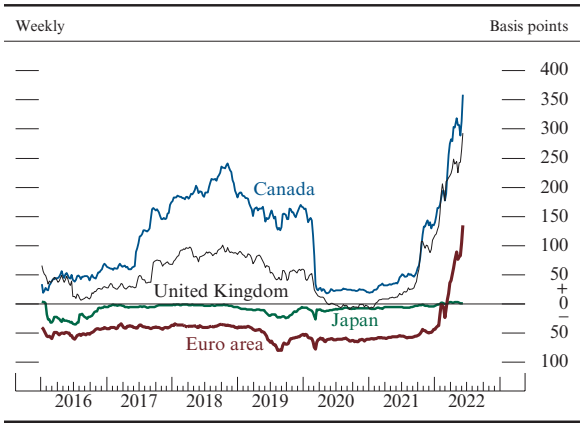
With inflation rising sharply across the globe, central banks have broadly shifted toward tighter monetary policy. Policy tightening started last year, as some emerging market central banks—particularly those in Latin America—increased policy rates out of concern that sharp increases in inflation could become entrenched in inflation expectations. Among the advanced foreign economies (AFEs), central banks of some smaller economies (New Zealand and Norway) with particularly strong recoveries were the first to hike their policy rates last autumn, while policy expectations for some major AFE central banks began to rise sharply (figure A).

Last December, the Bank of England (BOE) raised its policy rate from 0.1 percent to 0.25 percent, citing a strong labor market and rising inflation. This year, with U.K. inflation picking up more sharply, the BOE followed with additional rate hikes in subsequent meetings, taking its policy rate to 1 percent in May. The Bank of Canada (BOC) began raising its policy rate in March with a 25 basis point hike. In response to sharply higher inflation and the view that economic slack in the Canadian economy had been absorbed, the BOC followed with hikes of 50 basis points each in April and June, bringing the policy rate to 1.5 percent. As inflation concerns grew more widespread, the Reserve Bank of Australia (RBA) and the Swedish Riksbank pivoted sharply to hike rates in May, and the European Central Bank (ECB) recently stated that it intends to start raising its policy rate in July.

Supporting the overall thrust toward tighter global monetary policy, several AFE central banks that had expanded their balance sheets over the past two years are now allowing them to shrink. In recent months, the BOE, the BOC, the RBA, and the Swedish Riksbank have begun to shrink their balance sheets by stopping full reinvestments of maturing government bond holdings. The BOE has indicated that it will consider accelerating the pace of balance sheet reduction by selling U.K. government bonds; it will provide an update in August on a strategy for possible future bond sales. After tapering its purchases in recent months, the ECB announced it will end net asset purchases as of July 1.

Not all major foreign central banks have been tightening monetary policy. The Bank of Japan (BOJ) has maintained its overnight policy rate at negative 0.1 percent, given its outlook that Japanese inflation will remain subdued in the medium term. The BOJ also vowed to continue purchasing Japanese government bonds to defend its current yield curve control target band around 0 percent for the 10-year nominal yield. In addition, the People's Bank of China recently increased its monetary stimulus through reductions in reserve requirement ratios and some key benchmark interest rates amid a weakening of economic activity in China.

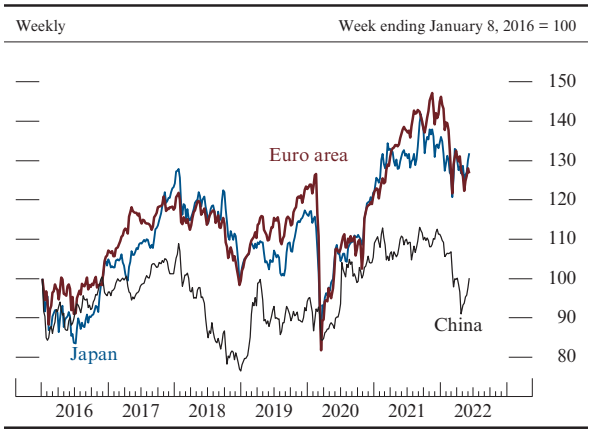
A. 12-month policy expectations for selected advanced foreign economies



NOTE: The data are weekly averages of daily 12-month market-implied central bank policy rates. The 12-month policy rates are implied by quotes on overnight index swaps tied to the policy rates. The data extend through June 10, 2022.

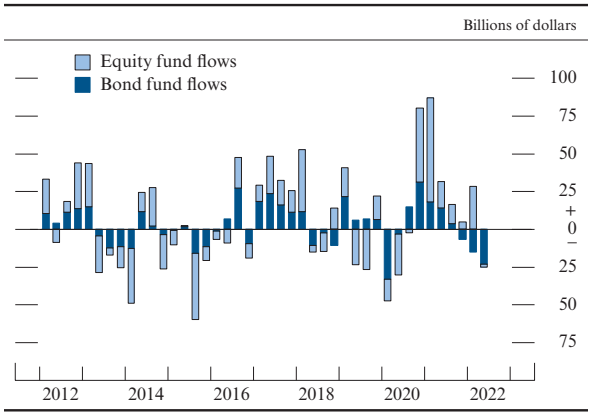
SOURCE: Bloomberg; Federal Reserve Board staff estimations.

42. Equity indexes for selected foreign economies



NOTE: The data are weekly averages of daily data and extend through June 10, 2022.
SOURCE: For the euro area, Dow Jones Euro Stoxx Index; for Japan, Tokyo Stock Price Index; for China, Shanghai Composite Index; all via Bloomberg. (For Dow Jones Indices licensing information, see the note on the Contents page.)

43. Emerging market mutual fund flows



NOTE: The bond and equity fund flows data are quarterly sums of weekly data from December 29, 2011, to June 8, 2022. Weekly data span Thursday through Wednesday, and the quarterly values are sums over weekly data for weeks ending in that quarter. The fund flows data exclude funds located in China.
SOURCE: EPFR Global.

spreads over German bund yields for euro-area peripheral countries recently widened significantly. These moves partially retraced following an unscheduled meeting of the European Central Bank (ECB) on June 15, where the ECB indicated that it would take action to address potential fragmentation in euro-area sovereign bond markets.

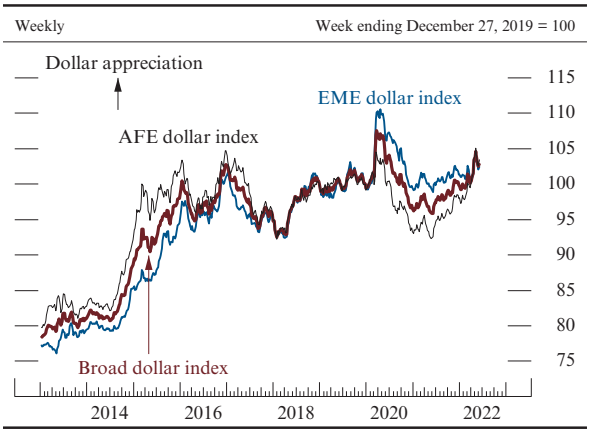
Concerns about persistently high inflation and associated monetary policy tightening across countries, as well as Russia's invasion of Ukraine and COVID lockdowns in China, weighed on foreign risky asset prices (figure 42). Equities in many AFEs have declined since the beginning of the year. Equity declines were particularly strong in the euro area, given the region's trade and financial linkages to Russia and concerns over the possibility of the conflict spreading to other parts of Europe. Euro-area corporate bond spreads have widened since the beginning of the year and are well above their pre-pandemic levels.

Financial conditions in EMEs have tightened since the beginning of the year but are not particularly tight relative to historical norms. EME-dedicated funds have experienced net outflows so far this quarter, reversing the inflows in the first quarter of this year (figure 43). Outflows have been concentrated in Asia, especially China. Since Russia's invasion of Ukraine, investment funds that focus on emerging Europe have experienced particularly rapid outflows. EME sovereign bond spreads widened considerably. European emerging market equities and Chinese equities declined significantly, the latter amid COVID-related lockdowns and related supply chain constraints as well as continued regulatory uncertainty. Latin American equities, supported in part by rising commodity prices, declined by less than other emerging markets.

. . . and the dollar appreciated notably

Since the beginning of the year, the broad dollar index—a measure of the trade-weighted value of the dollar against foreign currencies—has risen notably amid safe-haven flows and increases in U.S. yields (figure 44). The dollar appreciated more against AFE currencies than EME currencies, as rising commodity prices supported Latin American currencies. The Chinese renminbi depreciated against the dollar amid growth concerns related to the lockdowns in China and weaker-than-expected Chinese data releases. Among AFE currencies, the dollar appreciated particularly strongly against the Japanese yen, largely reflecting the widening U.S.–Japanese yield differential.

44. U.S. dollar exchange rate indexes



NOTE: The data, which are in foreign currency units per dollar, are weekly averages of daily values of the broad dollar index, advanced foreign economies (AFE) dollar index, and emerging market economies (EME) dollar index. The weekly data extend through June 10, 2022. As indicated by the leftmost arrow, increases in the data reflect U.S. dollar appreciation and decreases reflect U.S. dollar depreciation.

SOURCE: Federal Reserve Board, Statistical Release H.10, "Foreign Exchange Rates."

Part 2
Monetary Policy

The Federal Open Market Committee has swiftly raised the target range for the federal funds rate and anticipates that ongoing increases in the target range will be appropriate

With inflation far too high, well above the Federal Open Market Committee's (FOMC) 2 percent objective, and with tight labor market conditions, the Committee raised the target range for the federal funds rate off the effective lower bound in March. The Committee continued to raise the target range in May and June, bringing it to 1½ to 1¾ percent following the June meeting (figure 45). The Committee has also indicated that it anticipates that ongoing increases in the target range will be appropriate.

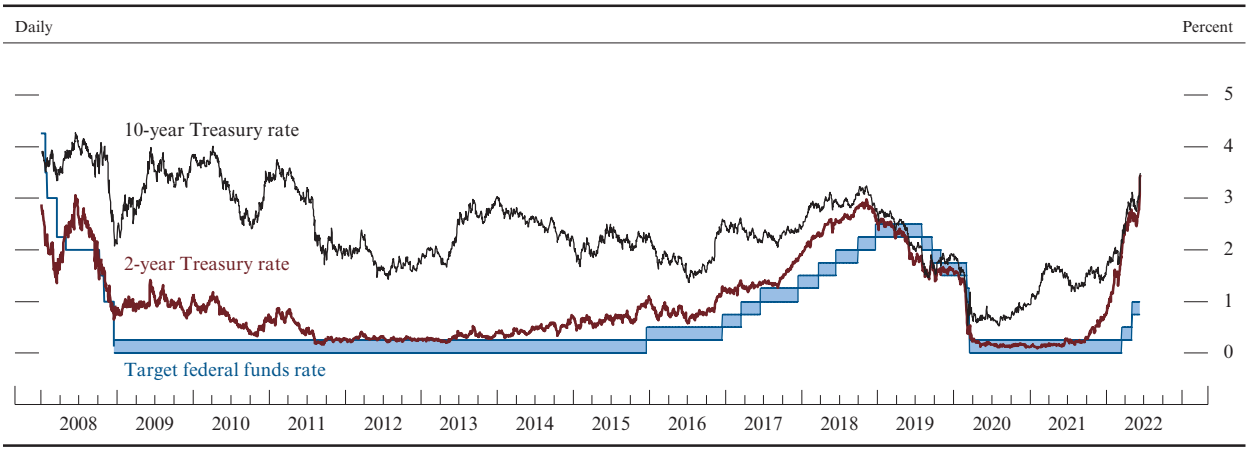
The Committee ceased net purchases of Treasury securities and agency mortgage-backed securities in early March and began the process of significantly reducing its securities holdings on June 1

Reflecting the need to firm the stance of monetary policy amid elevated inflation and tight labor market conditions, the Committee ended net asset purchases in early March and announced its plans for significantly reducing the size of the Federal Reserve's balance sheet in May.[13] Consistent with the Principles for Reducing the Size of the Federal Reserve's Balance Sheet that were issued in January, the May statement outlined the Committee's intention to reduce the Federal Reserve's securities holdings over time in a predictable manner primarily by adjusting the amounts reinvested of principal payments received from securities held in the System Open Market Account (SOMA).[14] Specifically, beginning in June, principal payments from securities held in the SOMA will be reinvested to the extent that they exceed monthly caps. For Treasury securities, the cap is initially set at $30 billion per month and after three months will increase

13. See the May 4, 2022, press release regarding the Plans for Reducing the Size of the Federal Reserve's Balance Sheet, available at https://www.federalreserve.gov/newsevents/pressreleases/monetary20220504b.htm.

14. See the January 26, 2022, press release regarding the Principles for Reducing the Size of the Federal Reserve's Balance Sheet, available at https://www.federalreserve.gov/newsevents/pressreleases/monetary20220126c.htm.

45. Selected interest rates



Note: The 2-year and 10-year Treasury rates are the constant-maturity yields based on the most actively traded securities.
Source: Department of the Treasury; Federal Reserve Board.

to $60 billion per month. For agency debt and agency mortgage-backed securities, the cap is initially set at $17.5 billion per month and after three months will increase to $35 billion per month.

Reductions in securities holdings will slow and then stop when reserve balances are somewhat above the level the Committee judges to be consistent with efficient implementation of policy in an ample-reserves regime. Once balance sheet runoff has ceased, reserve balances will likely continue to decline at a slower pace—reflecting growth in other Federal Reserve liabilities—until the Committee judges that reserve balances are at the level required for implementing policy efficiently in an ample regime, at which point reserve management purchases of securities would likely begin to maintain ample reserves. The Committee also noted that it is prepared to adjust any of the details of its approach to reducing the size of the balance sheet in light of economic and financial developments.

The FOMC will continue to monitor the implications of incoming information for the economic outlook

The Committee is strongly committed to returning inflation to its 2 percent objective. In assessing the appropriate stance of monetary policy, the Committee will continue to monitor the implications of incoming information for the economic outlook. The Committee's assessments will take into account a wide range of information, including readings on inflation and inflation expectations, wages, other measures of labor market conditions, financial and international developments, and public health.

In addition to considering a wide range of economic and financial data and information gathered from business contacts and other informed parties around the country, such as participants in conversations held as part of the *Fed Listens* initiative, policymakers routinely consult prescriptions for the policy interest rate provided by various monetary policy rules. These rule prescriptions can provide useful benchmarks for the FOMC. Although simple rules cannot capture the complexities of monetary policy and many practical considerations make it undesirable for the FOMC to adhere strictly to the prescriptions of any specific rule, some principles of good monetary policy can be illustrated by these policy rules (see the box "Monetary Policy Rules in the Current Environment").

Changes to the policy rate were implemented smoothly, and the size of the Federal Reserve's balance sheet was roughly stable

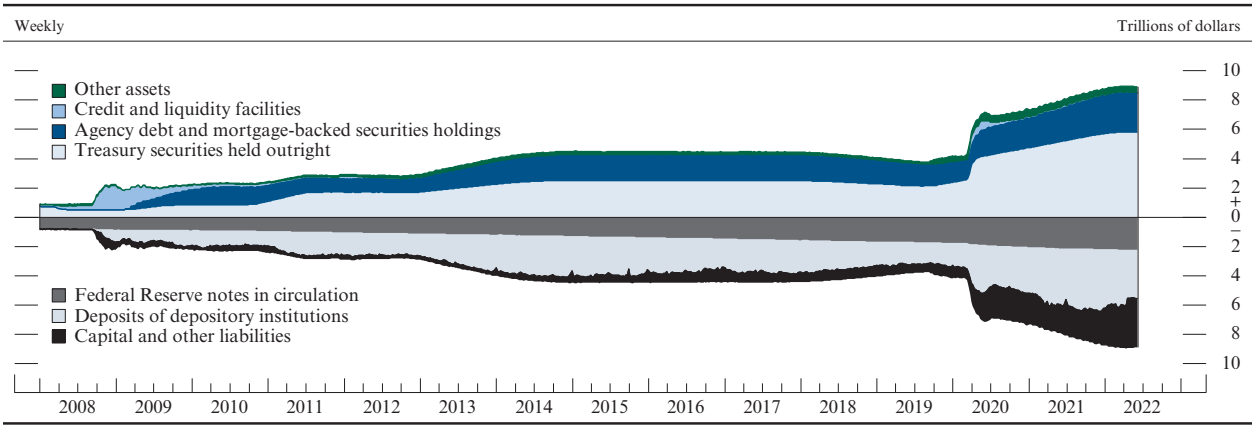
As in the previous tightening cycle and consistent with the implementation of monetary policy in an ample-reserves regime, the Federal Reserve used its administered rates—the interest rate on reserve balances (IORB) and the offering rate at the overnight reverse repurchase agreement (ON RRP) facility—to implement increases to the target range for the policy rate. The administered rates were effective in raising the effective federal funds rate and other short-term interest rates with the Committee's target range.

The Federal Reserve's balance sheet was roughly stable at $9 trillion, or 36 percent of U.S. nominal GDP, from February through May, and the process to significantly reduce securities holdings began on June 1 (figure 46).[15] Reserve balances have fallen from their all-time highs of a little over $4 trillion to around $3.3 trillion because of increasing take-up at the ON RRP. (See the box "Developments in the Federal Reserve's Balance Sheet and Money Markets.")

15. Although balance sheet reduction started on June 1, the actual reduction in securities holdings has been negligible thus far given the timing of principal payments.

All of the Federal Reserve's emergency credit and liquidity facilities are closed and balances have continued to decline as facilities' assets mature or prepay. A list of credit and liquidity facilities established by the Federal Reserve in response to COVID-19 is available on the Board's website at https://www.federalreserve.gov/funding-credit-liquidity-and-loan-facilities.htm.

46. Federal Reserve assets and liabilities



NOTE: "Other assets" includes repurchase agreements, FIMA (Foreign and International Monetary Authorities) repurchase agreements, and unamortized premiums and discounts on securities held outright. "Credit and liquidity facilities" consists of primary, secondary, and seasonal credit; term auction credit; central bank liquidity swaps; support for Maiden Lane, Bear Stearns Companies, Inc., and AIG; and other credit and liquidity facilities, including the Primary Dealer Credit Facility, the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility, the Commercial Paper Funding Facility, the Term Asset-Backed Securities Loan Facility, the Primary and Secondary Market Corporate Credit Facilities, the Paycheck Protection Program Liquidity Facility, the Municipal Liquidity Facility, and the Main Street Lending Program. "Agency debt and mortgage-backed securities holdings" includes agency residential mortgage-backed securities and agency commercial mortgage-backed securities. "Capital and other liabilities" includes reverse repurchase agreements, the U.S. Treasury General Account, and the U.S. Treasury Supplementary Financing Account. The key identifies shaded areas in order from top to bottom. The data extend through June 8, 2022.

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

Monetary Policy Rules in the Current Environment

Simple interest rate rules relate a policy interest rate, such as the federal funds rate, to a small number of other economic variables—typically including the current deviation of inflation from its target value and a measure of resource slack in the economy. Policymakers consult policy rate prescriptions derived from a variety of policy rules as part of their monetary policy deliberations without mechanically following the prescriptions of any particular rule.

Recently, inflation has run well above the Committee's 2 percent longer-run objective, the U.S. economy has been very strong, and labor market conditions have been very tight. Against this background, the simple monetary policy rules considered in this discussion have called for raising the federal funds rate significantly. Starting in March, the Federal Open Market Committee (FOMC) began raising the target range for the federal funds rate and indicated that it anticipates that ongoing increases in the target range will be appropriate. The FOMC also began the process of significantly reducing the size of the Federal Reserve's balance sheet.

Selected Policy Rules: Descriptions

In many economic models, desirable economic outcomes can be achieved if monetary policy responds in a predictable way to changes in economic conditions. In recognition of this idea, economists have analyzed many monetary policy rules, including the well-known Taylor (1993) rule, the "balanced approach" rule, the "adjusted Taylor (1993)" rule, and the "first difference" rule.[1] In addition to these rules, figure A shows a "balanced-approach (shortfalls)" rule, which represents one simple way to illustrate the Committee's focus on shortfalls from maximum employment.[2] These rules embody key design principles of good monetary policy, including that the policy rate should be adjusted forcefully enough over time to ensure a return of inflation to the central bank's longer-run objective and to anchor longer-term inflation expectations at levels consistent with that objective.

All five rules feature the difference between inflation and the FOMC's longer-run objective of 2 percent. The five rules use the unemployment rate gap, measured as the difference between an estimate of the rate of unemployment in the longer run (u_t^{LR}) and the current unemployment rate; the first-difference rule includes the change in the unemployment rate gap rather than its level.[3] All but the first-difference rule include an

(continued)

1. The Taylor (1993) rule was introduced in John B. Taylor (1993), "Discretion versus Policy Rules in Practice," Carnegie-Rochester Conference Series on Public Policy, vol. 39 (December), pp. 195–214. The balanced-approach rule was analyzed in John B. Taylor (1999), "A Historical Analysis of Monetary Policy Rules," in John B. Taylor, ed., *Monetary Policy Rules* (Chicago: University of Chicago Press), pp. 319–41. The adjusted Taylor (1993) rule was studied in David Reifschneider and John C. Williams (2000), "Three Lessons for Monetary Policy in a Low-Inflation Era," *Journal of Money, Credit and Banking,* vol. 32 (November), pp. 936–66. The first-difference rule is based on a rule suggested by Athanasios Orphanides (2003), "Historical Monetary Policy Analysis and the Taylor Rule," *Journal of Monetary Economics,* vol. 50 (July), pp. 983–1022. A review of policy rules is in John B. Taylor and John C. Williams (2011), "Simple and Robust Rules for Monetary Policy," in Benjamin M. Friedman and Michael Woodford, eds., *Handbook of Monetary Economics,* vol. 3B (Amsterdam: North-Holland), pp. 829–59. The same volume of the *Handbook of Monetary Economics* also discusses approaches other than policy rules for deriving policy rate prescriptions.

2. The FOMC's revised Statement on Longer-Run Goals and Monetary Policy Strategy, released in August 2020, refers to "shortfalls of employment" from the Committee's assessment of its maximum level rather than the "deviations of employment" used in the previous statement. The "balanced-approach (shortfalls)" rule reflects this change by prescribing policy rates identical to those prescribed by the balanced-approach rule at times when the unemployment rate is above its estimated longer-run level. However, when the unemployment rate is below that level, the balanced-approach (shortfalls) rule is more accommodative than the balanced-approach rule because it does not call for the policy rate to rise as the unemployment rate drops further.

3. Implementations of simple rules often use the output gap as a measure of resource slack in the economy. The rules described in figure A instead use the unemployment rate gap because that gap better captures the FOMC's statutory goal to promote maximum employment. Movements in these alternative measures of resource utilization are highly correlated. For more information, see the note below figure A.

A. Monetary policy rules

Taylor (1993) rule	$R_t^{T93} = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + (u_t^{LR} - u_t)$
Balanced-approach rule	$R_t^{BA} = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + 2(u_t^{LR} - u_t)$
Balanced-approach (shortfalls) rule	$R_t^{BAS} = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + 2min\{(u_t^{LR} - u_t), 0\}$
Adjusted Taylor (1993) rule	$R_t^{T93adj} = max\{R_t^{T93} - Z_t, \text{ELB}\}$
First-difference rule	$R_t^{FD} = R_{t-1} + 0.5(\pi_t - \pi^{LR}) + (u_t^{LR} - u_t) - (u_{t-4}^{LR} - u_{t-4})$

NOTE: R_t^{T93}, R_t^{BA}, R_t^{BAS}, R_t^{T93adj}, and R_t^{FD} represent the values of the nominal federal funds rate prescribed by the Taylor (1993), balanced-approach, balanced-approach (shortfalls), adjusted Taylor (1993), and first-difference rules, respectively.

R_{t-1} denotes the midpoint of the target range for the federal funds rate for quarter $t-1$, π_t is the 4-quarter price inflation for quarter t, u_t is the unemployment rate in quarter t, and r_t^{LR} is the level of the neutral real federal funds rate in the longer run that is expected to be consistent with sustaining maximum employment and inflation at the Federal Open Market Committee's 2 percent longer-run objective, represented by π^{LR}. In addition, u_t^{LR} is the rate of unemployment expected in the longer run. Z_t is the cumulative sum of past deviations of the federal funds rate from the prescriptions of the Taylor (1993) rule when that rule prescribes setting the federal funds rate below an effective lower bound (ELB) of 12.5 basis points.

The Taylor (1993) rule and other policy rules generally respond to the deviation of real output from its full capacity level. In these equations, the output gap has been replaced with the gap between the rate of unemployment in the longer run and its actual level (using a relationship known as Okun's law) to represent the rules in terms of the unemployment rate. The rules are implemented as responding to core personal consumption expenditures (PCE) inflation rather than to headline PCE inflation because current and near-term core inflation rates tend to outperform headline inflation rates as predictors of the medium-term behavior of headline inflation.

estimate of the neutral real interest rate in the longer run (r_t^{LR}).[4]

Unlike the other simple rules featured here, the adjusted Taylor (1993) rule recognizes that the federal funds rate cannot be reduced materially below the effective lower bound. To make up for the cumulative shortfall in policy accommodation following a recession during which the federal funds rate is constrained by its effective lower bound, the adjusted Taylor (1993) rule prescribes delaying the return of the policy rate to the (positive) levels prescribed by the standard Taylor (1993) rule until after the economy begins to recover.

Selected Policy Rules: Prescriptions

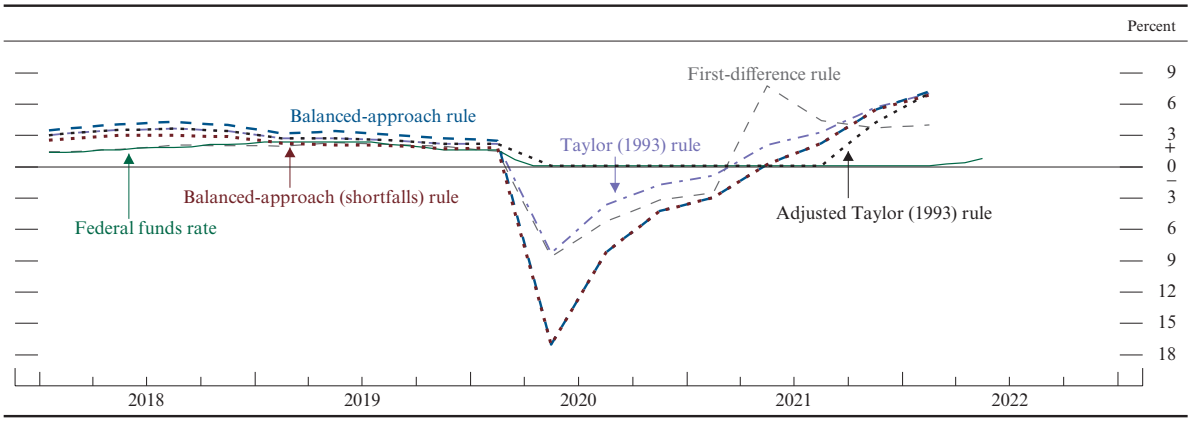
Figure B shows historical prescriptions for the federal funds rate under the five simple rules considered. For each quarterly period, the figure reports the policy rates prescribed by the rules, taking as given the prevailing economic conditions and survey-based estimates of u_t^{LR} and r_t^{LR} at the time. All of the rules considered called for a highly accommodative stance for monetary policy in response to the pandemic-driven recession. The recent elevated inflation readings imply that the prescriptions for the federal funds rate of simple policy rules in the first quarter of 2022 are well

(continued on next page)

4. The neutral real interest rate in the longer run (r_t^{LR}) is the level of the real federal funds rate that is expected to be consistent, in the longer run, with maximum employment and stable inflation. Like u_t^{LR}, r_t^{LR} is determined largely by nonmonetary factors. The first-difference rule shown in figure A does not require an estimate of r_t^{LR}. However, this rule has its own shortcomings. For example, research suggests that this sort of rule often results in greater volatility in employment and inflation relative to what would be obtained under the Taylor (1993) and balanced-approach rules.

Monetary Policy Rules in the Current Environment *(continued)*

B. Historical federal funds rate prescriptions from simple policy rules



NOTE: The rules use historical values of core personal consumption expenditures inflation, the unemployment rate, and, where applicable, historical values of the midpoint of the target range for the federal funds rate. Quarterly projections of longer-run values for the federal funds rate and the unemployment rate used in the computation of the rules' prescriptions are derived through interpolations of biannual projections from Blue Chip Economic Indicators. The longer-run value for inflation is set to 2 percent. The rules data are quarterly, and the federal funds rate data are the monthly average of the daily midpoint of the target range for the federal funds rate.

SOURCE: Federal Reserve Bank of Philadelphia; Wolters Kluwer, Blue Chip Economic Indicators; Federal Reserve Board staff calculations.

above their pre-pandemic levels, at between 4 percent and 7 percent. Overall, the prescriptions of all simple rules have risen notably over the past few quarters as inflation readings climbed further above 2 percent.

Policy Rules: Limitations

Simple policy rules are also subject to important limitations. One important limitation is that simple policy rules do not take into account the other tools of monetary policy, such as large-scale asset purchases. A second important limitation is that simple rules respond to only a small set of economic variables and thus necessarily abstract from many of the factors that the FOMC considers when it assesses the appropriate setting of the policy rate. Another limitation is that most simple policy rules do not take into account the effective lower bound on interest rates, which limits the extent to which the policy rate can be lowered to support the economy. This constraint was particularly evident in the aftermath of the pandemic-driven recession, when the lower bound on the policy rate motivated the FOMC's other policy actions to support the economy. Finally, simple policy rules generally abstract from the risk-management considerations associated with uncertainty about economic relationships and the evolution of the economy. As a result, the usefulness of simple policy rules can be limited in unusual economic circumstances.[5]

5. For example, Taylor (1993) on page 197 noted that "there will be episodes where monetary policy will need to be adjusted to deal with special factors. The Fed would need more than a simple policy rule as a guide in such cases."

Developments in the Federal Reserve's Balance Sheet and Money Markets

With the Federal Reserve's net asset purchases concluding in March, the size of the balance sheet has been roughly stable at $9 trillion since February 2022 (figures A and B). At its May 2022 meeting, the FOMC announced plans for significantly reducing the size of the Federal Reserve's balance sheet starting June 1. Balance sheet reduction, along with increases in the target range for the federal funds rate, firms the stance of monetary policy.

Despite the roughly constant total size of the balance sheet, reserves—the largest liability on the Federal Reserve's balance sheet—have continued to fall significantly since February 2022, reflecting growth in take-up at the overnight reverse repurchase agreement (ON RRP) facility (figure C).[1] In addition, the Treasury General Account (TGA)—another volatile liability—rose considerably upon larger than expected tax receipts and peaked just short of $1 trillion on June 2 before retracing the movement.

Usage at the ON RRP facility has risen $496 billion since February 2022 to stand at a record $2.2 trillion at the time of this report. Low rates on repurchase agreements—reflecting abundant liquidity in the banking system and limited Treasury bill supply—have contributed to this increasingly elevated participation.

(continued on next page)

1. Reserves consist of deposits held at Federal Reserve Banks by depository institutions, such as commercial banks, savings banks, credit unions, thrift institutions, and U.S. branches and agencies of foreign banks. Reserve balances allow depository institutions to facilitate daily payment flows, both in ordinary times and in stress scenarios, without borrowing funds or selling assets.

A. Balance sheet comparison
Billions of dollars

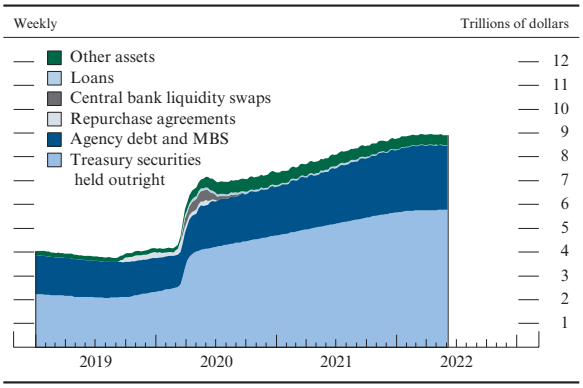
	June 8, 2022	February 16, 2022	Change
Assets			
Total securities			
Treasury securities	5,772	5,739	33
Agency debt and MBS	2,710	2,707	3
Net unamortized premiums	336	350	−14
Repurchase agreements	0	0	0
Loans and lending facilities			
PPPLF	19	28	−8
Other loans and lending facilities	37	40	−3
Central bank liquidity swaps	0	0	0
Other assets	47	48	−1
Total assets	**8,921**	**8,911**	**10**
Liabilities and capital			
Federal Reserve notes	2,227	2,185	42
Reserves held by depository institutions	3,317	3,797	−480
Reverse repurchase agreements			
Foreign official and international accounts	272	257	14
Others	2,163	1,644	519
U.S. Treasury General Account	627	709	−82
Other deposits	247	251	−5
Other liabilities and capital	69	67	1
Total liabilities and capital	**8,921**	**8,911**	**10**

Note: MBS is mortgage-backed securities. PPPLF is Paycheck Protection Program Liquidity Facility. Components may not sum to totals because of rounding.

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

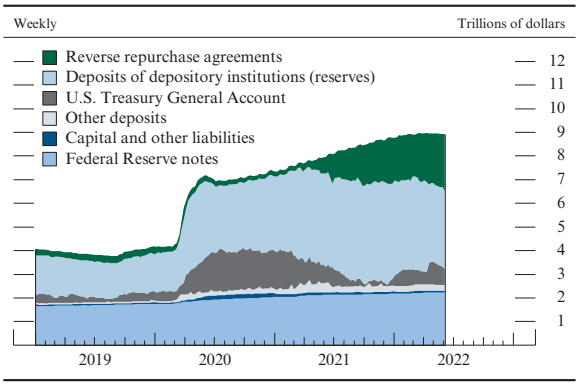
Developments in the Federal Reserve's Balance Sheet and Money Markets *(continued)*

B. Federal Reserve assets



NOTE: MBS is mortgage-backed securities. The key identifies shaded areas in order from top to bottom. The data extend through June 8, 2022.
SOURCE: Federal Reserve Board, Statistical Release H.4.1, "Factors Affecting Reserve Balances."

C. Federal Reserve liabilities



NOTE: "Capital and other liabilities" includes Treasury contributions. The key identifies shaded areas in order from top to bottom. The data extend through June 8, 2022
SOURCE: Federal Reserve Board, Statistical Release H.4.1, "Factors Affecting Reserve Balances."

In addition, uncertainty about the magnitude and pace of policy rate increases contributed to a preference for short-duration assets, like those provided by the ON RRP facility. The ON RRP facility is intended to help keep the effective federal funds rate from falling below the target range set by the FOMC, as institutions with access to the ON RRP should be unwilling to lend funds below the ON RRP's pre-announced offering rate. The facility continued to serve this intended purpose, and the set of administered rates—interest on reserve balances (IORB) and the ON RRP offering rate—was effective at raising and maintaining the effective federal funds rate within the target range during the policy rate adjustments that have taken place since March.

Going forward, the planned balance sheet decline will drain reserves from the banking system and add longer-duration assets, which will likely put upward pressure on short-term rates and reduce demand at the ON RRP facility. The Committee will monitor the evolution of reserves and other liabilities to ensure a smooth entry into efficient operation of monetary policy in an ample-reserves regime.

Part 3
Summary of Economic Projections

The following material was released after the conclusion of the June 14–15, 2022, meeting of the Federal Open Market Committee.

In conjunction with the Federal Open Market Committee (FOMC) meeting held on June 14–15, 2022, meeting participants submitted their projections of the most likely outcomes for real gross domestic product (GDP) growth, the unemployment rate, and inflation for each year from 2022 to 2024 and over the longer run. Each participant's projections were based on information available at the time of the meeting, together with her or his assessment of appropriate monetary policy—including a path for the federal funds rate and its longer-run value—and assumptions about other factors likely to affect economic outcomes. The longer-run projections represent each participant's assessment of the value to which each variable would be expected to converge, over time, under appropriate monetary policy and in the absence of further shocks to the economy. "Appropriate monetary policy" is defined as the future path of policy that each participant deems most likely to foster outcomes for economic activity and inflation that best satisfy his or her individual interpretation of the statutory mandate to promote maximum employment and price stability.

Table 1. Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents, under their individual assumptions of projected appropriate monetary policy, June 2022

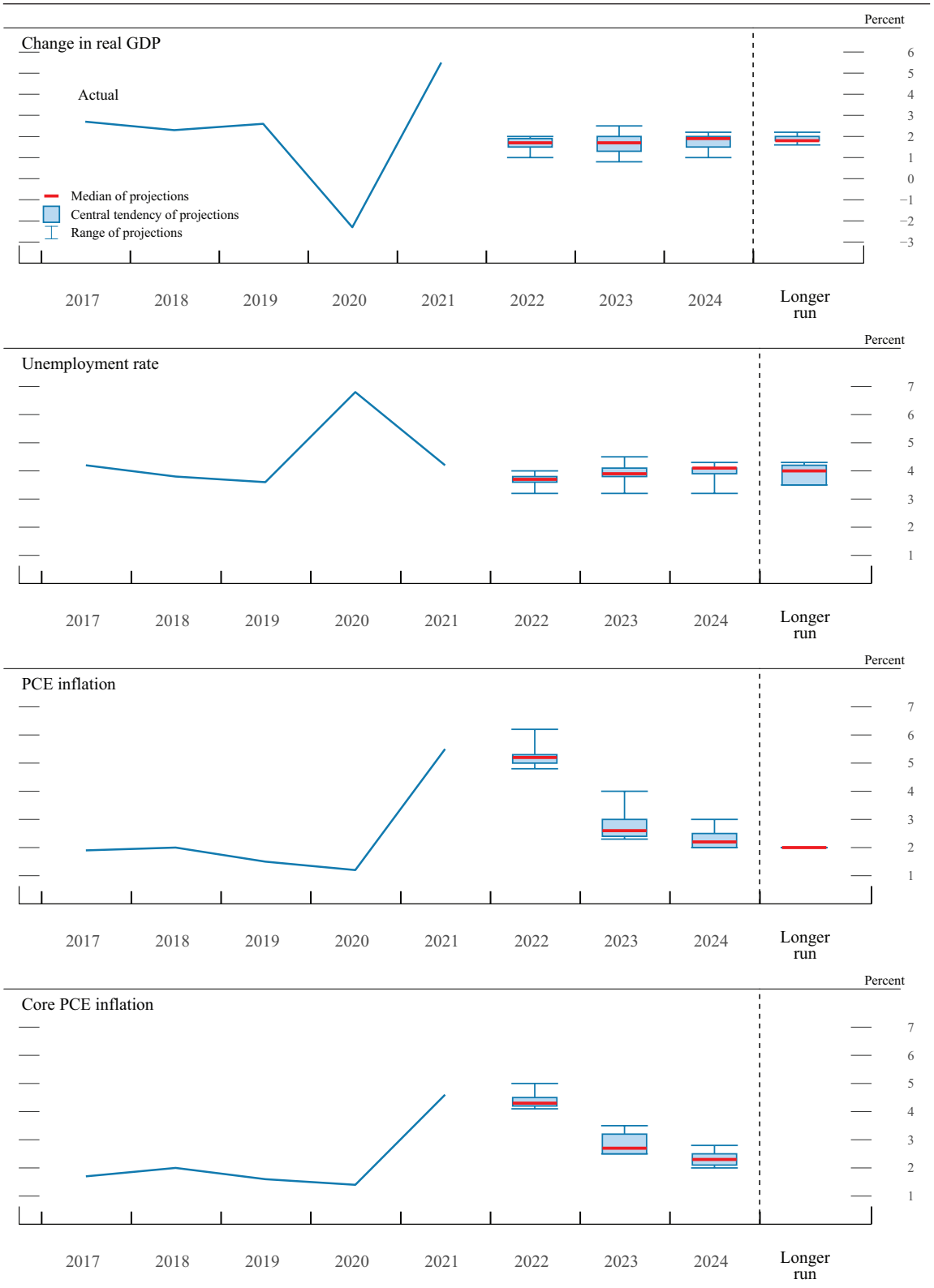
Percent

Variable	Median[1]				Central tendency[2]				Range[3]			
	2022	2023	2024	Longer run	2022	2023	2024	Longer run	2022	2023	2024	Longer run
Change in real GDP	1.7	1.7	1.9	1.8	1.5–1.9	1.3–2.0	1.5–2.0	1.8–2.0	1.0–2.0	0.8–2.5	1.0–2.2	1.6–2.2
March projection	2.8	2.2	2.0	1.8	2.5–3.0	2.1–2.5	1.8–2.0	1.8–2.0	2.1–3.3	2.0–2.9	1.5–2.5	1.6–2.2
Unemployment rate	3.7	3.9	4.1	4.0	3.6–3.8	3.8–4.1	3.9–4.1	3.5–4.2	3.2–4.0	3.2–4.5	3.2–4.3	3.5–4.3
March projection	3.5	3.5	3.6	4.0	3.4–3.6	3.3–3.6	3.2–3.7	3.5–4.2	3.1–4.0	3.1–4.0	3.1–4.0	3.5–4.3
PCE inflation	5.2	2.6	2.2	2.0	5.0–5.3	2.4–3.0	2.0–2.5	2.0	4.8–6.2	2.3–4.0	2.0–3.0	2.0
March projection	4.3	2.7	2.3	2.0	4.1–4.7	2.3–3.0	2.1–2.4	2.0	3.7–5.5	2.2–3.5	2.0–3.0	2.0
Core PCE inflation[4]	4.3	2.7	2.3		4.2–4.5	2.5–3.2	2.1–2.5		4.1–5.0	2.5–3.5	2.0–2.8	
March projection	4.1	2.6	2.3		3.9–4.4	2.4–3.0	2.1–2.4		3.6–4.5	2.1–3.5	2.0–3.0	
Memo: Projected appropriate policy path												
Federal funds rate	3.4	3.8	3.4	2.5	3.1–3.6	3.6–4.1	2.9–3.6	2.3–2.5	3.1–3.9	2.9–4.4	2.1–4.1	2.0–3.0
March projection	1.9	2.8	2.8	2.4	1.6–2.4	2.4–3.1	2.4–3.4	2.3–2.5	1.4–3.1	2.1–3.6	2.1–3.6	2.0–3.0

Note: Projections of change in real gross domestic product (GDP) and projections for both measures of inflation are percent changes from the fourth quarter of the previous year to the fourth quarter of the year indicated. PCE inflation and core PCE inflation are the percentage rates of change in, respectively, the price index for personal consumption expenditures (PCE) and the price index for PCE excluding food and energy. Projections for the unemployment rate are for the average civilian unemployment rate in the fourth quarter of the year indicated. Each participant's projections are based on his or her assessment of appropriate monetary policy. Longer-run projections represent each participant's assessment of the rate to which each variable would be expected to converge under appropriate monetary policy and in the absence of further shocks to the economy. The projections for the federal funds rate are the value of the midpoint of the projected appropriate target range for the federal funds rate or the projected appropriate target level for the federal funds rate at the end of the specified calendar year or over the longer run. The March projections were made in conjunction with the meeting of the Federal Open Market Committee on March 15–16, 2022. One participant did not submit longer-run projections for the change in real GDP, the unemployment rate, or the federal funds rate in conjunction with the March 15–16, 2022, meeting, and one participant did not submit such projections in conjunction with the June 14–15, 2022, meeting.

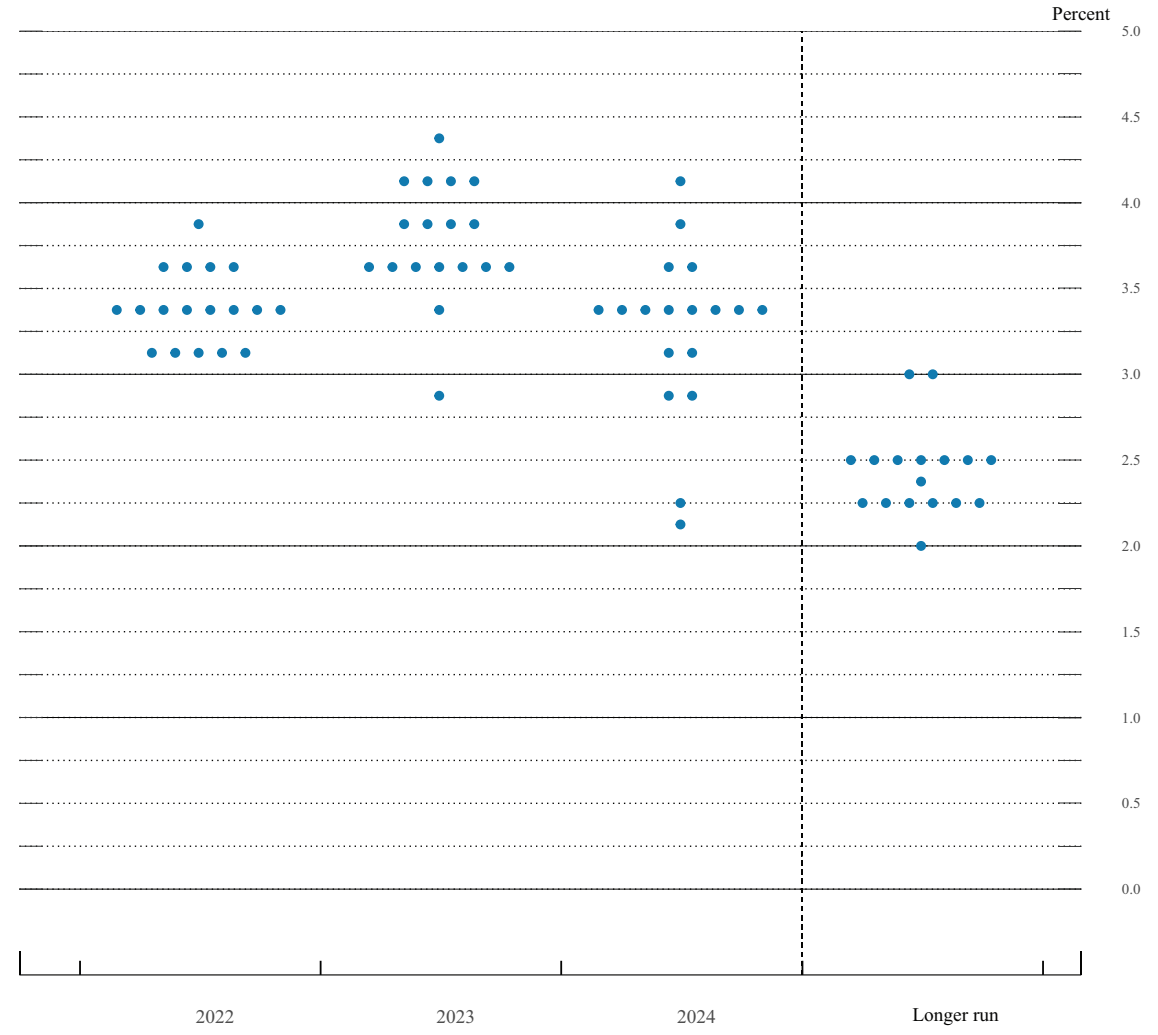
1. For each period, the median is the middle projection when the projections are arranged from lowest to highest. When the number of projections is even, the median is the average of the two middle projections.
2. The central tendency excludes the three highest and three lowest projections for each variable in each year.
3. The range for a variable in a given year includes all participants' projections, from lowest to highest, for that variable in that year
4. Longer-run projections for core PCE inflation are not collected.

Figure 1. Medians, central tendencies, and ranges of economic projections, 2022–24 and over the longer run



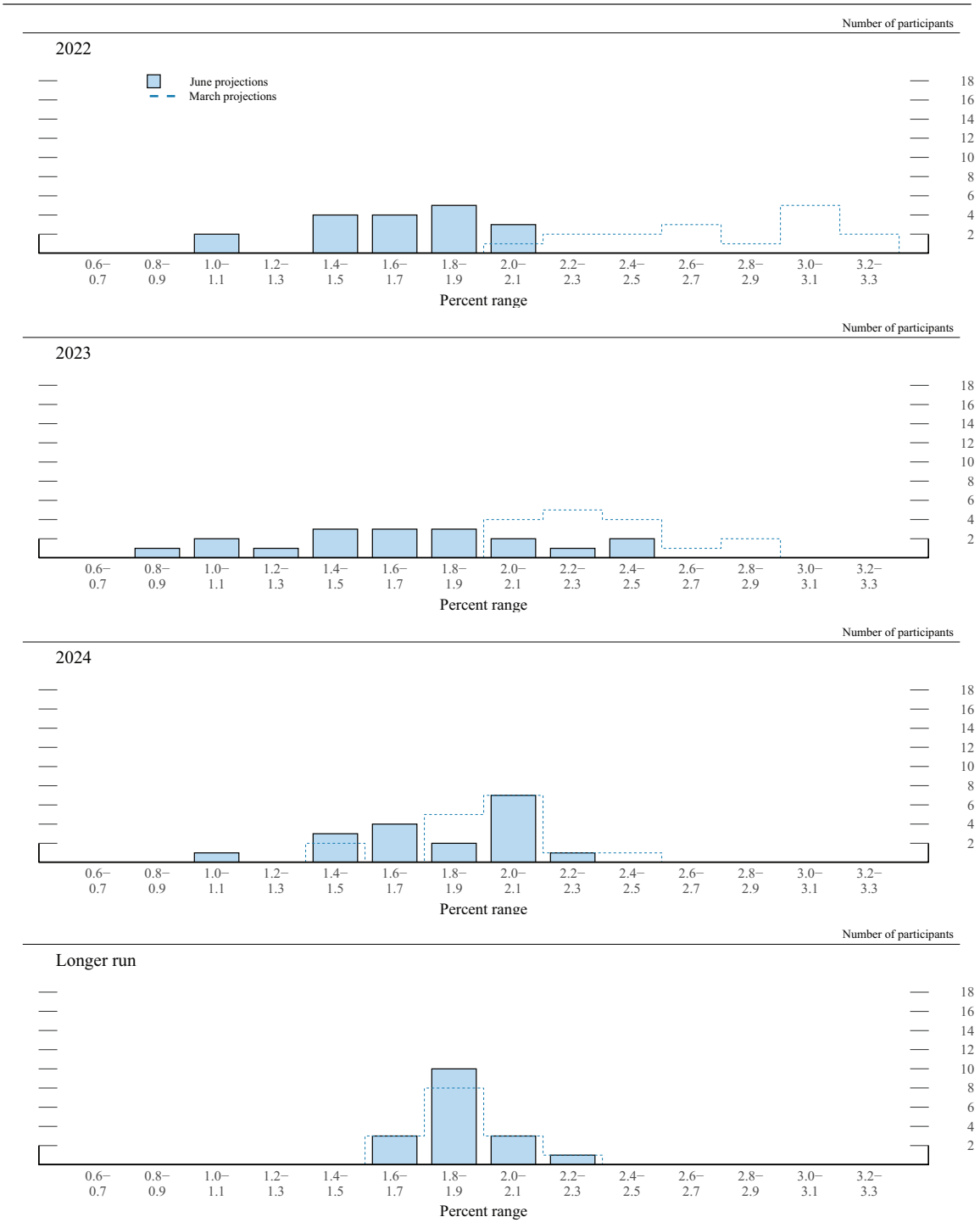
NOTE: Definitions of variables and other explanations are in the notes to table 1. The data for the actual values of the variables are annual.

Figure 2. FOMC participants' assessments of appropriate monetary policy: Midpoint of target range or target level for the federal funds rate



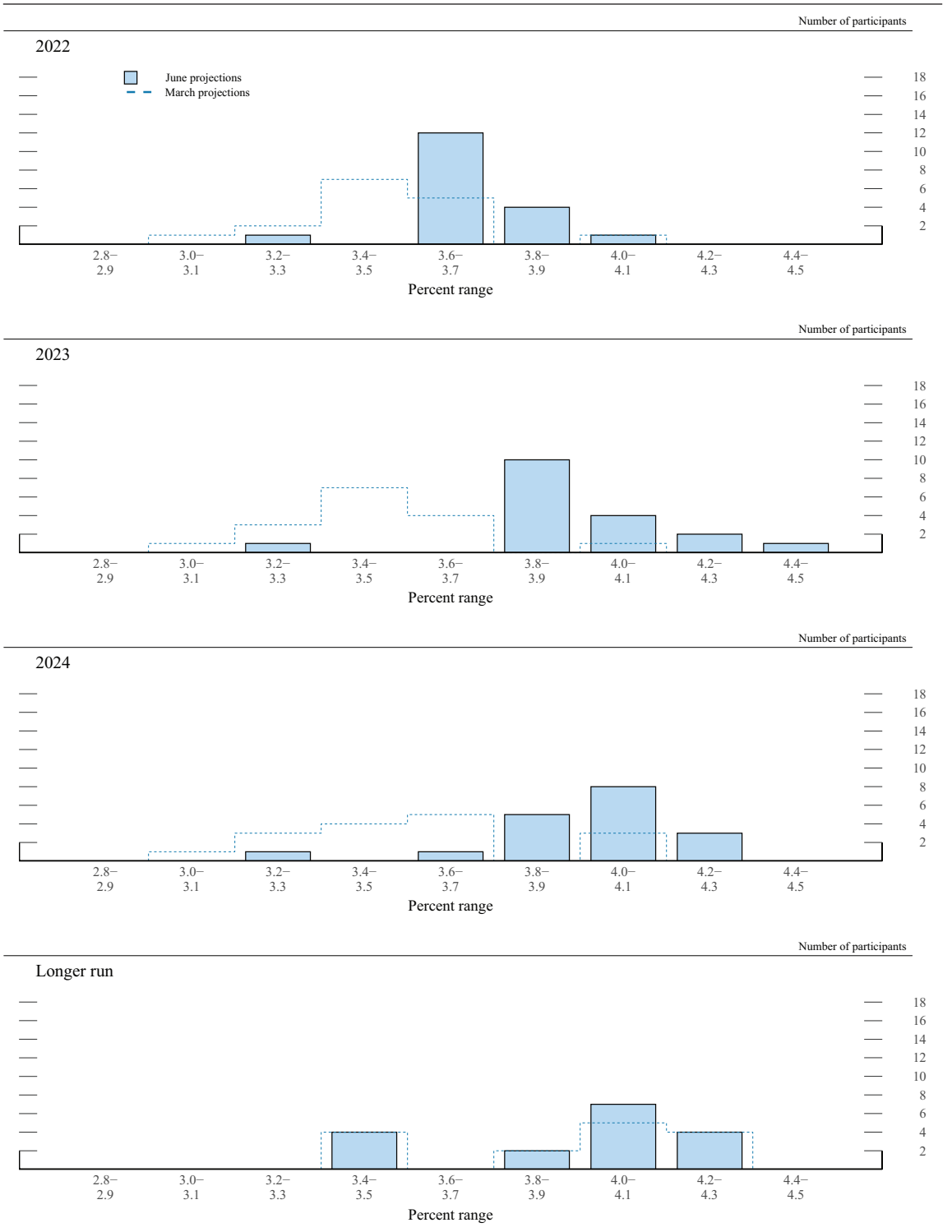
NOTE: Each shaded circle indicates the value (rounded to the nearest 1/8 percentage point) of an individual participant's judgment of the midpoint of the appropriate target range for the federal funds rate or the appropriate target level for the federal funds rate at the end of the specified calendar year or over the longer run. One participant did not submit longer-run projections for the federal funds rate.

Figure 3.A. Distribution of participants' projections for the change in real GDP, 2022–24 and over the longer run



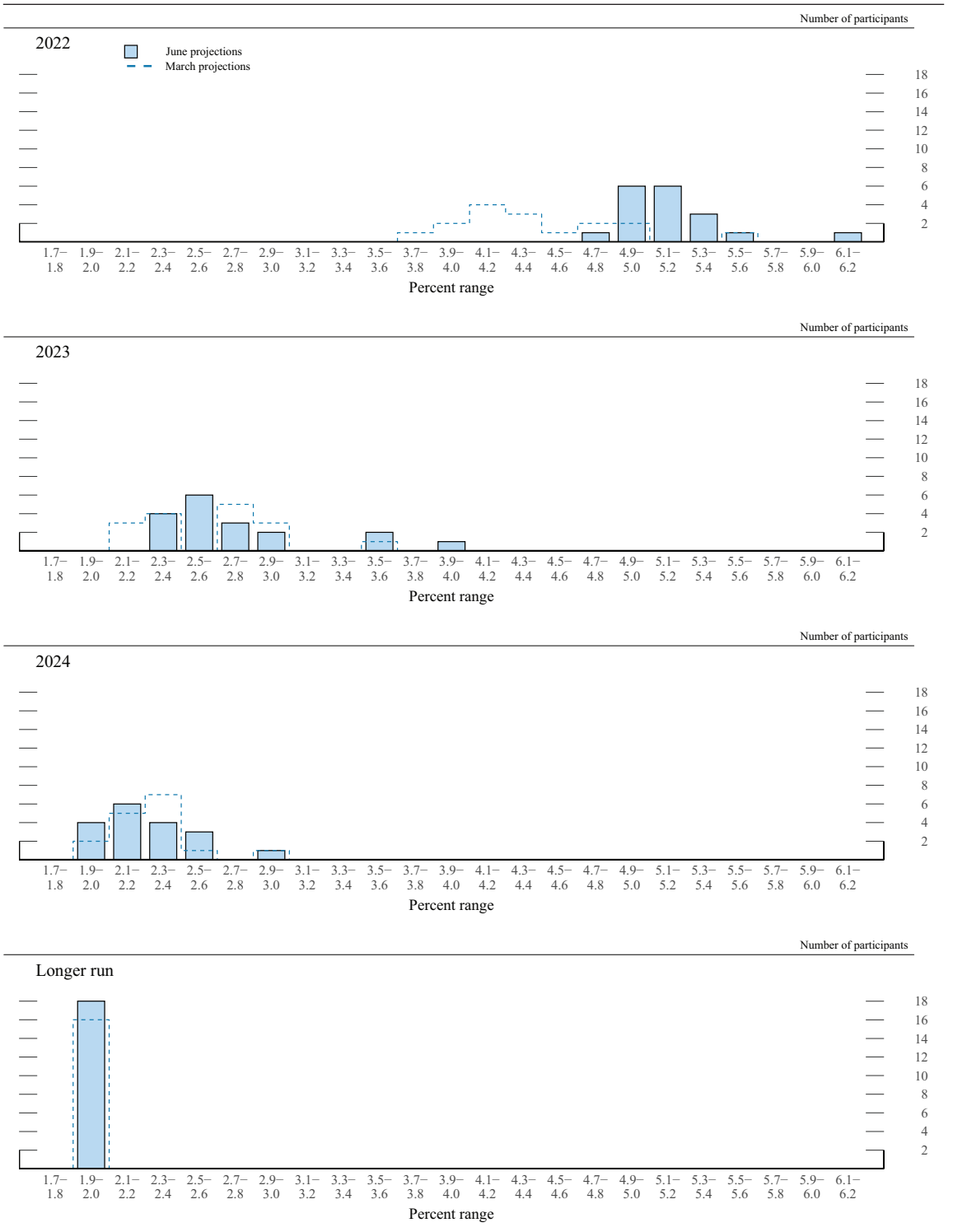
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.B. Distribution of participants' projections for the unemployment rate, 2022–24 and over the longer run



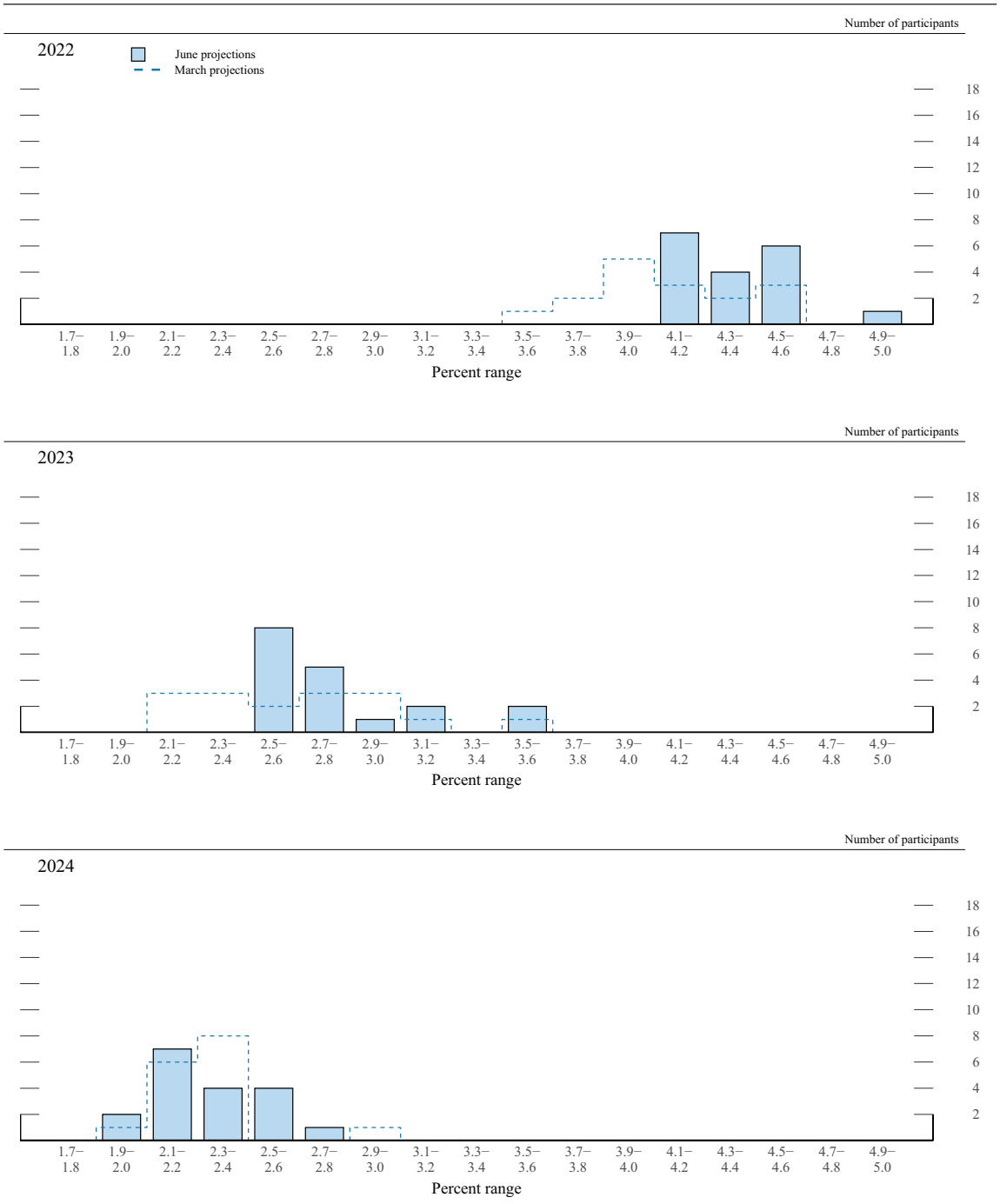
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.C. Distribution of participants' projections for PCE inflation, 2022–24 and over the longer run



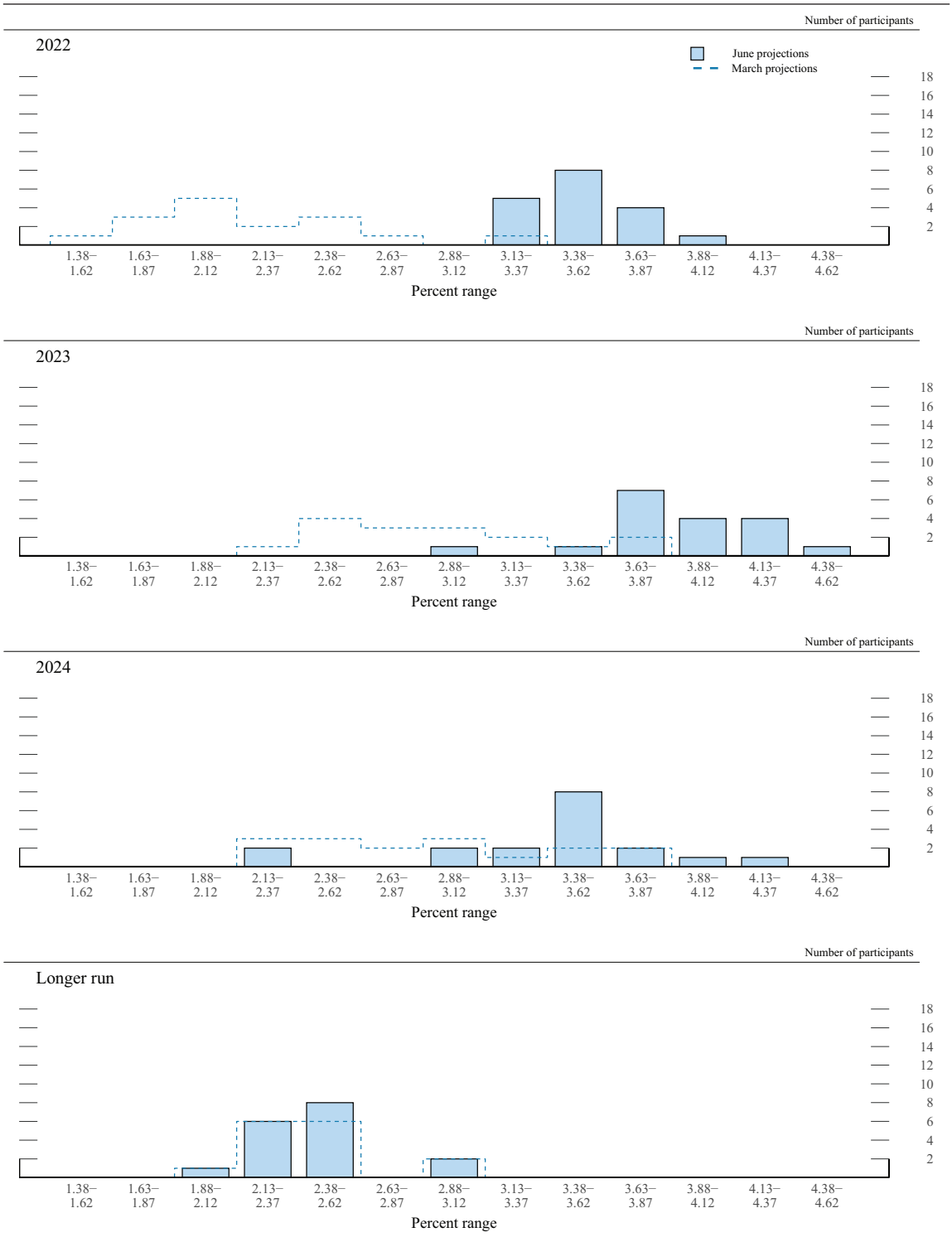
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.D. Distribution of participants' projections for core PCE inflation, 2022–24



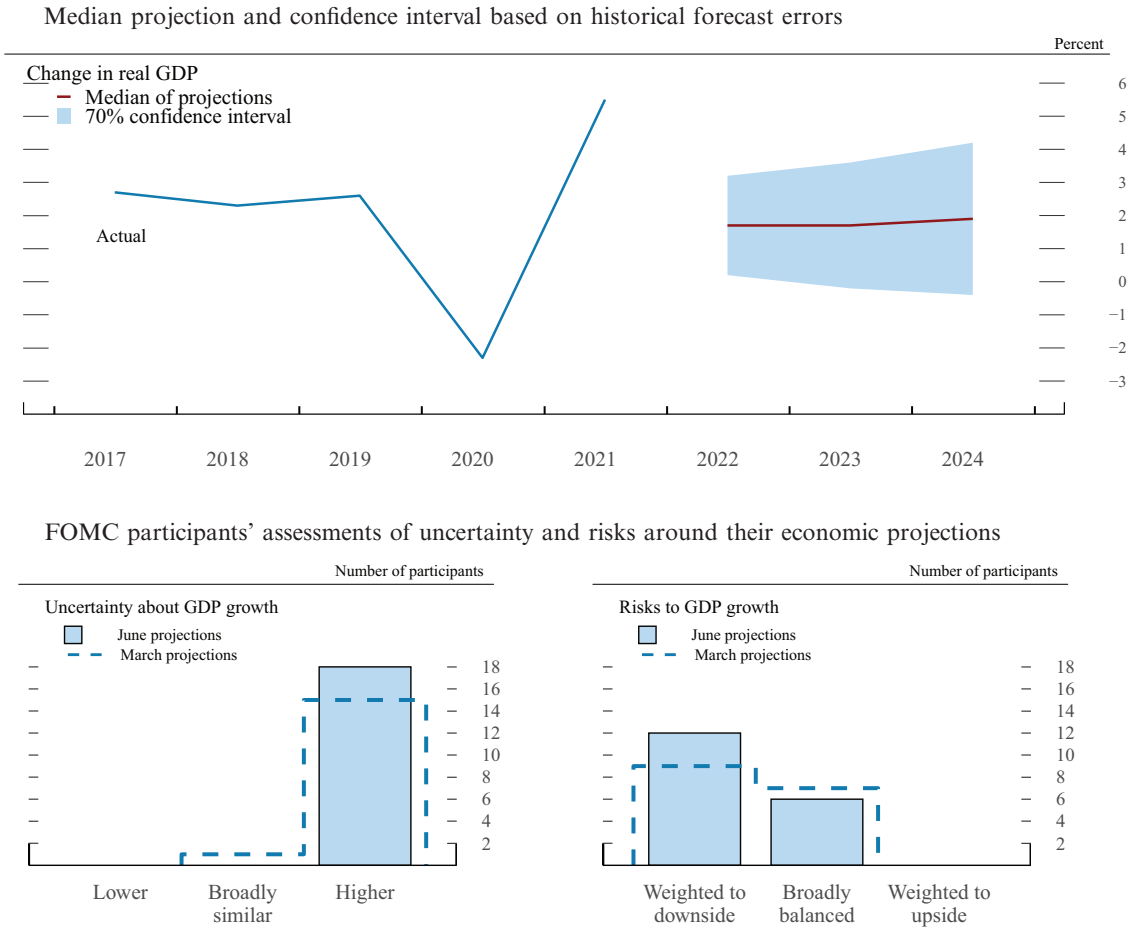
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.E. Distribution of participants' judgments of the midpoint of the appropriate target range for the federal funds rate or the appropriate target level for the federal funds rate, 2022–24 and over the longer run



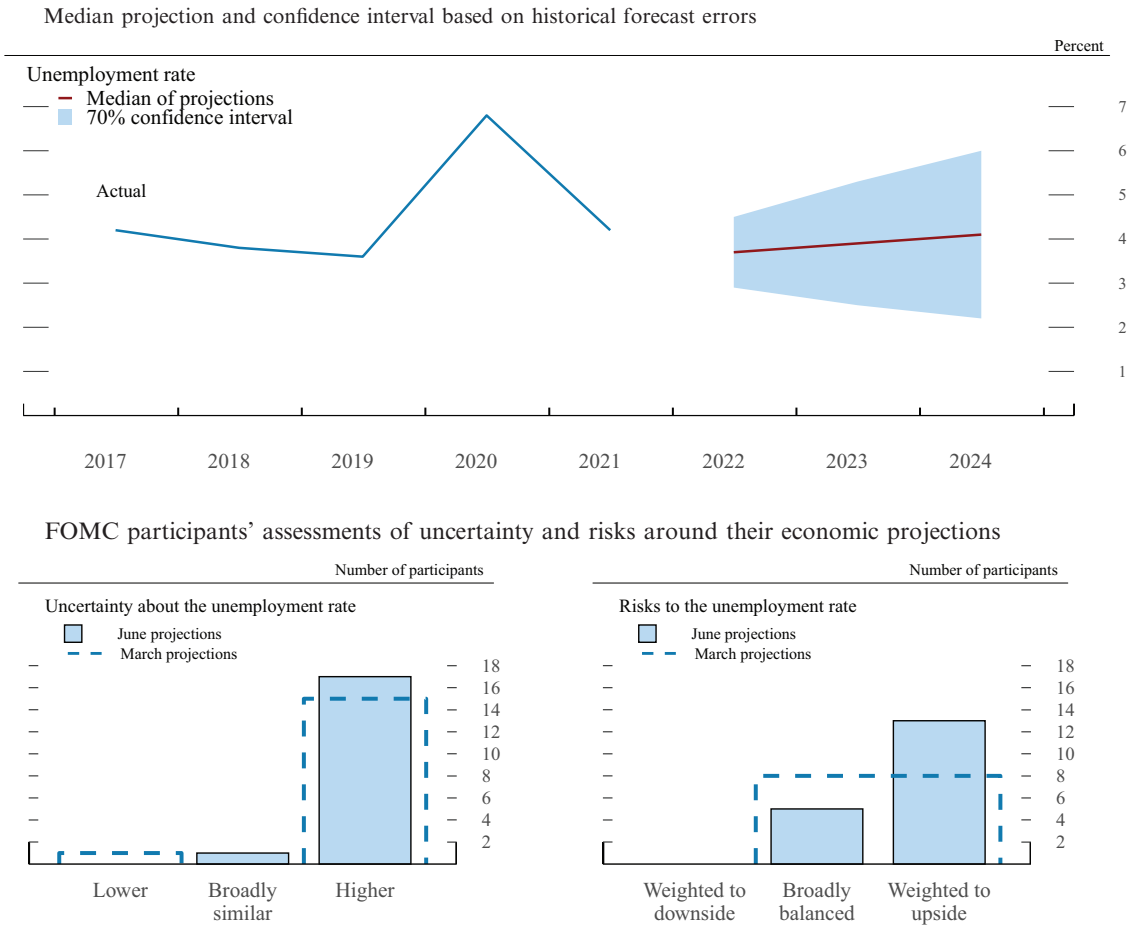
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 4.A. Uncertainty and risks in projections of GDP growth



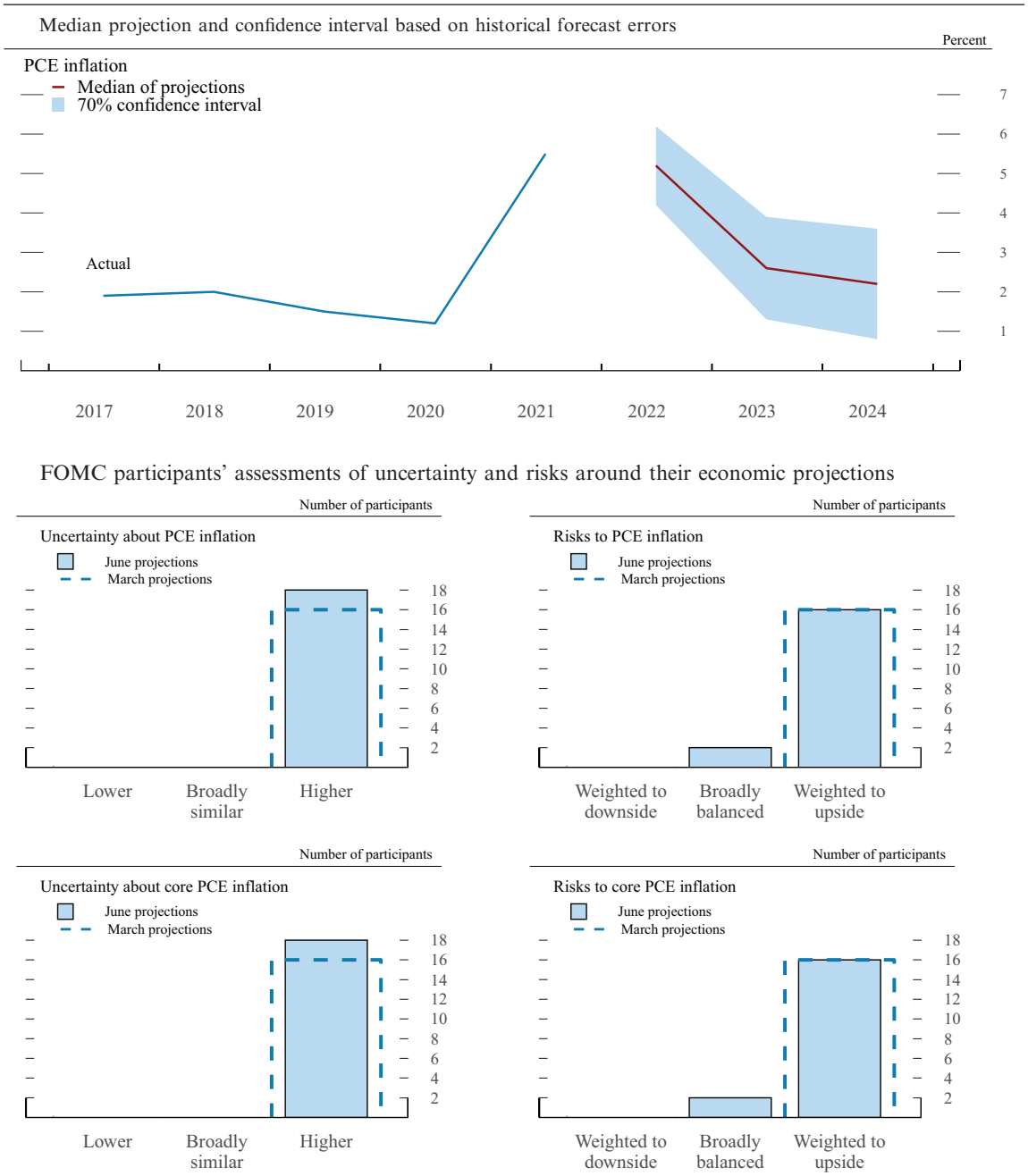
NOTE: The blue and red lines in the top panel show actual values and median projected values, respectively, of the percent change in real gross domestic product (GDP) from the fourth quarter of the previous year to the fourth quarter of the year indicated. The confidence interval around the median projected values is assumed to be symmetric and is based on root mean squared errors of various private and government forecasts made over the previous 20 years; more information about these data is available in table 2. Because current conditions may differ from those that prevailed, on average, over the previous 20 years, the width and shape of the confidence interval estimated on the basis of the historical forecast errors may not reflect FOMC participants' current assessments of the uncertainty and risks around their projections; these current assessments are summarized in the lower panels. Generally speaking, participants who judge the uncertainty about their projections as "broadly similar" to the average levels of the past 20 years would view the width of the confidence interval shown in the historical fan chart as largely consistent with their assessments of the uncertainty about their projections. Likewise, participants who judge the risks to their projections as "broadly balanced" would view the confidence interval around their projections as approximately symmetric. For definitions of uncertainty and risks in economic projections, see the box "Forecast Uncertainty."

Figure 4.B. Uncertainty and risks in projections of the unemployment rate



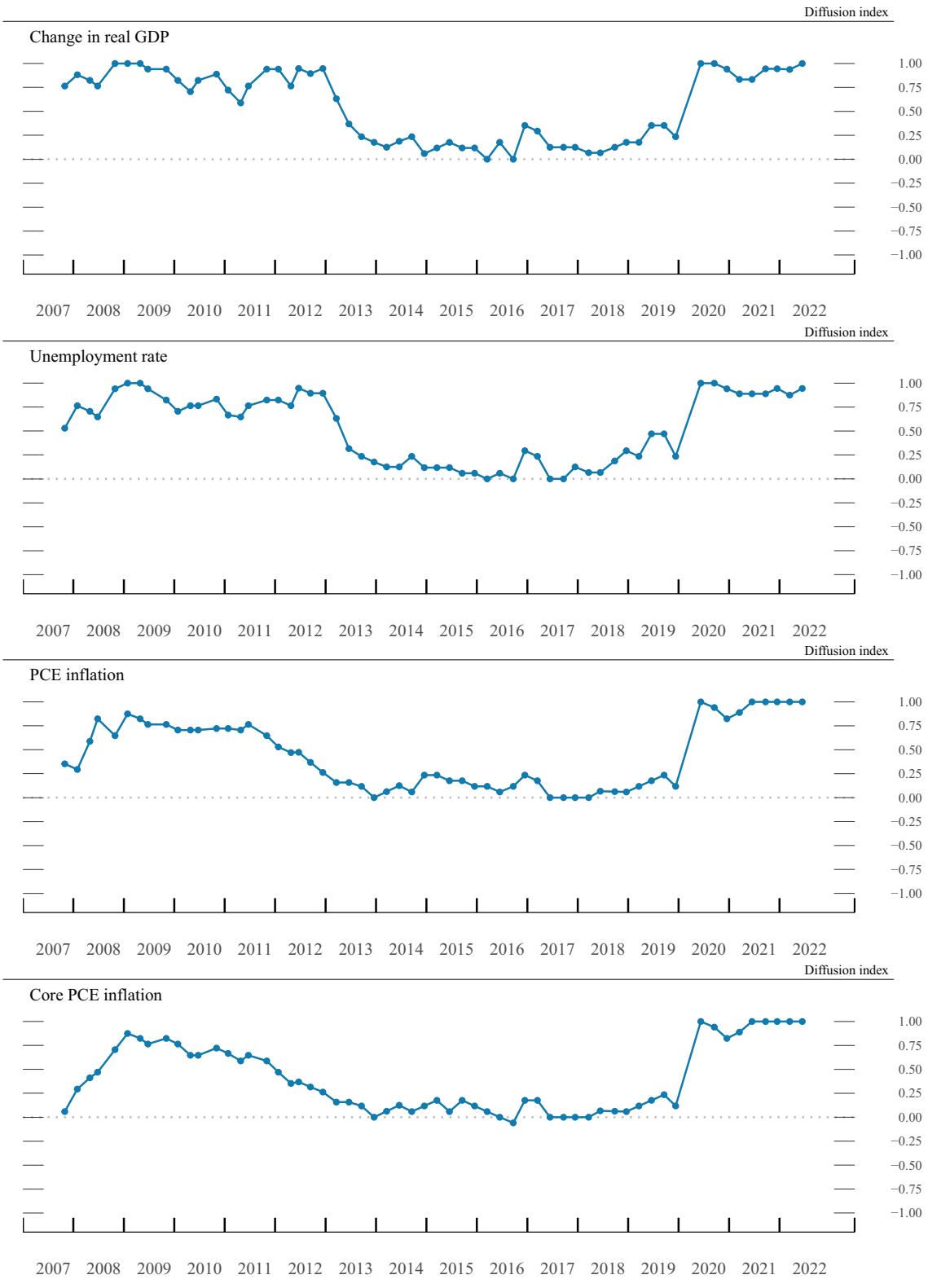
NOTE: The blue and red lines in the top panel show actual values and median projected values, respectively, of the average civilian unemployment rate in the fourth quarter of the year indicated. The confidence interval around the median projected values is assumed to be symmetric and is based on root mean squared errors of various private and government forecasts made over the previous 20 years; more information about these data is available in table 2. Because current conditions may differ from those that prevailed, on average, over the previous 20 years, the width and shape of the confidence interval estimated on the basis of the historical forecast errors may not reflect FOMC participants' current assessments of the uncertainty and risks around their projections; these current assessments are summarized in the lower panels. Generally speaking, participants who judge the uncertainty about their projections as "broadly similar" to the average levels of the past 20 years would view the width of the confidence interval shown in the historical fan chart as largely consistent with their assessments of the uncertainty about their projections. Likewise, participants who judge the risks to their projections as "broadly balanced" would view the confidence interval around their projections as approximately symmetric. For definitions of uncertainty and risks in economic projections, see the box "Forecast Uncertainty."

Figure 4.C. Uncertainty and risks in projections of PCE inflation



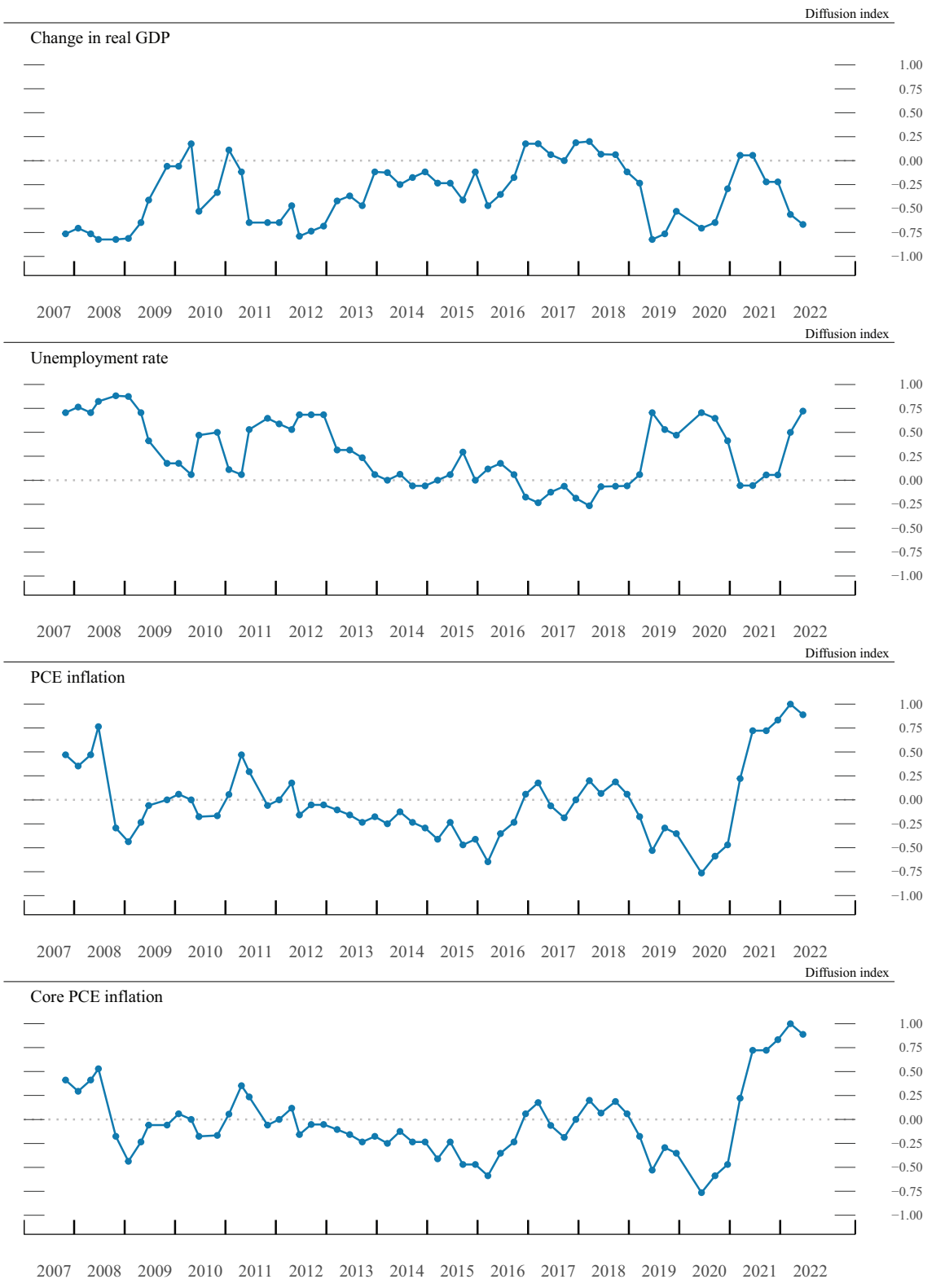
NOTE: The blue and red lines in the top panel show actual values and median projected values, respectively, of the percent change in the price index for personal consumption expenditures (PCE) from the fourth quarter of the previous year to the fourth quarter of the year indicated. The confidence interval around the median projected values is assumed to be symmetric and is based on root mean squared errors of various private and government forecasts made over the previous 20 years; more information about these data is available in table 2. Because current conditions may differ from those that prevailed, on average, over the previous 20 years, the width and shape of the confidence interval estimated on the basis of the historical forecast errors may not reflect FOMC participants' current assessments of the uncertainty and risks around their projections; these current assessments are summarized in the lower panels. Generally speaking, participants who judge the uncertainty about their projections as "broadly similar" to the average levels of the past 20 years would view the width of the confidence interval shown in the historical fan chart as largely consistent with their assessments of the uncertainty about their projections. Likewise, participants who judge the risks to their projections as "broadly balanced" would view the confidence interval around their projections as approximately symmetric. For definitions of uncertainty and risks in economic projections, see the box "Forecast Uncertainty."

Figure 4.D. Diffusion indexes of participants' uncertainty assessments



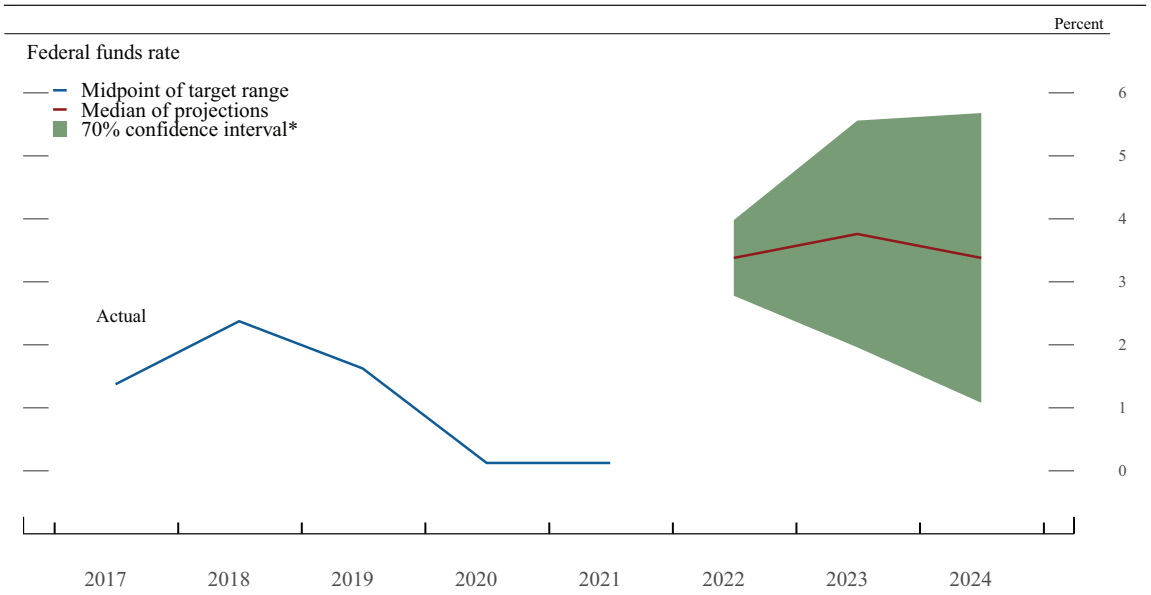
NOTE: For each SEP, participants provided responses to the question "Please indicate your judgment of the uncertainty attached to your projections relative to the levels of uncertainty over the past 20 years." Each point in the diffusion indexes represents the number of participants who responded "Higher" minus the number who responded "Lower," divided by the total number of participants. Figure excludes March 2020 when no projections were submitted.

Figure 4.E. Diffusion indexes of participants' risk weightings



NOTE: For each SEP, participants provided responses to the question "Please indicate your judgment of the risk weighting around your projections." Each point in the diffusion indexes represents the number of participants who responded "Weighted to the Upside" minus the number who responded "Weighted to the Downside," divided by the total number of participants. Figure excludes March 2020 when no projections were submitted.

Figure 5. Uncertainty and risks in projections of the federal funds rate



NOTE: The blue and red lines are based on actual values and median projected values, respectively, of the Committee's target for the federal funds rate at the end of the year indicated. The actual values are the midpoint of the target range; the median projected values are based on either the midpoint of the target range or the target level. The confidence interval around the median projected values is based on root mean squared errors of various private and government forecasts made over the previous 20 years. The confidence interval is not strictly consistent with the projections for the federal funds rate, primarily because these projections are not forecasts of the likeliest outcomes for the federal funds rate, but rather projections of participants' individual assessments of appropriate monetary policy. Still, historical forecast errors provide a broad sense of the uncertainty around the future path of the federal funds rate generated by the uncertainty about the macroeconomic variables as well as additional adjustments to monetary policy that may be appropriate to offset the effects of shocks to the economy.

The confidence interval is assumed to be symmetric except when it is truncated at zero - the bottom of the lowest target range for the federal funds rate that has been adopted in the past by the Committee. This truncation would not be intended to indicate the likelihood of the use of negative interest rates to provide additional monetary policy accommodation if doing so was judged appropriate. In such situations, the Committee could also employ other tools, including forward guidance and large-scale asset purchases, to provide additional accommodation. Because current conditions may differ from those that prevailed, on average, over the previous 20 years, the width and shape of the confidence interval estimated on the basis of the historical forecast errors may not reflect FOMC participants' current assessments of the uncertainty and risks around their projections.

* The confidence interval is derived from forecasts of the average level of short-term interest rates in the fourth quarter of the year indicated; more information about these data is available in table 2. The shaded area encompasses less than a 70 percent confidence interval if the confidence interval has been truncated at zero.

Table 2. Average historical projection error ranges
Percentage points

Variable	2022	2023	2024
Change in real GDP[1]	± 1.5	± 1.9	± 2.3
Unemployment rate[1]	± 0.8	± 1.4	± 1.9
Total consumer prices[2]	± 1.0	± 1.3	± 1.4
Short-term interest rates[3]	± 0.6	± 1.8	± 2.3

NOTE: Error ranges shown are measured as plus or minus the root mean squared error of projections for 2002 through 2021 that were released in the summer by various private and government forecasters. As described in the box "Forecast Uncertainty," under certain assumptions, there is about a 70 percent probability that actual outcomes for real GDP, unemployment, consumer prices, and the federal funds rate will be in ranges implied by the average size of projection errors made in the past. For more information, see David Reifschneider and Peter Tulip (2017), "Gauging the Uncertainty of the Economic Outlook Using Historical Forecasting Errors: The Federal Reserve's Approach," Finance and Economics Discussion Series 2017-020 (Washington: Board of Governors of the Federal Reserve System, February), https://dx.doi.org/10.17016/FEDS.2017.020.

1. Definitions of variables are in the general note to table 1.
2. Measure is the overall consumer price index, the price measure that has been most widely used in government and private economic forecasts. Projections are percent changes on a fourth quarter to fourth quarter basis.
3. For Federal Reserve staff forecasts, measure is the federal funds rate. For other forecasts, measure is the rate on 3-month Treasury bills. Projection errors are calculated using average levels, in percent, in the fourth quarter.

Forecast Uncertainty

The economic projections provided by the members of the Board of Governors and the presidents of the Federal Reserve Banks inform discussions of monetary policy among policymakers and can aid public understanding of the basis for policy actions. Considerable uncertainty attends these projections, however. The economic and statistical models and relationships used to help produce economic forecasts are necessarily imperfect descriptions of the real world, and the future path of the economy can be affected by myriad unforeseen developments and events. Thus, in setting the stance of monetary policy, participants consider not only what appears to be the most likely economic outcome as embodied in their projections, but also the range of alternative possibilities, the likelihood of their occurring, and the potential costs to the economy should they occur.

Table 2 summarizes the average historical accuracy of a range of forecasts, including those reported in past *Monetary Policy Report*s and those prepared by the Federal Reserve Board's staff in advance of meetings of the Federal Open Market Committee (FOMC). The projection error ranges shown in the table illustrate the considerable uncertainty associated with economic forecasts. For example, suppose a participant projects that real gross domestic product (GDP) and total consumer prices will rise steadily at annual rates of, respectively, 3 percent and 2 percent. If the uncertainty attending those projections is similar to that experienced in the past and the risks around the projections are broadly balanced, the numbers reported in table 2 would imply a probability of about 70 percent that actual GDP would expand within a range of 1.5 to 4.5 percent in the current year, 1.1 to 4.9 percent in the second year, and 0.7 to 5.3 percent in the third year. The corresponding 70 percent confidence intervals for overall inflation would be 1.0 to 3.0 percent in the current year, 0.7 to 3.3 percent in the second year, and 0.6 to 3.4 percent in the third year. Figures 4.A through 4.C illustrate these confidence bounds in "fan charts" that are symmetric and centered on the medians of FOMC participants' projections for GDP growth, the unemployment rate, and inflation. However, in some instances, the risks around the projections may not be symmetric. In particular, the unemployment rate cannot be negative; furthermore, the risks around a particular projection might be tilted to either the upside or the downside, in which case the corresponding fan chart would be asymmetrically positioned around the median projection.

Because current conditions may differ from those that prevailed, on average, over history, participants provide judgments as to whether the uncertainty attached to their projections of each economic variable is greater than, smaller than, or broadly similar to typical levels of forecast uncertainty seen in the past 20 years, as presented in table 2 and reflected in the widths of the confidence intervals shown in the top panels of figures 4.A through 4.C. Participants' current assessments of the uncertainty surrounding their projections are summarized in the bottom-left panels

(continued)

of those figures. Participants also provide judgments as to whether the risks to their projections are weighted to the upside, are weighted to the downside, or are broadly balanced. That is, while the symmetric historical fan charts shown in the top panels of figures 4.A through 4.C imply that the risks to participants' projections are balanced, participants may judge that there is a greater risk that a given variable will be above rather than below their projections. These judgments are summarized in the lower-right panels of figures 4.A through 4.C.

As with real activity and inflation, the outlook for the future path of the federal funds rate is subject to considerable uncertainty. This uncertainty arises primarily because each participant's assessment of the appropriate stance of monetary policy depends importantly on the evolution of real activity and inflation over time. If economic conditions evolve in an unexpected manner, then assessments of the appropriate setting of the federal funds rate would change from that point forward. The final line in table 2 shows the error ranges for forecasts of short-term interest rates. They suggest that the historical confidence intervals associated with projections of the federal funds rate are quite wide. It should be noted, however, that these confidence intervals are not strictly consistent with the projections for the federal funds rate, as these projections are not forecasts of the most likely quarterly outcomes but rather are projections of participants' individual assessments of appropriate monetary policy and are on an end-of-year basis. However, the forecast errors should provide a sense of the uncertainty around the future path of the federal funds rate generated by the uncertainty about the macroeconomic variables as well as additional adjustments to monetary policy that would be appropriate to offset the effects of shocks to the economy.

If at some point in the future the confidence interval around the federal funds rate were to extend below zero, it would be truncated at zero for purposes of the fan chart shown in figure 5; zero is the bottom of the lowest target range for the federal funds rate that has been adopted by the Committee in the past. This approach to the construction of the federal funds rate fan chart would be merely a convention; it would not have any implications for possible future policy decisions regarding the use of negative interest rates to provide additional monetary policy accommodation if doing so were appropriate. In such situations, the Committee could also employ other tools, including forward guidance and asset purchases, to provide additional accommodation.

While figures 4.A through 4.C provide information on the uncertainty around the economic projections, figure 1 provides information on the range of views across FOMC participants. A comparison of figure 1 with figures 4.A through 4.C shows that the dispersion of the projections across participants is much smaller than the average forecast errors over the past 20 years.

Abbreviations

AFE	advanced foreign economy
BOC	Bank of Canada
BOE	Bank of England
BOJ	Bank of Japan
CCP	central counterparty
COVID-19	coronavirus disease 2019
CPI	consumer price index
ECB	European Central Bank
ECI	employment cost index
EME	emerging market economy
EPOP ratio	employment-to-population ratio
FOMC	Federal Open Market Committee; also, the Committee
GDP	gross domestic product
IORB	interest rate on reserve balances
LFPR	labor force participation rate
MBS	mortgage-backed securities
MMF	money market fund
ON RRP	overnight reverse repurchase agreement
PCE	personal consumption expenditures
repo	repurchase agreement
SOMA	System Open Market Account
S&P	Standard & Poor's
TGA	Treasury General Account
USD	U.S. dollar
VIX	implied volatility for the S&P 500 index