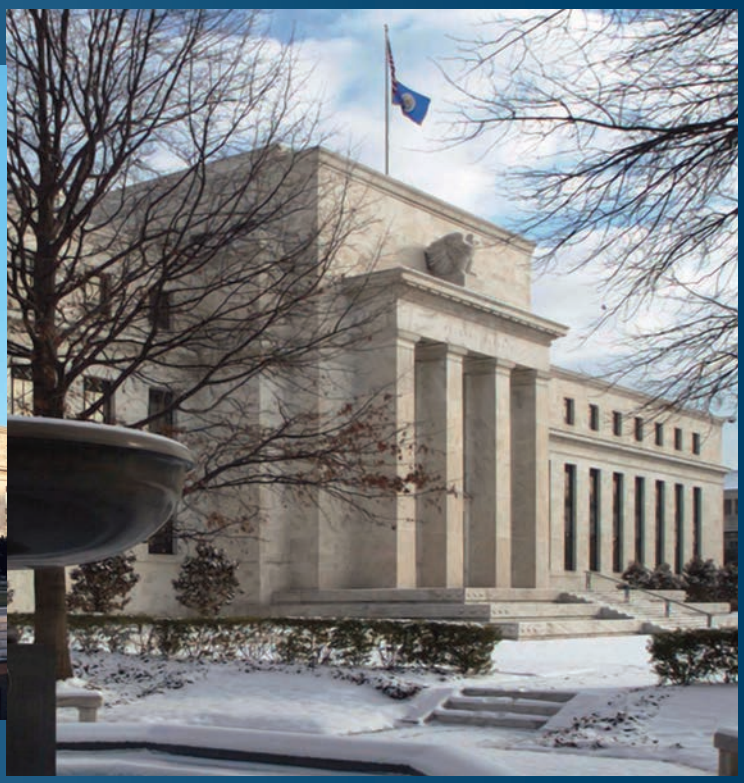
For use at 11:00 a.m., EST
February 22, 2019

Monetary Policy Report

February 22, 2019



Board of Governors of the Federal Reserve System

Letter of Transmittal

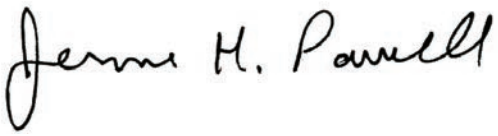
Board of Governors of the
Federal Reserve System

Washington, D.C., February 22, 2019

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, Chairman

Statement on Longer-Run Goals and Monetary Policy Strategy

Adopted effective January 24, 2012; as amended effective January 29, 2019

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.

Inflation, employment, and long-term interest rates fluctuate over time in response to economic and financial disturbances. Moreover, monetary policy actions tend to influence economic activity and prices with a lag. 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 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 would be concerned if inflation were running persistently above or below this objective. Communicating this symmetric inflation goal clearly to the public helps keep longer-term inflation expectations firmly anchored, thereby fostering price stability and moderate long-term interest rates and enhancing the Committee's ability to promote maximum employment in the face of significant economic disturbances. The maximum level of employment is largely determined by nonmonetary factors that affect the structure and dynamics of the labor market. These factors may change over time and may not be directly measurable. 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 maximum level of employment, recognizing that such assessments are necessarily uncertain and subject to revision. The Committee considers a wide range of indicators in making these assessments. Information about Committee participants' estimates of the longer-run normal rates of output growth and unemployment is published four times per year in the FOMC's Summary of Economic Projections. For example, in the most recent projections, the median of FOMC participants' estimates of the longer-run normal rate of unemployment was 4.4 percent.

In setting monetary policy, the Committee seeks to mitigate deviations of inflation from its longer-run goal and deviations of employment from the Committee's assessments of its maximum level. These objectives are generally complementary. However, under circumstances in which the Committee judges that the objectives are not complementary, it follows a balanced approach in promoting them, taking into account the magnitude of the 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 reaffirm these principles and to make adjustments as appropriate at its annual organizational meeting each January.

Contents

Summary 1
Economic and Financial Developments 1
Monetary Policy 2
Special Topics 3

Part 1: Recent Economic and Financial Developments 5
Domestic Developments 5
Financial Developments 22
International Developments 29

Part 2: Monetary Policy 33

Part 3: Summary of Economic Projections 47
The Outlook for Economic Activity 48
The Outlook for Inflation 50
Appropriate Monetary Policy 51
Uncertainty and Risks 51

Abbreviations 65

List of Boxes

Employment Disparities between Rural and Urban Areas 10
Developments Related to Financial Stability 26
Monetary Policy Rules and Systematic Monetary Policy 36
The Role of Liabilities in Determining the Size of the Federal Reserve's Balance Sheet 41
Federal Reserve Transparency: Rationale and New Initiatives 45
Forecast Uncertainty 62

Note: This report reflects information that was publicly available as of noon EST on February 21, 2019. Unless otherwise stated, the time series in the figures extend through, for daily data, February 20, 2019; for monthly data, January 2019; and, for quarterly data, 2018:Q4. 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.

For figures 16 and 34, note that the S&P 500 Index and the Dow Jones Bank Index are products of S&P Dow Jones Indices LLC and/or its affiliates and have been licensed for use by the Board. Copyright © 2019 S&P Dow Jones Indices LLC, a division of S&P Global, and/or its affiliates. All rights reserved. Redistribution, reproduction, and/or photocopying in whole or in part are prohibited without written permission of S&P Dow Jones Indices LLC. For more information on any of S&P Dow Jones Indices LLC's indices please visit www.spdji.com. S&P® is a registered trademark of Standard & Poor's Financial Services LLC, and Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC. Neither S&P Dow Jones Indices LLC, Dow Jones Trademark Holdings LLC, their affiliates nor their third party licensors make any representation or warranty, express or implied, as to the ability of any index to accurately represent the asset class or market sector that it purports to represent, and neither S&P Dow Jones Indices LLC, Dow Jones Trademark Holdings LLC, their affiliates nor their third party licensors shall have any liability for any errors, omissions, or interruptions of any index or the data included therein.

Summary

Economic activity in the United States appears to have increased at a solid pace, on balance, over the second half of 2018, and the labor market strengthened further. Inflation has been near the Federal Open Market Committee's (FOMC) longer-run objective of 2 percent, aside from the transitory effects of recent energy price movements. In this environment, the FOMC judged that, on balance, current and prospective economic conditions called for a further gradual removal of policy accommodation. In particular, the FOMC raised the target range for the federal funds rate twice in the second half of 2018, putting its level at 2¼ to 2½ percent following the December meeting. In light of softer global economic and financial conditions late in the year and muted inflation pressures, the FOMC indicated at its January meeting that it will be patient as it determines what future adjustments to the federal funds rate may be appropriate to support the Committee's congressionally mandated objectives of maximum employment and price stability.

Economic and Financial Developments

The labor market. The labor market has continued to strengthen since the middle of last year. Payroll employment growth has remained strong, averaging 224,000 per month since June 2018. The unemployment rate has been about unchanged over this period, averaging a little under 4 percent—a low level by historical standards—while the labor force participation rate has moved up despite the ongoing downward influence from an aging population. Wage growth has also picked up recently.

Inflation. Consumer price inflation, as measured by the 12-month change in the price index for personal consumption expenditures, moved down from a little above the FOMC's objective of 2 percent in the middle of last year to an estimated 1.7 percent in December, restrained by recent declines in consumer energy prices. The 12-month measure of inflation that excludes food and energy items (so-called core inflation), which historically has been a better indicator of where overall inflation will be in the future than the headline measure that includes those items, is estimated to have been 1.9 percent in December—up ¼ percentage point from a year ago. Survey-based measures of longer-run inflation expectations have generally been stable, though market-based measures of inflation compensation have moved down some since the first half of 2018.

Economic growth. Available indicators suggest that real gross domestic product (GDP) increased at a solid rate, on balance, in the second half of last year and rose a little under 3 percent for the year as a whole—a noticeable pickup from the pace in recent years. Consumer spending expanded at a strong rate for most of the second half, supported by robust job gains, past increases in household wealth, and higher disposable income due in part to the Tax Cuts and Jobs Act, though spending appears to have weakened toward year-end. Business investment grew as well, though growth seems to have slowed somewhat from a sizable gain in the first half. However, housing market activity declined last year amid rising mortgage interest rates and higher material and labor costs. Indicators of both consumer and business sentiment remain at favorable levels, but some measures have softened since the fall, likely a reflection of financial market volatility and increased concerns about the global outlook.

Financial conditions. Domestic financial conditions for businesses and households have become less supportive of economic growth since July. Financial market participants' appetite for risk deteriorated markedly in the latter part of last year amid investor concerns

about downside risks to the growth outlook and rising trade tensions between the United States and China. As a result, Treasury yields and risky asset prices declined substantially between early October and late December in the midst of heightened volatility, although those moves partially retraced early this year. On balance since July, the expected path of the federal funds rate over the next several years shifted down, long-term Treasury yields and mortgage rates moved lower, broad measures of U.S. equity prices increased somewhat, and spreads of yields on corporate bonds over those on comparable-maturity Treasury securities widened modestly. Credit to large nonfinancial firms remained solid in the second half of 2018; corporate bond issuance slowed considerably toward the end of the year but has rebounded since then. Despite increases in interest rates for consumer loans, consumer credit expanded at a solid pace, and financing conditions for consumers largely remain supportive of growth in household spending. The foreign exchange value of the U.S. dollar strengthened slightly against the currencies of the U.S. economy's trading partners.

Financial stability. The U.S. financial system remains substantially more resilient than in the decade preceding the financial crisis. Pressures associated with asset valuations eased compared with July 2018, particularly in the equity, corporate bond, and leveraged loan markets. Regulatory capital and liquidity ratios of key financial institutions, including large banks, are at historically high levels. Funding risks in the financial system are low relative to the period leading up to the crisis. Borrowing by households has risen roughly in line with household incomes and is concentrated among prime borrowers. While debt owed by businesses is high and credit standards—especially within segments of the loan market focused on lower-rated or unrated firms—deteriorated in the second half of 2018, issuance of these loans has slowed more recently.

International Developments. Foreign economic growth stepped down significantly last year from the brisk pace in 2017. Aggregate growth in the advanced foreign economies slowed markedly, especially in the euro area, and several Latin American economies continued to underperform. The pace of economic activity in China slowed noticeably in the second half of 2018. Inflation pressures in major advanced foreign economies remain subdued, prompting central banks to maintain accommodative monetary policies.

Financial conditions abroad tightened in the second half of 2018, in part reflecting political uncertainty in Europe and Latin America, trade policy developments in the United States and its trading partners, as well as concerns about moderating global growth. Although financial conditions abroad improved in recent weeks, alongside those in the United States, on balance since July 2018, global equity prices were lower, sovereign yields in many economies declined, and sovereign credit spreads in the European periphery and the most vulnerable emerging market economies increased somewhat. Market-implied paths of policy rates in advanced foreign economies generally edged down.

Monetary Policy

Interest rate policy. As the labor market continued to strengthen and economic activity expanded at a strong rate, the FOMC increased the target range for the federal funds rate gradually over the second half of 2018. Specifically, the FOMC decided to raise the federal funds rate in September and in December, bringing it to the current range of 2¼ to 2½ percent.

In December, against the backdrop of increased concerns about global growth, trade tensions, and volatility in financial markets, the Committee indicated it would monitor global economic and financial developments and assess their implications for

the economic outlook. In January, the FOMC stated that it continued to view sustained expansion of economic activity, strong labor market conditions, and inflation near the Committee's 2 percent objective as the most likely outcomes. Nonetheless, in light of global economic and financial developments and muted inflation pressures, the Committee noted that it will be patient as it determines what future adjustments to the target range for the federal funds rate may be appropriate to support these outcomes. FOMC communications continued to emphasize that the Committee's approach to setting the stance of policy should be importantly guided by the implications of incoming data for the economic outlook. In particular, the timing and size of future adjustments to the target range for the federal funds rate will depend on the Committee's assessment of realized and expected economic conditions relative to its maximum-employment objective and its symmetric 2 percent inflation objective.

Balance sheet policy. The FOMC continued to implement the balance sheet normalization program that has been under way since October 2017. Specifically, the FOMC reduced its holdings of Treasury and agency securities in a gradual and predictable manner by reinvesting only principal payments it received from these securities that exceeded gradually rising caps. Consequently, the Federal Reserve's total assets declined by about $260 billion since the middle of last year, ending the period close to $4 trillion.

Together with the January postmeeting statement, the Committee released an updated Statement Regarding Monetary Policy Implementation and Balance Sheet Normalization to provide additional information about its plans to implement monetary policy over the longer run. In particular, the FOMC stated that it intends to continue to implement monetary policy in a regime with an ample supply of reserves so that active management of reserves is not required. In addition, the Committee noted that it is prepared to adjust any of the details for completing balance sheet normalization in light of economic and financial developments.

Special Topics

Labor markets in urban versus rural areas. The recovery in the U.S. labor market since the end of the recession has been uneven across the country, with rural areas showing markedly less improvement than cities and their surrounding metropolitan areas. In particular, the employment-to-population ratio and labor force participation rate in rural areas remain well below their pre-recession levels, while the recovery in urban areas has been more complete. Differences in the mix of industries in rural and urban areas—a larger share of manufacturing in rural areas and a greater concentration of fast-growing services industries in urban areas—have contributed to the stronger rebound in urban areas. (See the box "Employment Disparities between Rural and Urban Areas" in Part 1.)

Monetary policy rules. In evaluating the stance of monetary policy, policymakers consider a wide range of information on the current economic conditions and the outlook. Policymakers also consult prescriptions for the policy interest rate derived from a variety of policy rules for guidance, without mechanically following the prescriptions of any specific rule. The FOMC's approach for conducting systematic monetary policy provides sufficient flexibility to address the intrinsic complexities and uncertainties in the economy while keeping monetary policy predictable and transparent. (See the box "Monetary Policy Rules and Systematic Monetary Policy" in Part 2.)

Balance sheet normalization and monetary policy implementation. Since the financial crisis, the size of the Federal Reserve's balance sheet has been determined in large part by its decisions about asset purchases for

economic stimulus, with growth in total assets primarily matched by higher reserve balances of depository institutions. However, liabilities other than reserves have grown significantly over the past decade. In the longer run, the size of the balance sheet will be importantly determined by the various factors affecting the demand for Federal Reserve liabilities. (See the box "The Role of Liabilities in Determining the Size of the Federal Reserve's Balance Sheet" in Part 2.)

Federal Reserve transparency and accountability. For central banks, transparency provides an essential basis for accountability. Transparency also enhances the effectiveness of monetary policy and a central bank's efforts to promote financial stability. For these reasons, the Federal Reserve uses a wide variety of communications to explain its policymaking approach and decisions as clearly as possible. Through several new initiatives, including a review of its monetary policy framework that will include outreach to a broad range of stakeholders, the Federal Reserve seeks to enhance transparency and accountability regarding how it pursues its statutory responsibilities. (See the box "Federal Reserve Transparency: Rationale and New Initiatives" in Part 2.)

Part 1
Recent Economic and Financial Developments

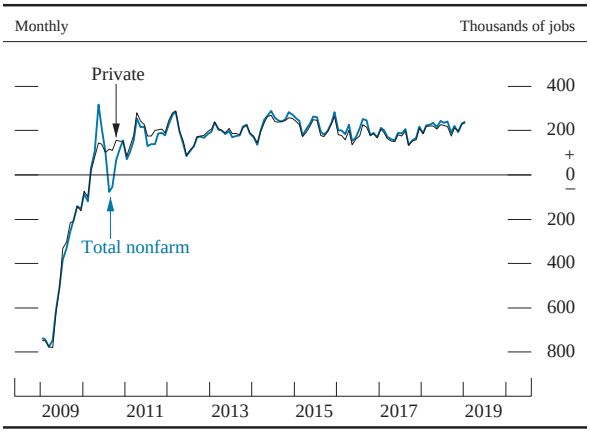
Domestic Developments

The labor market strengthened further during the second half of 2018 and early this year . . .

Payroll employment gains have remained strong, averaging 224,000 per month since June 2018 (figure 1). This pace is similar to the pace in the first half of last year, and it is faster than the average pace of job gains in 2016 and 2017.

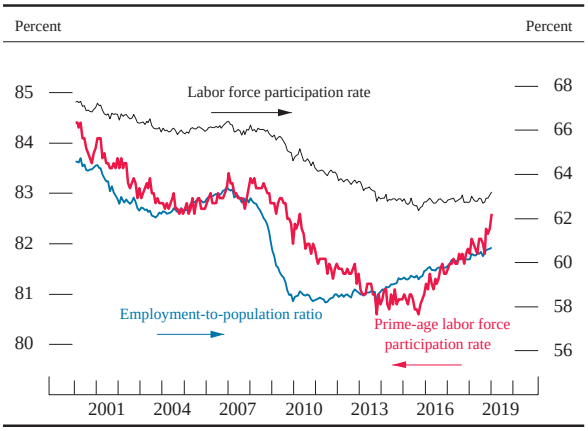
The strong pace of job gains over this period has primarily been manifest in a rising labor force participation rate (LFPR)—the share of the population that is either working or actively looking for work—rather than a declining unemployment rate.[1] Since June 2018, the LFPR has moved up about ¼ percentage point and was 63.2 percent in January—a bit higher than the narrow range it has maintained in recent years (figure 2). The improvement is especially notable because the aging of the population—and, in particular, the movement of members of the baby-boom cohort into their retirement years—has otherwise imparted a downward influence on the LFPR. Indeed, the LFPR for individuals between 25 and 54 years old—which is much less sensitive to population aging—has

1. Net change in payroll employment



Note: The data are 3-month moving averages.
Source: Bureau of Labor Statistics via Haver Analytics.

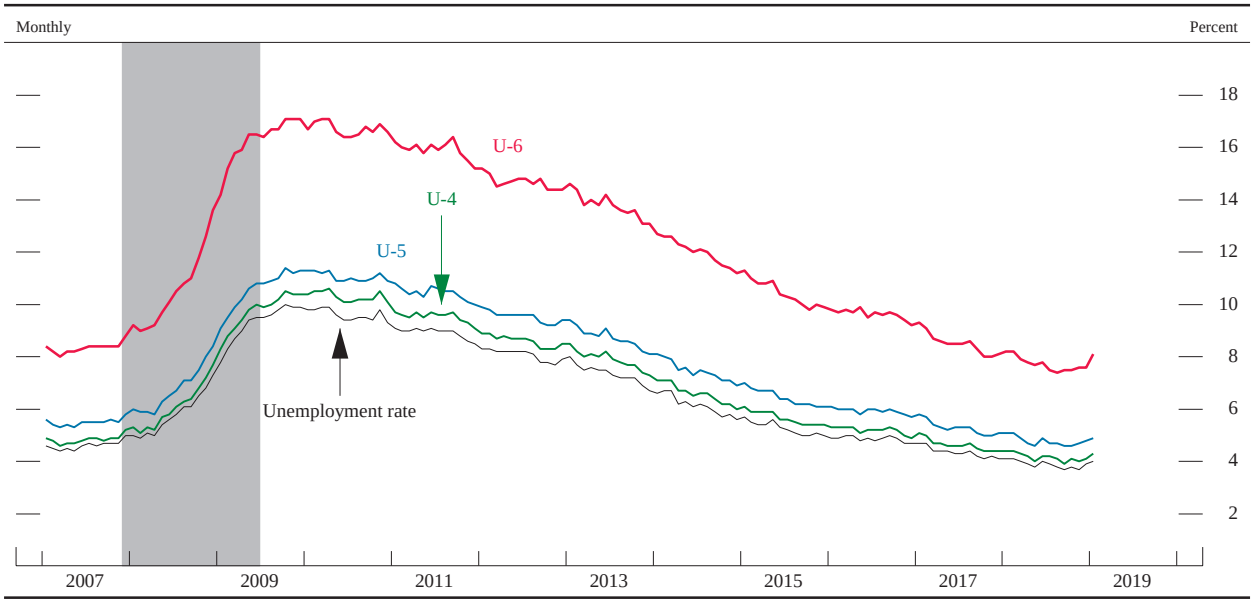
2. Labor force participation rates and employment-to-population ratio



Note: The data are monthly. The prime-age labor force participation rate is a percentage of the population aged 25 to 54. 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.

1. The observed pace of payroll job gains would have been sufficient to push the unemployment rate lower had the LFPR not risen. Indeed, monthly payroll gains in the range of 115,000 to 145,000 appear consistent with an unchanged unemployment rate around 4.0 percent and an unchanged LFPR around 62.9 percent (which are the June 2018 values of these rates). If instead the LFPR were declining 0.2 percentage point per year—roughly the influence of population aging—the range of job gains needed to maintain an unchanged unemployment rate would be about 40,000 per month lower. There is considerable uncertainty around these estimates, as the difference between monthly payroll gains and employment changes from the Current Population Survey (the source of the unemployment rate and LFPR) can be quite volatile over short periods.

3. Measures of labor underutilization



NOTE: Unemployment rate measures total unemployed as a percentage of the labor force. U-4 measures total unemployed plus discouraged workers, as a percentage of the labor force plus discouraged workers. Discouraged workers are a subset of marginally attached workers who are not currently looking for work because they believe no jobs are available for them. U-5 measures total unemployed plus all marginally attached to the labor force, as a percentage of the labor force plus persons marginally attached to the labor force. Marginally attached workers are not in the labor force, want and are available for work, and have looked for a job in the past 12 months. U-6 measures total unemployed plus all marginally attached workers plus total employed part time for economic reasons, as a percentage of the labor force plus all marginally attached workers. The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.

SOURCE: Bureau of Labor Statistics via Haver Analytics.

improved considerably more than the overall LFPR, including a ½ percentage point rise since June 2018.[2]

At the same time, the unemployment rate has remained little changed and has generally been running a little under 4 percent.[3] Nevertheless, the unemployment rate remains at a historically low level and is ½ percentage point below the median of the Federal Open Market Committee (FOMC) participants' estimates of its longer-run normal level (figure 3).[4] Combining the movements in both unemployment and labor force participation,

2. Since 2015, the increase in the prime-age LFPR for women was nearly 2 percentage points, while the increase for men was only about 1 percentage point. In January, the LFPR for prime-age women was slightly above where it stood in 2007, whereas for men it was still about 2 percentage points below.

3. The unemployment rate in January was 4.0 percent, boosted somewhat by the partial government shutdown, as some furloughed federal workers and temporarily laid-off federal contractors are treated as unemployed in the household employment survey.

4. See the Summary of Economic Projections in Part 3 of this report.

the employment-to-population ratio for individuals 16 and over—the share of that segment of the population who are working—was 60.7 percent in January and has been gradually increasing since 2011.

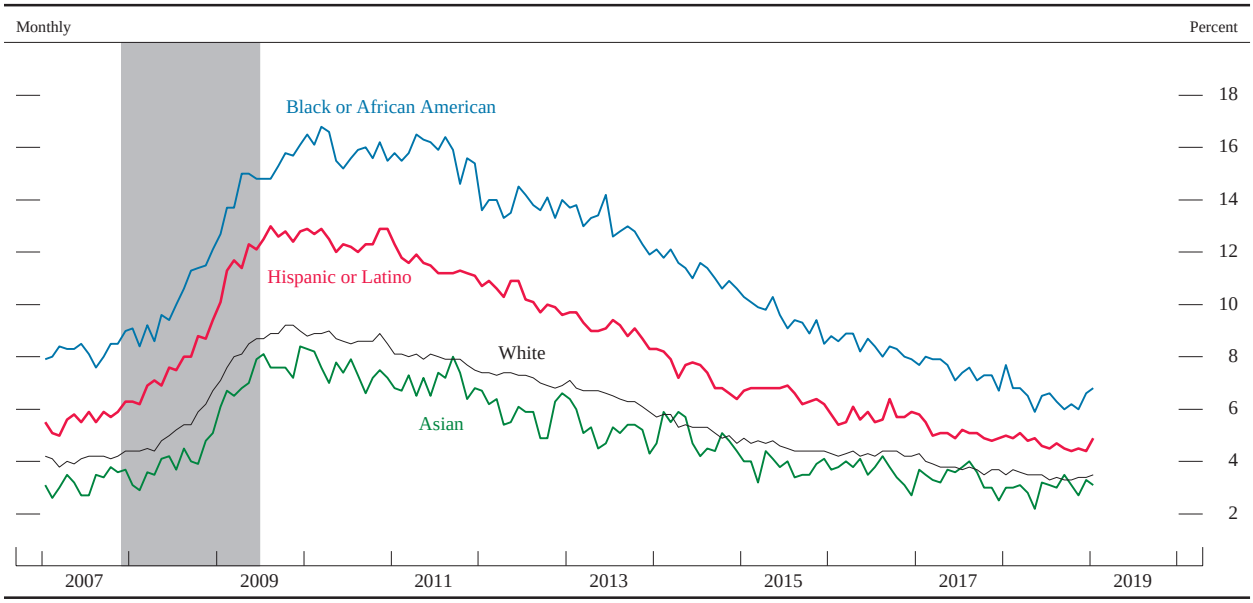
Other indicators are also consistent with a strong labor market. As reported in the Job Openings and Labor Turnover Survey (JOLTS), the job openings rate has moved higher since the first half of 2018, and in December, it was at its highest level since the data began in 2000. The quits rate in the JOLTS is also near the top of its historical range, an indication that workers have become more confident that they can successfully switch jobs when they wish to. In addition, the JOLTS layoff rate has remained low, and the number of people filing initial claims for unemployment insurance benefits has also remained low. Survey evidence indicates that households perceive jobs as plentiful and that businesses see vacancies as hard to fill.

. . . and unemployment rates have fallen for all major demographic groups over the past several years

The flattening in unemployment since mid-2018 has been evident across racial and ethnic groups (figure 4). Even so, over the past several years, the decline in the unemployment rates for blacks or African Americans and for Hispanics has been particularly notable, and the unemployment rates for these groups are near their lowest readings since these series began in the early 1970s. Differences in unemployment rates across ethnic and racial groups have narrowed in recent years, as they typically do during economic expansions, after having widened during the recession; on net, unemployment rates for African Americans and Hispanics remain substantially above those for whites and Asians, with differentials generally a bit below pre-recession levels.

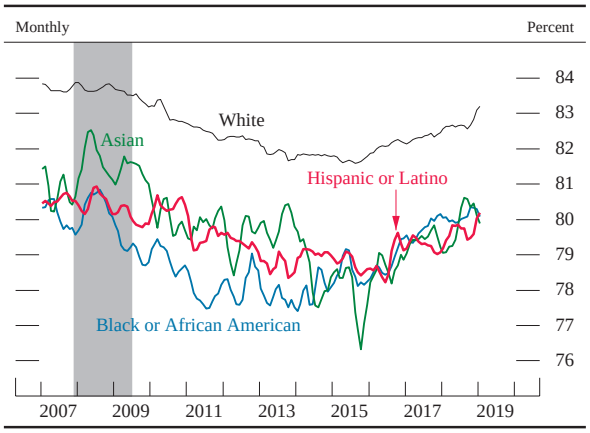
The rise in LFPRs for prime-age individuals over the past few years has also been apparent in each of these racial and ethnic groups. Nonetheless, the LFPR for whites remains

4. 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. The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.
SOURCE: Bureau of Labor Statistics via Haver Analytics.

5. Prime-age labor force participation rate by race and ethnicity



NOTE: The prime-age labor force participation rate is a percentage of the population aged 25 to 54. Persons whose ethnicity is identified as Hispanic or Latino may be of any race. The data are seasonally adjusted by Board staff and are 3-month moving averages. The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.
SOURCE: Bureau of Labor Statistics.

higher than that for other groups (figure 5). Important differences in economic outcomes persist across other characteristics as well (see, for example, the box "Employment Disparities between Rural and Urban Areas," which highlights that there has been less improvement since 2010 in the LFPR and employment-to-population ratio for prime-age individuals in rural areas compared with urban areas).

Increases in labor compensation have picked up recently but remain moderate by historical standards . . .

Most available indicators suggest that growth of hourly compensation has stepped up further since June 2018 after having firmed somewhat over the past few years; however, growth rates remain moderate compared with those that prevailed in the decade before the recession. Compensation per hour in the business sector—a broad-based measure of wages and benefits, but one that is quite volatile—rose 2¼ percent over the four quarters ending in 2018:Q3, about the same as the average annual increase over the past seven years or so (figure 6). The employment cost index, a less volatile measure of both wages and the cost

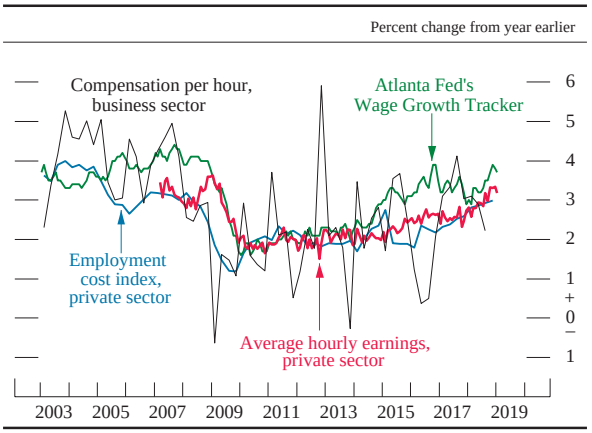
to employers of providing benefits, increased 3 percent over the same period, while average hourly earnings—which do not take account of benefits—increased 3.2 percent over the 12 months ending in January of this year; the annual increases in both of these measures were the strongest in nearly 10 years. The measure of wage growth computed by the Federal Reserve Bank of Atlanta that tracks median 12-month wage growth of individuals reporting to the Current Population Survey showed an increase of 3.7 percent in January, near the upper end of its readings in the past three years and well above the average increase in the preceding few years.[5]

. . . and have likely been restrained by slow growth of labor productivity over much of the expansion

These moderate rates of compensation gains likely reflect the offsetting influences of a strong labor market and productivity growth that has been weak through much of the expansion. From 2008 to 2017, labor productivity increased a little more than 1 percent per year, on average, well below the average pace from 1996 to 2007 of nearly 3 percent and also below the average gain in the 1974–95 period (figure 7). Although considerable debate remains about the reasons for the slowdown over this period, the weakness in productivity growth may be partly attributable to the sharp pullback in capital investment during the most recent recession and the relatively slow recovery that followed. More recently, however, labor productivity is estimated to have increased almost 2 percent at an annual rate in the first three quarters of 2018—still moderate relative to earlier periods, but its fastest three-quarter gain since 2010. While it is uncertain whether this faster rate of growth will persist, a sustained pickup in productivity growth, as well as additional labor market strengthening, would likely support stronger gains in labor compensation.

5. The Atlanta Fed's measure differs from others in that it measures the wage growth only of workers who were employed both in the current survey month and 12 months earlier.

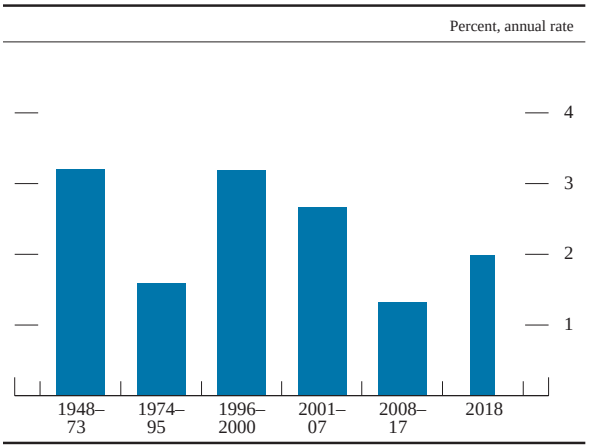
6. Measures of change in hourly compensation



NOTE: Business-sector compensation is on a 4-quarter percentage change basis and extends through 2018:Q3. 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 and begin in March 2007; 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 via Haver Analytics; Federal Reserve Bank of Atlanta, Wage Growth Tracker.

7. 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. The bar for 2018 reports growth from 2017:Q4 through 2018:Q3 at an annual rate.

SOURCE: Bureau of Labor Statistics via Haver Analytics.

Employment Disparities between Rural and Urban Areas

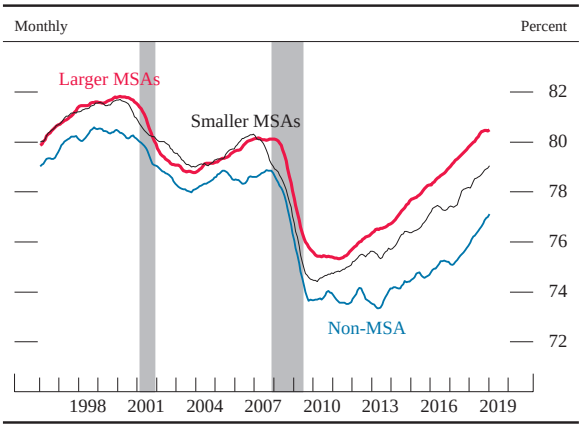
The U.S. labor market has recovered substantially since 2010. For people in their prime working years (ages 25 to 54), the unemployment rate has moved down steadily to levels below the previous business cycle peak in 2007, the labor force participation rate (LFPR) has retraced much of its decline, and the share of the population who are employed—known as the employment-to-population ratio, or EPOP ratio—has returned to about its level before the recession. However, the labor market recovery has been uneven across the country, with "rural" (or nonmetro) areas showing markedly less improvement than cities and their surroundings (metro areas).[1]

The extent of the initial decline and subsequent improvement in the EPOP ratio varied by metropolitan status. The gap between the EPOP ratios in rural and larger urban areas is now noticeably wider than it was before the recession, and the cyclical recovery started later in rural areas. Specifically, as shown in figure A, the prime-age EPOP is now slightly above its pre-recession level in larger urban areas, whereas it is just below its pre-recession average in smaller urban areas and much below its pre-recession level in rural areas.[2]

The EPOP ratio can usefully be viewed as summarizing both the LFPR—that is, the share of the population that either has a job or is actively looking for work—and the unemployment rate, which measures the share of the labor force without a job and actively searching.[3] The divergence in rural and urban EPOP ratios during the economic expansion almost entirely reflects divergences in LFPRs rather than in unemployment rates (figures B and C). In particular, the rural and urban unemployment rates have tracked each

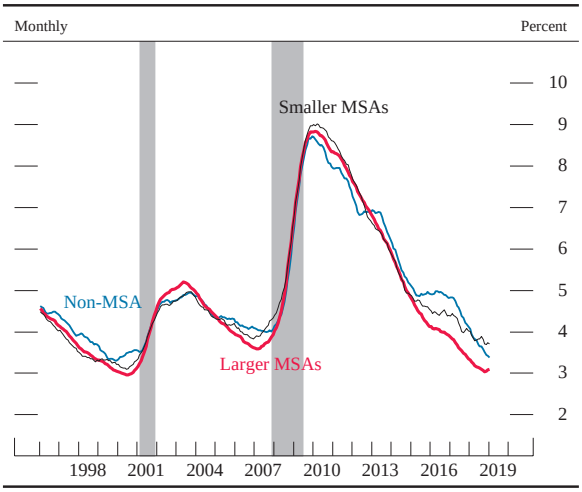
(continued)

A. Employment-to-population ratios



NOTE: Data are for persons aged 25 to 54. Larger metropolitan statistical areas (MSAs) consist of 500,000 people or more, and smaller MSAs consist of 100,000 to 500,000 people. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.
SOURCE: References listed in box note 2.

B. Unemployment rates



NOTE: Data are for persons aged 25 to 54. Larger metropolitan statistical areas (MSAs) consist of 500,000 people or more, and smaller MSAs consist of 100,000 to 500,000 people. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.
SOURCE: References listed in box note 2.

1. For convenience, we refer to metropolitan counties with strong commuting ties to an urbanized center as "urban" and nonmetropolitan counties that lack such ties as "rural."
2. For all figures in this discussion, the raw data are from the U.S. Census Bureau, Current Population Survey; note that the Bureau of Labor Statistics is involved in the survey process for the Current Population Survey. Calculations of the series shown are as described in Alison Weingarden (2017), "Labor Market Outcomes in Metropolitan and Non-metropolitan Areas: Signs of Growing Disparities," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, September 25), www.federalreserve.gov/econres/notes/feds-notes/labor-market-outcomes-in-metropolitan-and-non-metropolitan-areas-signs-of-growing-disparities-20170925.htm. The figures show 12-month moving averages of the monthly time-series.
3. Specifically, the EPOP ratio equals (LFPR) x (1 – unemployment rate), where LFPR is defined as "labor force/population" and the unemployment rate is defined as "persons unemployed/labor force." These numbers are multiplied by 100 for presentation purposes in the figures.

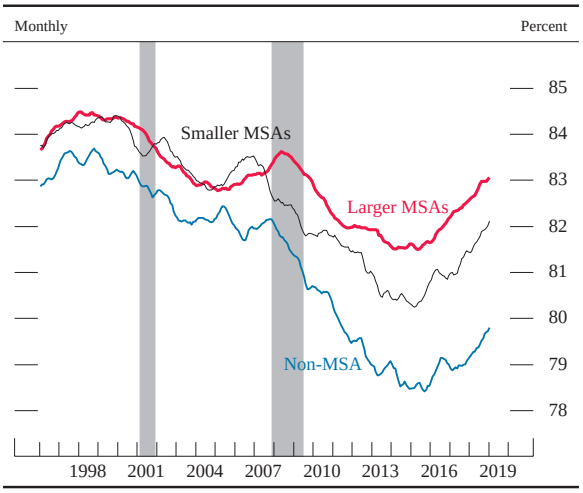
other fairly closely in this expansion, though they have diverged a little in the past few years. In contrast, the difference between rural and urban LFPRs has widened significantly over the past decade.

On average, people in rural areas tend to have fewer years of schooling than people in urban areas, and because the EPOP ratio tends to be lower for individuals with less education, this demographic difference has contributed to the persistent rural–urban divide. However, these educational differences do not appear responsible for the fact that the gap between rural and urban EPOP ratios have widened. Figure D shows that, in recent years, rural and urban EPOP ratios diverged substantially even within educational categories, similar to the divergence in EPOPs more generally. The left panel of figure D shows that the EPOP ratio of non-college-educated adults ages 25 to 54 has been much lower in rural areas than in urban ones beginning in 2012. The right panel of figure D shows that the EPOP ratio of college-educated adults used to be *higher* in rural areas than in urban ones, but that is no longer so. Thus, the recent widening of the rural–urban disparity in EPOP ratios has not been primarily driven by differences in years of education.

Nevertheless, because the recovery in the EPOP ratio for non-college-educated adults in rural areas

(continued on next page)

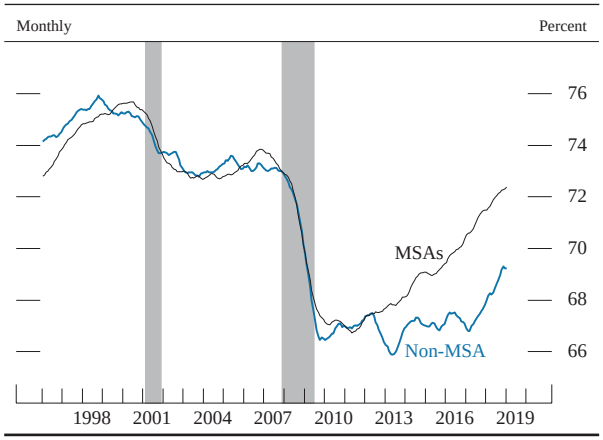
C. Labor force participation rates



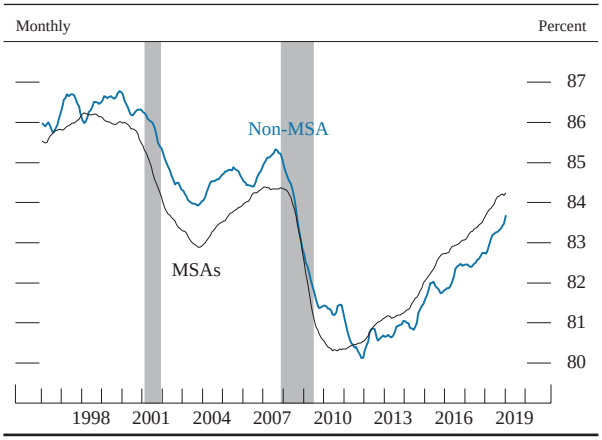
NOTE: Data are for persons aged 25 to 54. Larger metropolitan statistical areas (MSAs) consist of 500,000 people or more, and smaller MSAs consist of 100,000 to 500,000 people. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.
SOURCE: References listed in box note 2.

D. Employment-to-population ratios

Noncollege adults



College adults



NOTE: Data are for persons aged 25 to 54. MSA is metropolitan statistical area. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.
SOURCE: References listed in box note 2.

Employment Disparities *(continued)*

has been particularly weak, it is likely that broader macroeconomic trends—including the ongoing shift in labor demand that has favored individuals with more education—have had more adverse consequences for the populations in rural areas than in urban areas. For example, manufacturing, where employment has stagnated, accounts for a larger share of employment in rural areas than in urban areas, while fast-growing services industries, such as health-care and professional services that tend to employ workers with more education, are more concentrated in urban areas. Indeed, employment in manufacturing has not yet fully recovered from the recession. And, despite the strength in the past two years, the share of total employment in manufacturing has remained near its post-recession low.

The fact that most of the EPOP divergence is seen in labor force participation rather than unemployment rates suggests that many rural workers who experienced a permanent job loss, perhaps due to a factory closing, decided to eventually exit the labor force rather than continue their job search. Some individuals who had been working, despite ongoing health problems, may have responded to job loss and poor reemployment opportunities by applying for Social Security Disability Insurance (SSDI) benefits, and, in fact, take-up increased a little more in rural areas than it did in urban ones over the past decade.[4]

When regions are faced with adverse changes in labor demand, some residents may respond by migrating to more prosperous areas. The more out-migration that occurs from areas with relatively fewer labor market opportunities, the smaller should be the observed decline in local-area EPOPs.[5] However, some research suggests that the average migration response to adverse demand shocks has decreased in recent decades, which could amplify the labor market effects of local shocks and lead to persistent disparities in EPOP ratios across areas.[6]

---

4. This increase could reflect growing public health problems (which expands the pool of individuals who qualify for SSDI) and sluggish labor demand in rural areas (which increases the propensity of individuals to apply for SSDI benefits).

5. Although a higher rate of rural out-migration would help close the EPOP gap, depopulation might exacerbate economic difficulties for those who remain in rural areas.

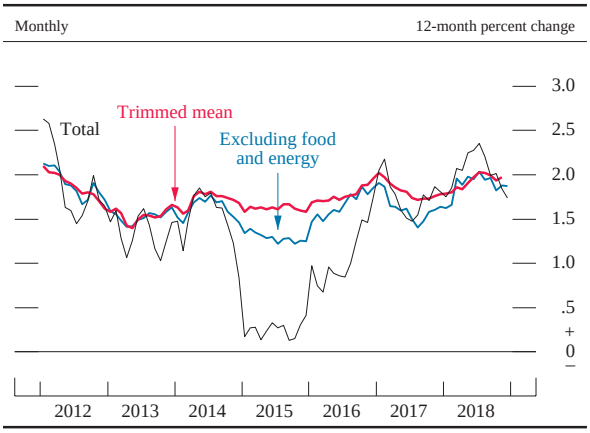
6. See, for example, Mai Dao, Davide Furceri, and Prakash Loungani (2017), "Regional Labor Market Adjustment in the United States: Trend and Cycle," *Review of Economics and Statistics*, vol. 99 (May), pp. 243–57.

Price inflation is close to 2 percent

Consumer price inflation has fluctuated around the FOMC's objective of 2 percent, largely reflecting movements in energy prices. As measured by the 12-month change in the price index for personal consumption expenditures (PCE), inflation is estimated to have been 1.7 percent in December after being above 2 percent for much of 2018 (figure 8).[6] Core PCE inflation—that is, inflation excluding consumer food and energy prices—is estimated to have been 1.9 percent in December. Because food and energy prices are often quite volatile, core inflation typically provides a better indication than the total measure of where overall inflation will be in the future. Total inflation was below core inflation for the year as a whole not only because of softness in energy prices, but also because food price inflation has remained relatively low.

Core inflation has moved up since 2017, when inflation was held down by some unusually large price declines in a few relatively small categories of spending, such as mobile phone services. The trimmed mean PCE price index, produced by the Federal Reserve Bank of Dallas, provides an alternative way to purge inflation of transitory influences, and it may be less sensitive than the core index to idiosyncratic price movements such as those noted earlier. The 12-month change in this measure did not decline as much as core PCE inflation in 2017, and it was 2.0 percent in November.[7] Inflation likely has been increasingly supported by the strong labor market in an environment of stable inflation expectations; inflation last year was

8. Change in the price index for personal consumption expenditures



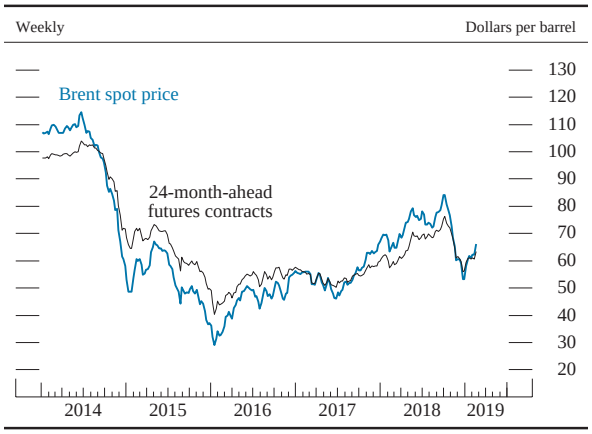
NOTE: The data for total and excluding food and energy extend through December 2018; final values are staff estimates. The trimmed data extend through November 2018.

SOURCE: For trimmed mean, Federal Reserve Bank of Dallas; for all else, Bureau of Economic Analysis; all via Haver Analytics.

6. The partial government shutdown has delayed publication of the Bureau of Economic Analysis's estimate for PCE price inflation in December, and the numbers reported here are estimates based on the December consumer and producer price indexes.

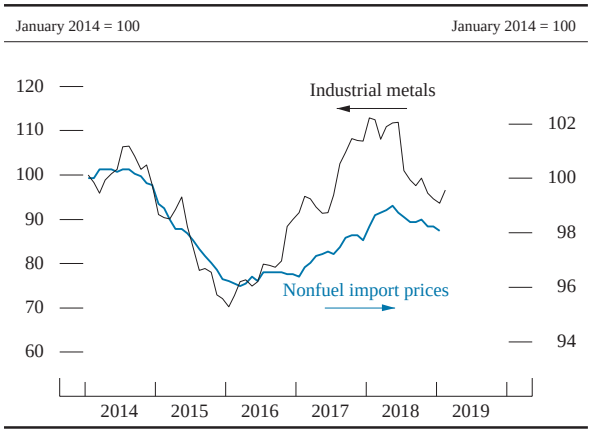
7. The trimmed mean index excludes whichever prices showed the largest increases or decreases in a given month. Note that over the past 20 years, changes in the trimmed mean index have averaged about ¼ percentage point above core PCE inflation and 0.1 percentage point above total PCE inflation.

9. Spot and futures prices for crude oil



NOTE: The data are weekly averages of daily data and extend through February 20, 2019.
SOURCE: ICE Brent Futures via Bloomberg.

10. Nonfuel import prices and industrial metals indexes



NOTE: The data for nonfuel import prices are monthly. The data for industrial metals are a monthly average of daily data and extend through February 20, 2019.
SOURCE: For nonfuel import prices, Bureau of Labor Statistics; for industrial metals, S&P GSCI Industrial Metals Spot Index via Haver Analytics.

also boosted slightly by the tariffs that were imposed throughout 2018.

Oil prices have dropped markedly in recent months . . .

As noted, the slower pace of total inflation in late 2018 relative to core inflation largely reflected softening in consumer energy prices toward the end of the year. After peaking at about $86 per barrel in early October, the price of crude oil subsequently fell sharply and has averaged around $60 per barrel this year (figure 9). The recent decline in oil prices has led to moderate reductions in the cost of gasoline and heating oil. Supply factors, including surging oil production in Saudi Arabia, Russia, and the United States, appear to be most responsible for the recent price declines, but concerns about weaker global growth likely also played a role.

. . . while prices of imports other than energy have also declined

After climbing steadily since their early 2016 lows, nonfuel import prices peaked in May 2018 and declined for much of the rest of 2018 in response to dollar appreciation, lower foreign inflation, and declines in commodity prices. In particular, metal prices fell markedly in the second half of 2018, partly reflecting concerns about prospects for the global economy (figure 10). Nonfuel import prices, before accounting for the effects of tariffs on the price of imported goods, had roughly a neutral influence on U.S. price inflation in 2018.

Survey-based measures of inflation expectations have been stable . . .

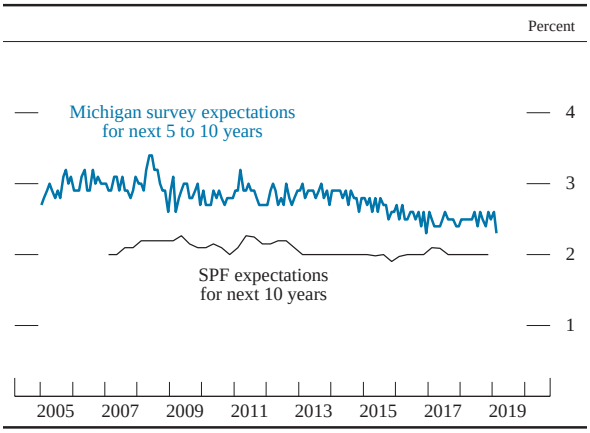
Expectations of inflation likely influence actual inflation by affecting wage- and price-setting decisions. Survey-based measures of inflation expectations at medium- and longer-term horizons have remained generally stable over the second half of 2018. In the Survey of Professional Forecasters, conducted by the Federal Reserve Bank of Philadelphia, the median expectation for the annual rate of increase in the PCE price index over the

next 10 years has been very close to 2 percent for the past several years (figure 11). In the University of Michigan Surveys of Consumers, the median value for inflation expectations over the next 5 to 10 years has been around 2½ percent since the end of 2016, though this level is about ¼ percentage point lower than had prevailed through 2014. In contrast, in the Survey of Consumer Expectations, conducted by the Federal Reserve Bank of New York, the median of respondents' expected inflation rate three years hence—while relatively stable around 3 percent since early 2018—is nonetheless at the top of the range it has occupied over the past couple of years.

. . . while market-based measures of inflation compensation have come down since the first half of 2018

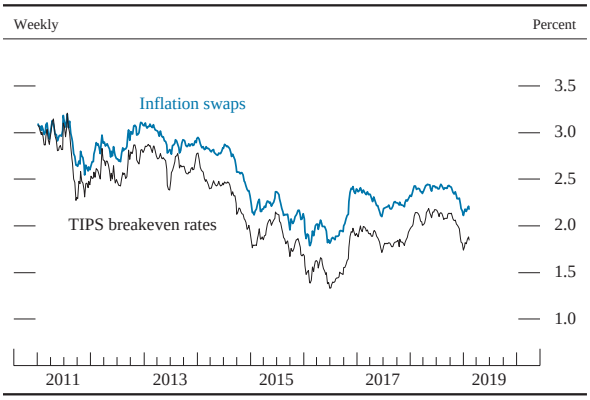
Inflation expectations can also be gauged by market-based measures of inflation compensation. However, the inference is not straightforward, because market-based measures can be importantly affected by changes in premiums that provide compensation for bearing inflation and liquidity risks. Measures of longer-term inflation compensation—derived either from differences between yields on nominal Treasury securities and those on comparable-maturity Treasury Inflation-Protected Securities (TIPS) or from inflation swaps—moved down in the fall and are below levels that prevailed earlier in 2018 (figure 12).[8] The TIPS-based measure of 5-to-10-year-forward inflation compensation and the analogous measure from inflation swaps are now about 1¾ percent

11. Median inflation expectations



NOTE: The Michigan survey data are monthly and extend through February 2019; the February data are preliminary. The SPF data for inflation expectations for personal consumption expenditures are quarterly and begin in 2007:Q1.
SOURCE: University of Michigan Surveys of Consumers; Federal Reserve Bank of Philadelphia, Survey of Professional Forecasters (SPF).

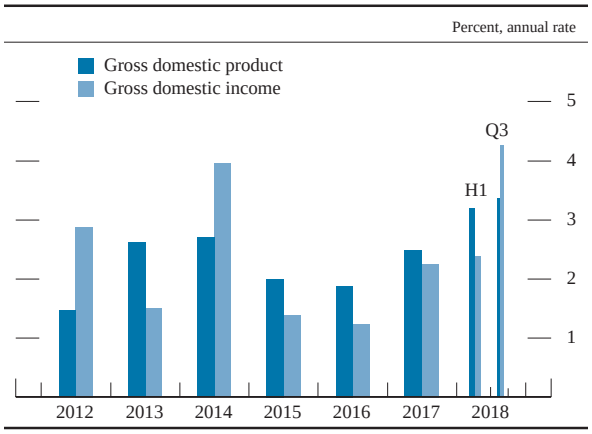
12. 5-to-10-year-forward inflation compensation



NOTE: The data are weekly averages of daily data and extend through February 15, 2019. TIPS is Treasury Inflation-Protected Securities.
SOURCE: Federal Reserve Bank of New York; Barclays; Federal Reserve Board staff estimates.

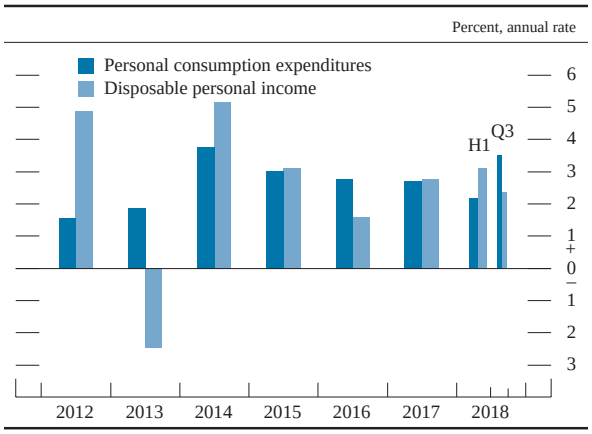
8. Inflation compensation implied by the TIPS breakeven inflation rate is based on the difference, at comparable maturities, between yields on nominal Treasury securities and yields on TIPS, which are indexed to the total consumer price index (CPI). Inflation swaps are contracts in which one party makes payments of certain fixed nominal amounts in exchange for cash flows that are indexed to cumulative CPI inflation over some horizon. Inflation compensation derived from inflation swaps typically exceeds TIPS-based compensation, but week-to-week movements in the two measures are highly correlated.

13. Change in real gross domestic product and gross domestic income



SOURCE: Bureau of Economic Analysis via Haver Analytics.

14. Change in real personal consumption expenditures and disposable personal income



SOURCE: Bureau of Economic Analysis via Haver Analytics.

and 2¼ percent, respectively, with both measures below their respective ranges that persisted for most of the 10 years before the start of the notable declines in mid-2014.[9]

Real gross domestic product growth was solid, on balance, in the second half of 2018

Real gross domestic product (GDP) rose at an annual rate of 3½ percent in the third quarter, and available indicators point to a moderate gain in the fourth quarter.[10] For the year, GDP growth appears to have been a little less than 3 percent, up from the 2½ percent pace in 2017 and the 2 percent pace in the preceding two years (figure 13). Last year's growth reflects, in part, solid growth in household and business spending, on balance, as well as an increase in government purchases of goods and services; by contrast, housing-sector activity turned down last year. Private domestic final purchases—that is, final purchases by households and businesses, which tend to provide a better indication of future GDP growth than most other components of overall spending—likely posted a strong gain for the year.

Some measures of consumer and business sentiment have recently softened—likely reflecting concerns about financial market volatility, the global economic outlook, trade policy tensions, and the government shutdown—and consumer spending appears to have weakened at the end of the year. Nevertheless, the economic expansion continues to be supported by steady job gains, past increases in household wealth, expansionary fiscal policy, and still-favorable domestic financial conditions, including

9. As these measures are based on CPI inflation, one should probably subtract about ¼ percentage point—the average differential with PCE inflation over the past two decades—to infer inflation compensation on a PCE basis.

10. The initial estimate of GDP by the Bureau of Economic Analysis for the fourth quarter was delayed because of the partial government shutdown and will now be released on February 28.

moderate borrowing costs and easy access to credit for many households and businesses.

Ongoing improvements in the labor market continue to support household income and consumer spending . . .

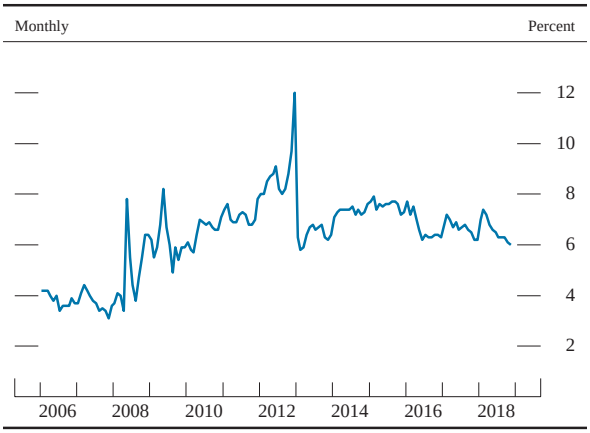
Real consumer spending picked up after some transitory weakness in the first half of 2018, rising at a strong annual rate of 3½ percent in the third quarter and increasing robustly through November (figure 14). However, despite anecdotal reports of favorable holiday sales, retail sales were reported to have declined sharply in December. Real disposable personal income—that is, income after taxes and adjusted for price changes—looks to have increased around 3 percent over the year, boosted by ongoing improvements in the labor market and the reduction in income taxes due to the implementation of the Tax Cuts and Jobs Act (TCJA). With consumer spending rising at about the same rate as gains in disposable income in 2018 through the third quarter (the latest data available), the personal saving rate was roughly unchanged, on net, over this period (figure 15).

. . . although wealth gains have moderated and consumer confidence has recently softened

While increases in household wealth have likely continued to support consumer spending, gains in net worth slowed last year. House prices continued to move up in 2018, boosting the wealth of homeowners, but the pace of growth moderated (figure 16). U.S. equity prices are, on net, similar to their levels at the end of 2017. Still, the level of equity and housing wealth relative to income remains very high by historical standards (figure 17).[11]

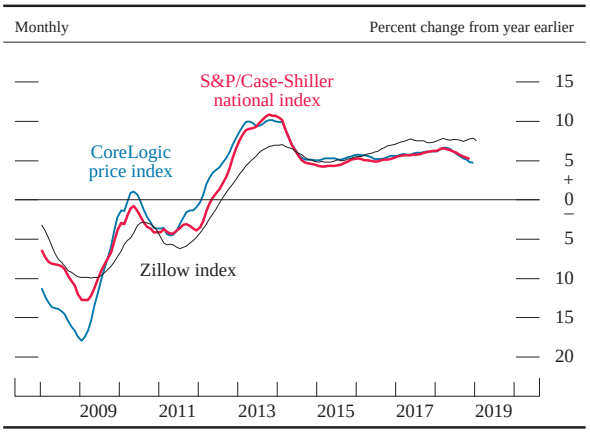
11. Indeed, in the third quarter of 2018—the most recent period for which data are available—household net worth was seven times the value of disposable income, the highest-ever reading for that ratio, which dates back to 1947. However, following the decline in stock prices since the summer, this ratio has likely fallen somewhat.

15. Personal saving rate



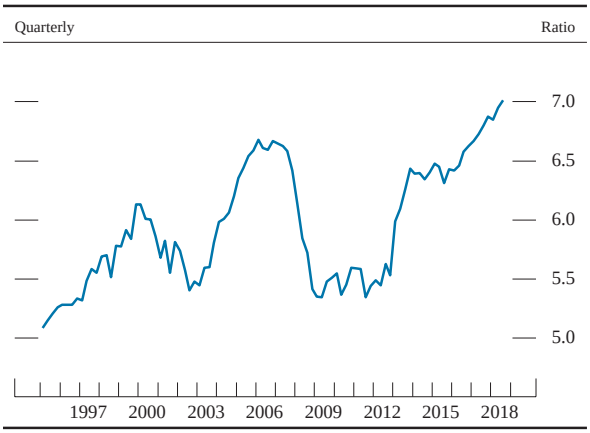
NOTE: Data extend through November 2018.
SOURCE: Bureau of Economic Analysis via Haver Analytics.

16. Prices of existing single-family houses



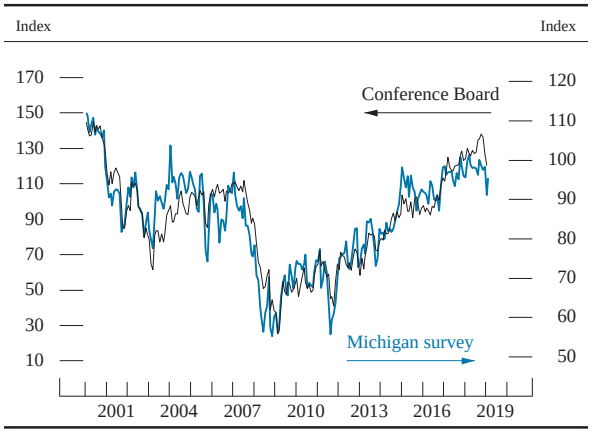
NOTE: The data for the S&P/Case-Shiller index extend through November 2018. The data for the CoreLogic index extend through December 2018.
SOURCE: CoreLogic Home Price Index; Zillow; S&P/Case-Shiller U.S. National Home Price Index. The S&P/Case-Shiller Index is a product of S&P Dow Jones Indices LLC and/or its affiliates. (For Dow Jones Indices licensing information, see the note on the Contents page.)

17. Wealth-to-income ratio



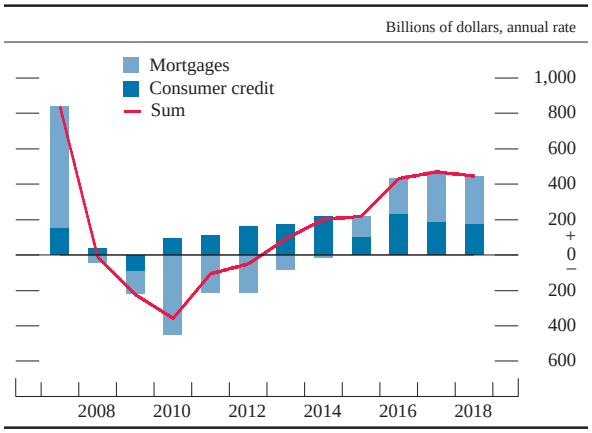
NOTE: Data extend through 2018:Q3. The series is the ratio of household net worth to disposable personal income.
SOURCE: For net worth, Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States"; for income, Bureau of Economic Analysis via Haver Analytics.

18. Indexes of consumer sentiment



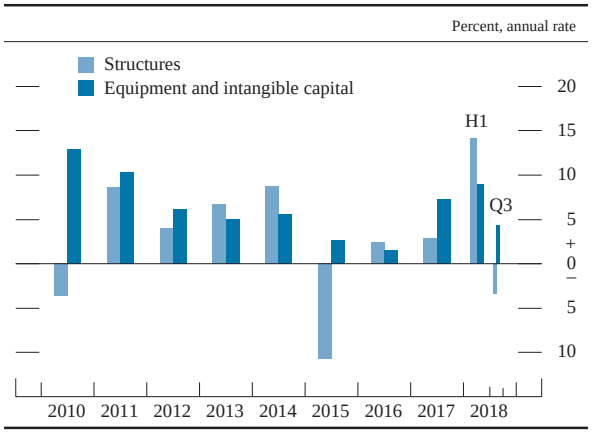
NOTE: The data are monthly. Michigan data extend through February 2019; the February data are preliminary. The Conference Board data are indexed to 100 in 1985. The Michigan survey data are indexed to 100 in 1966.
SOURCE: University of Michigan Surveys of Consumers; Conference Board.

19. Changes in household debt



NOTE: Changes are calculated from year-end to year-end except 2018 changes, which are calculated from 2017:Q3 to 2018:Q3.
SOURCE: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

20. Change in real private nonresidential fixed investment



SOURCE: Bureau of Economic Analysis via Haver Analytics.

Consumer sentiment as measured by the Michigan survey flattened out at a high level through much of 2018, and the sentiment measure from the Conference Board survey climbed through most of the year, with both measures posting their highest annual averages since 2000 (figure 18). However, consumer sentiment has turned down since around year-end, on net, with the declines primarily reflecting consumers' expectations for future conditions rather than their assessment of current conditions. Consumer attitudes about car buying have also weakened. Nevertheless, these indicators of consumers' outlook remain at generally favorable levels, likely reflecting rising income, job gains, and low inflation.

Borrowing conditions for consumers remain generally favorable despite interest rates being near the high end of their post-recession range

Despite increases in interest rates for consumer loans and some reported further tightening in credit card lending standards, financing conditions for consumers largely remain supportive of growth in household spending, and consumer credit growth in 2018 expanded further at a solid pace (figure 19). Mortgage credit has continued to be readily available for households with solid credit profiles. For borrowers with low credit scores, mortgage underwriting standards have eased somewhat since the first half of 2018 but remain noticeably tighter than before the recession. Financing conditions in the student loan market remain stable, with over 90 percent of such credit being extended by the federal government. Delinquencies on such loans, though staying elevated, continued to improve gradually on net.

Business investment growth has moderated after strong gains early in 2018 . . .

Investment spending by businesses rose rapidly in the first half of last year, and the available data are consistent with growth having slowed in the second half (figure 20).

The apparent slowdown reflects, in part, more moderate growth in investment in equipment and intangibles as well as a likely decline in investment in nonresidential structures after strong gains earlier in the year. Forward-looking indicators of business spending—such as business sentiment, capital spending plans, and profit expectations from industry analysts—have softened recently but remain positive overall. And while new orders of capital goods flattened out toward the end of last year, the backlog of unfilled orders for this equipment has continued to rise.

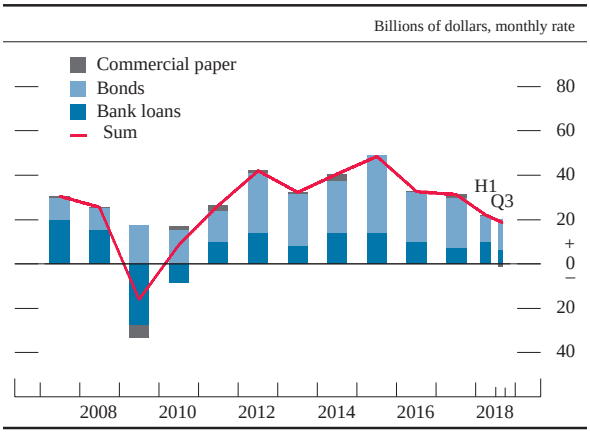
. . . as corporate financing conditions tightened somewhat but remained accommodative overall

Spreads of yields on nonfinancial corporate bonds over those on comparable-maturity Treasury securities widened modestly, on balance, since the middle of 2018 as investors' risk appetite appeared to recede some. Nonetheless, a net decrease in Treasury yields over the past several months has left interest rates on corporate bonds still low by historical standards, and financing conditions appear to have remained accommodative overall. Aggregate net flows of credit to large nonfinancial firms remained solid in the third quarter (figure 21). The gross issuance of corporate bonds and new issuance of leveraged loans both fell considerably toward the end of the year but have since rebounded, mirroring movements in financial market volatility.

Respondents to the January Senior Loan Officer Opinion Survey on Bank Lending Practices, or SLOOS, reported that lending standards for commercial and industrial (C&I) loans remained basically unchanged in the fourth quarter after having reported easing standards over the past several quarters. However, banks reported tightening lending standards on all categories of commercial real estate (CRE) loans in the fourth quarter on net.

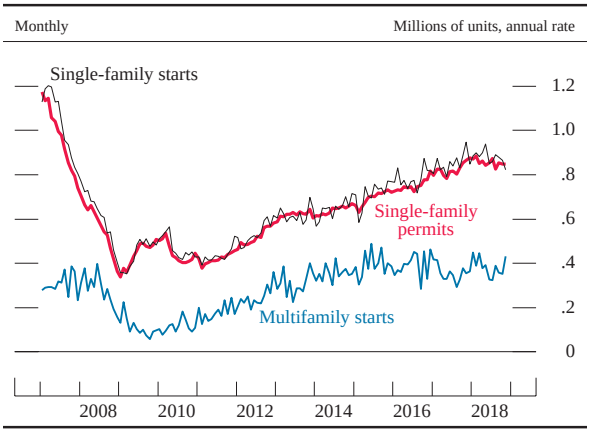
Meanwhile, financing conditions for small businesses have remained generally

21. Selected components of net debt financing for nonfinancial businesses



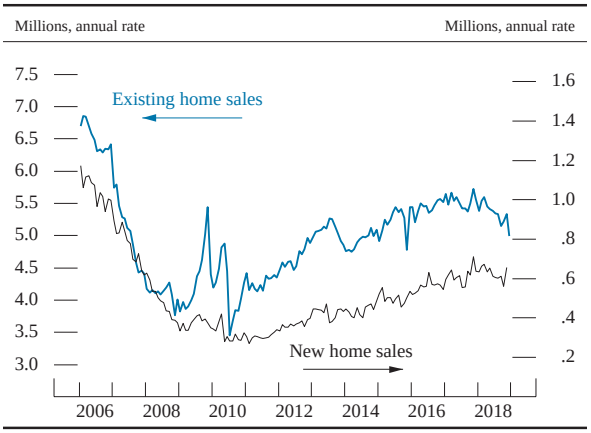
SOURCE: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

22. Private housing starts and permits



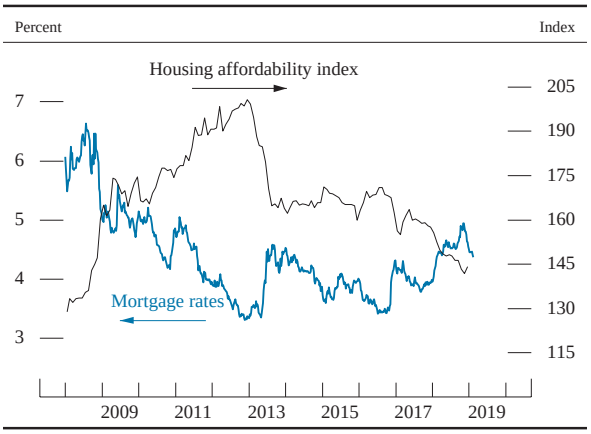
NOTE: The data extend through November 2018.
SOURCE: U.S. Census Bureau via Haver Analytics.

23. New and existing home sales



NOTE: Data are monthly. New home sales extends through November 2018 and includes only single-family sales. Existing home sales extends through December 2018 and includes single-family, condo, townhome, 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.

24. Mortgage rates and housing affordability



NOTE: The housing affordability index data are monthly through December 2018, and the mortgage rate data are weekly through February 14, 2019. At an index value of 100, a median-income family has exactly enough income to qualify for a median-priced home mortgage. Housing affordability is seasonally adjusted by Board staff.
SOURCE: For housing affordability index, National Association of Realtors; for mortgage rates, Freddie Mac Primary Mortgage Market Survey.

accommodative. Lending volumes to small businesses rebounded a bit in recent months, and indicators of recent loan performance stayed strong.

Activity in the housing sector has been declining

Residential investment declined in 2018, as housing starts held about flat and sales of existing homes moved lower (figures 22 and 23). The drop in residential investment reflects rising mortgage rates—which remain higher than in 2017 despite coming down some recently—as well as higher material and labor building costs, which have likely restrained new home construction. Consumers' perceptions of homebuying conditions deteriorated sharply over 2018, consistent with the decline in the affordability of housing associated with both higher mortgage rates and still-rising house prices (figure 24).

Net exports likely subtracted from GDP growth in 2018

After a strong performance in the first half of last year supported by robust exports of agricultural products, real exports declined in the third quarter, and available indicators suggest only a partial rebound in the fourth quarter (figure 25). At the same time, growth in real imports seems to have picked up in the second half of 2018. As a result, real net exports—which lifted U.S. real GDP growth during the first half of 2018—appear to have subtracted from growth in the second half. For the year as a whole, net exports likely subtracted a little from real GDP growth, similar to 2016 and 2017. The nominal trade deficit and the current account deficit in 2018 were little changed as a percent of GDP from 2017 (figure 26).

Federal fiscal policy actions boosted economic growth in 2018 . . .

Fiscal policy at the federal level boosted GDP growth in 2018, both because of lower income and business taxes from the TCJA and

because federal purchases appear to have risen significantly faster than in 2017 as a result of the Bipartisan Budget Act of 2018 (figure 27).[12] The partial government shutdown, which was in effect from December 22 through January 25, likely held down GDP growth in the first quarter of this year somewhat, largely because of the lost work of furloughed federal government workers and temporarily affected federal contractors.

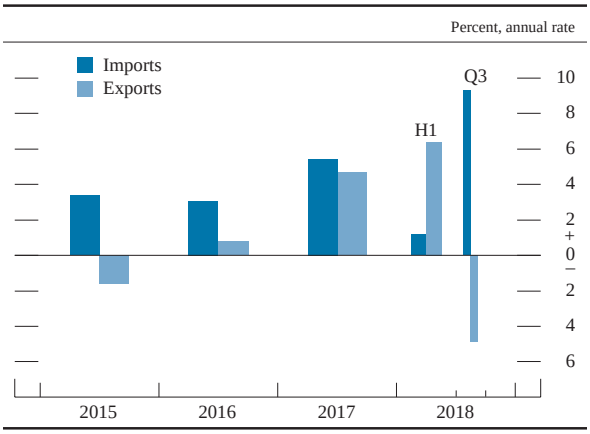
The federal unified deficit widened in fiscal year 2018 to 3¾ percent of nominal GDP because receipts moved lower, to roughly 16½ percent of GDP (figure 28). Expenditures edged down, to 20¼ percent of GDP, but remain above the levels that prevailed in the decade before the start of the 2007–09 recession. The ratio of federal debt held by the public to nominal GDP equaled 78 percent at the end of fiscal 2018 and remains quite elevated relative to historical norms (figure 29). The Congressional Budget Office projects that this ratio will rise over the next several years.

. . . and the fiscal position of most state and local governments is stable

The fiscal position of most state and local governments is stable, although there is a range of experiences across these governments. After several years of slow growth, revenue gains of state governments strengthened notably as sales and income tax collections have picked up over the past few quarters. At the local level, property tax collections continue to rise at a solid clip, pushed higher by past house price gains. After declining a bit in 2017, real state and local government purchases grew moderately last year, driven largely by a boost in construction but also reflecting modest growth in employment at these governments.

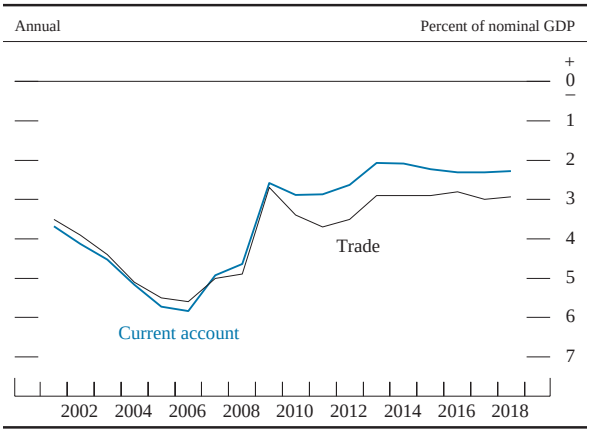
12. The Joint Committee on Taxation estimated that the TCJA would reduce average annual tax revenue by a little more than 1 percent of GDP starting in 2018 and for several years thereafter. This revenue estimate does not account for the potential macroeconomic effects of the legislation.

25. Change in real imports and exports of goods and services



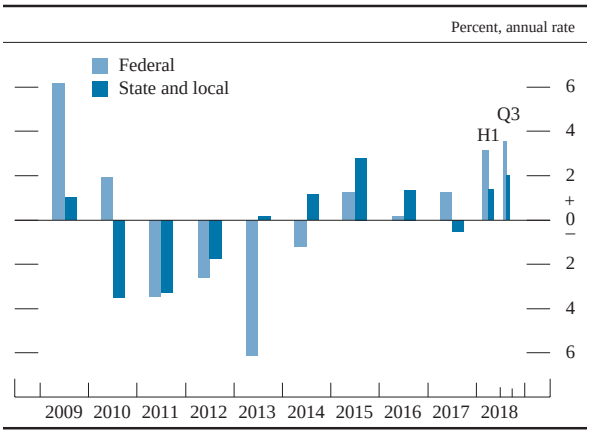
Source: Bureau of Economic Analysis via Haver Analytics.

26. U.S. trade and current account balances



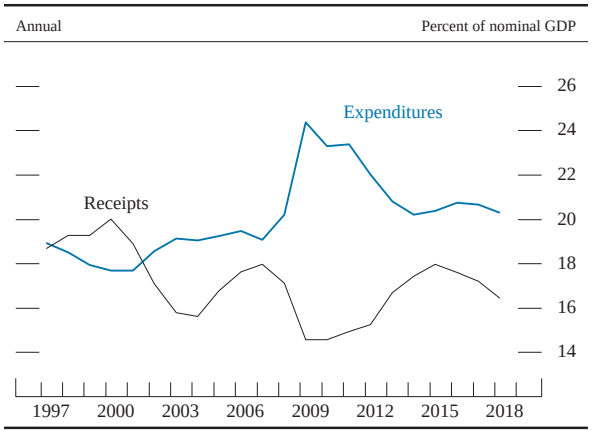
Note: Data for 2018 are the average of the first three quarters of the year, at an annualized rate. GDP is gross domestic product.
Source: Bureau of Economic Analysis via Haver Analytics.

27. Change in real government expenditures on consumption and investment



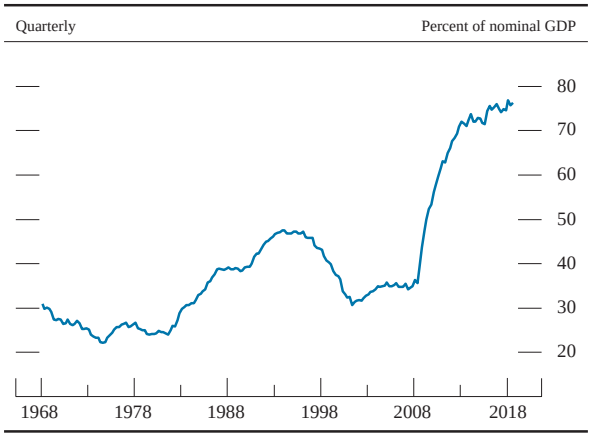
Source: Bureau of Economic Analysis.

28. Federal receipts and expenditures



NOTE: The receipts and expenditures data are on a unified-budget basis and are for fiscal years (October through September); gross domestic product (GDP) data are for the four quarters ending in Q3.
SOURCE: Office of Management and Budget via Haver Analytics.

29. Federal government debt held by the public



NOTE: The data extend through 2018:Q3. The data for gross domestic product (GDP) are at an annual rate. 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.
SOURCE: For GDP, Bureau of Economic Analysis via Haver Analytics; for federal debt, Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

Financial Developments

The expected path of the federal funds rate over the next several years has moved down

Despite the further strengthening in the labor market and continued expansion in the U.S. economy, market-based measures of the expected path for the federal funds rate over the next several years have declined, on net, since the middle of last year (figure 30). Various factors contributed to this shift, including increased investor concerns about downside risks to the global economic outlook and rising trade tensions, as well as FOMC communications that were viewed as signaling patience and greater flexibility in the conduct of monetary policy in response to adverse macroeconomic or financial market developments.

Survey-based measures of the expected path of the policy rate through 2020 also shifted down, on net, relative to the levels observed in the first half of 2018. According to the results of the most recent Survey of Primary Dealers and Survey of Market Participants, both conducted by the Federal Reserve Bank of New York just before the January FOMC meeting, the median of respondents' modal projections for the path of the federal funds rate implies two additional 25 basis point rate increases in 2019. Relative to the December survey, these increases are expected to occur later in 2019. Looking further ahead, respondents to the January survey forecast no rate increases in 2020 and in 2021.[13] Meanwhile, market-based measures of uncertainty about the policy rate approximately one to two years ahead were little changed, on balance, from their levels at the end of last June.

13. 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.

The nominal Treasury yield curve continued to flatten

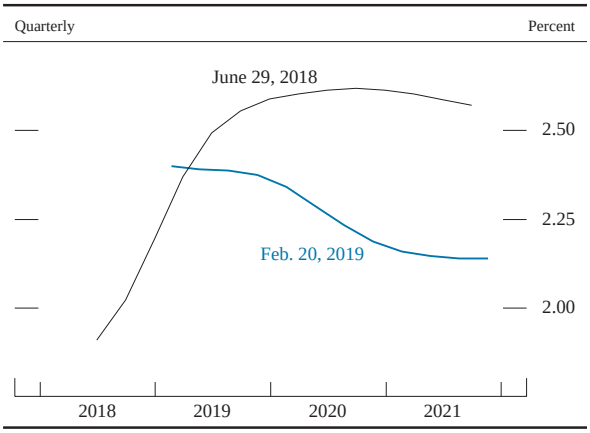
The nominal Treasury yield curve flattened somewhat further since the first half of 2018, with the 2-year nominal Treasury yield little changed and the 5- and 10-year nominal Treasury yields declining about 25 basis points on net (figure 31). At the same time, yields on inflation-protected Treasury securities edged up, leaving market-based measures of inflation compensation moderately lower. In explaining movements in Treasury yields since mid-2018, market participants have pointed to developments related to the global economic outlook and trade tensions, FOMC communications, and fluctuations in oil prices. Option-implied volatility on swap rates—an indicator of uncertainty about Treasury yields—declined slightly on net.

Consistent with changes in yields on nominal Treasury securities, yields on 30-year agency mortgage-backed securities (MBS)—an important determinant of mortgage interest rates—decreased about 20 basis points, on balance, since the middle of last year and remain low by historical standards (figure 32). Meanwhile, yields on both investment-grade and high-yield corporate debt declined a bit (figure 33). As a result, the spreads on corporate bond yields over comparable-maturity Treasury yields are modestly wider than at the end of June. The cumulative increases over the past year have left spreads for high-yield and investment-grade corporate bonds close to their historical medians, with both spreads notably above the very low levels that prevailed a year ago.

Broad equity price indexes increased somewhat

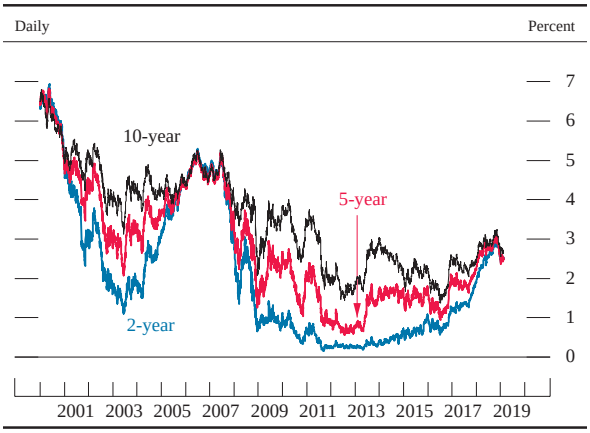
Broad U.S. stock market indexes increased somewhat since the middle of last year, on net, amid substantial volatility (figure 34). Concerns over the sustainability of corporate earnings growth, the global growth outlook, international trade tensions, and some Federal

30. Market-implied federal funds rate path



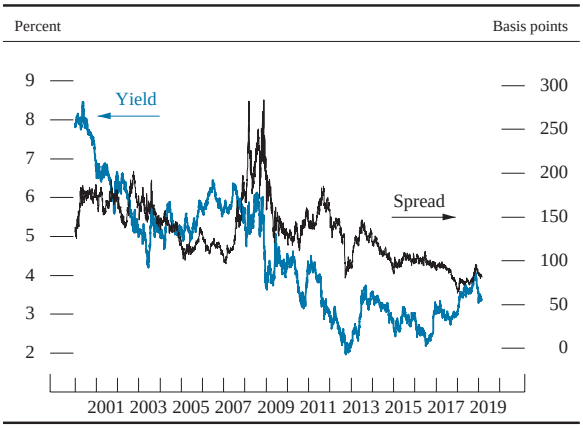
NOTE: The federal funds rate path is implied by quotes on overnight index swaps—a derivative contract tied to the effective federal funds rate. The implied path as of February 20, 2019, is compared with that as of June 29, 2018. The path is estimated with a spline approach, assuming a term premium of 0 basis points. The current path extends through November 2021 and the previous one through September 2021.
SOURCE: Bloomberg; Federal Reserve Board staff estimates.

31. Yields on nominal Treasury securities



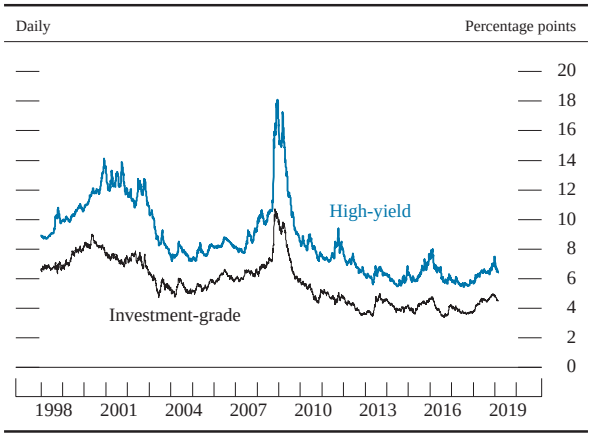
SOURCE: Department of the Treasury via Haver Analytics.

32. Yield and spread on agency mortgage-backed securities



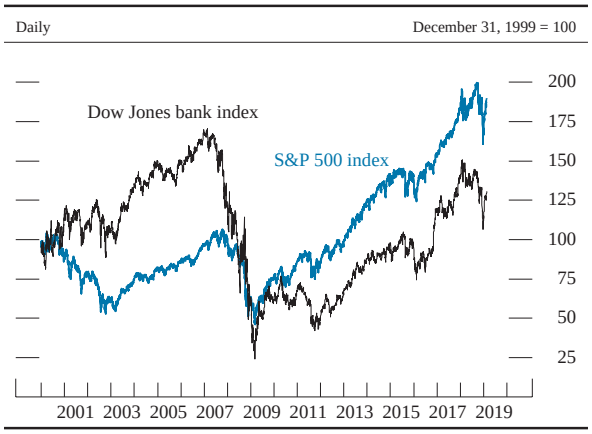
NOTE: The data are daily. Yield shown is for the Fannie Mae 30-year current coupon, the coupon rate at which new mortgage-backed securities would be priced at par, or face, value. Spread shown is to the average of the 5- and 10-year nominal Treasury yields.
SOURCE: Department of the Treasury; Barclays Live.

33. Corporate bond yields, by securities rating



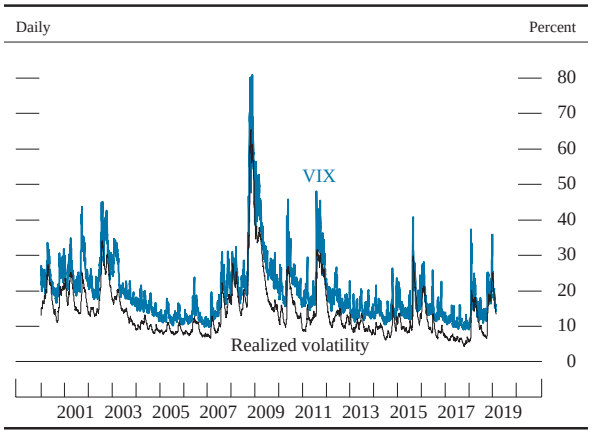
NOTE: Investment-grade is the 10-year triple-B, which reflects the effective yield of the ICE BofAML 7-to-10-year triple-B U.S. Corporate Index (C4A4). High-yield is the 10-year high-yield and reflects the effective yield of the ICE BofAML 7-to-10-year U.S. Cash Pay High Yield Index (J4A0).
SOURCE: ICE Bank of America Merrill Lynch Indices, used with permission.

34. Equity prices



SOURCE: Standard & Poor's Dow Jones Indices via Bloomberg. (For Dow Jones Indices licensing information, see the note on the Contents page.)

35. 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. For realized volatility, five-minute returns are used in an exponentially weighted moving average with 75 percent of weight distributed over the past 20 days.
SOURCE: Cboe Volatility Index® (VIX®) accessed via Bloomberg.

Reserve communications that were perceived as less accommodative than expected weighed on investor sentiment for a time. There were considerable differences in stock returns across sectors, reflecting their varying degrees of sensitivities to energy price declines, trade tensions, and rising interest rates. In particular, stock prices of companies in the utilities sector—which tend to benefit from falling interest rates—and in the health-care sector outperformed broader indexes. Conversely, stock prices in the energy sector substantially underperformed the broad indexes, as oil prices dropped sharply. Basic materials—a sector that was particularly sensitive to concerns about the global growth outlook and trade tensions—also underperformed. Bank stock prices declined slightly, on net, as the yield curve flattened and funding costs rose. Measures of implied and realized stock price volatility for the S&P 500 index—the VIX and the 20-day realized volatility—increased sharply in the fourth quarter of last year to near the high levels observed in early February 2018 amid sharp equity price declines. These volatility measures partially retraced following the turn of the year, with the VIX returning to near the 30th percentile of its historical distribution and with realized volatility ending the period close to the 70th percentile of its historical range (figure 35). (For a discussion of financial stability issues, see the box "Developments Related to Financial Stability.")

Markets for Treasury securities, mortgage-backed securities, and municipal bonds have functioned well

Available indicators of Treasury market functioning have generally remained stable since the first half of 2018, with a variety of liquidity metrics—including bid-ask spreads, bid sizes, and estimates of transaction costs—displaying few signs of liquidity pressures. Liquidity conditions in the agency MBS market were also generally stable. Overall, the functioning of Treasury and agency MBS markets has not been materially affected by

the implementation of the Federal Reserve's balance sheet normalization program over the past year and a half. Credit conditions in municipal bond markets have remained stable since the middle of last year, though yield spreads on 20-year general obligation municipal bonds over comparable-maturity Treasury securities were modestly higher on net.

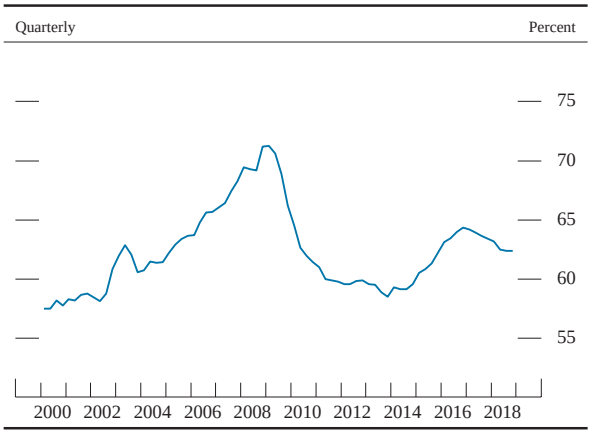
Money market rates have moved up in line with increases in the FOMC's target range

Conditions in domestic short-term funding markets have also remained generally stable since the beginning of the summer. Increases in the FOMC's target range were transmitted effectively through money markets, with yields on a broad set of money market instruments moving higher in response to the FOMC's policy actions in September and December. The effective federal funds rate moved to parity with the interest rate paid on reserves and was closely tracked by the overnight Eurodollar rate. Other short-term interest rates, including those on commercial paper and negotiable certificates of deposits, also moved up in light of increases in the policy rate.

Bank credit continued to expand, and bank profitability improved

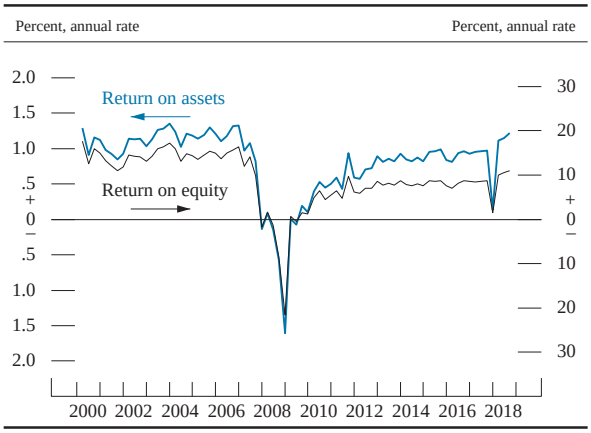
Aggregate credit provided by commercial banks expanded through the second half of 2018 at a stronger pace than the one observed in the first half of last year, as the strength in C&I loan growth more than offset the moderation in the growth in CRE loans and loans to households. In the fourth quarter of last year, the pace of bank credit expansion was about in line with that of nominal GDP, leaving the ratio of total commercial bank credit to current-dollar GDP little changed relative to last June (figure 36). Overall, measures of bank profitability improved further in the third quarter despite a flattening yield curve, but they remain below their pre-crisis levels (figure 37).

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



NOTE: Data for 2018:Q4 are estimated.
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.

37. Profitability of bank holding companies



NOTE: The data are quarterly and are seasonally adjusted. The data extend through 2018:Q3.
SOURCE: Federal Reserve Board, Form FR Y-9C, Consolidated Financial Statements for Bank Holding Companies.

Developments Related to Financial Stability

The Federal Reserve Board's financial stability monitoring framework

The framework used by the Federal Reserve Board to monitor financial stability distinguishes between shocks to and vulnerabilities of the financial system. Shocks, such as sudden changes to financial or economic conditions, are typically surprises and are inherently difficult to predict, whereas vulnerabilities tend to build up over time and are the aspects of the financial system that are most expected to cause widespread problems in times of stress. Some vulnerabilities are cyclical in nature, rising and falling over time, while others are structural, stemming from longer-term forces shaping the nature of credit intermediation. As a result, the framework focuses primarily on monitoring vulnerabilities and emphasizes four broad categories based on academic research.[1]

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

2. Excessive borrowing by businesses and households leaves them vulnerable to distress if their incomes decline or the assets they own fall in value.

3. Excessive leverage within the financial sector increases the risk that financial institutions will not have the ability to absorb losses when hit by adverse shocks.

4. Funding risks expose the financial system to the possibility that investors will "run" by withdrawing their funds from a particular institution or sector. Facing a run, financial institutions may need to sell assets quickly at "fire sale" prices, thereby incurring substantial losses and potentially even becoming insolvent. Historians and economists often refer to widespread investor runs as "financial panics."

While this framework provides a systematic way to assess financial stability, some potential risks do not fit neatly into it because they are novel or difficult to quantify, such as cybersecurity or developments in crypto-assets. In addition, some vulnerabilities are difficult to measure with currently available data, and the set of vulnerabilities may evolve over time. Given these limitations, we continually rely on ongoing research by the Federal Reserve staff, academics, and other experts.

Since the publication of the Federal Reserve Board's first *Financial Stability Report* on November 28, 2018, some areas where valuation pressures were a concern have cooled, particularly those related to below-investment-grade corporate debt.[2] Regulatory capital and liquidity ratios of key financial institutions, especially large banks, are at historically high levels. Funding risks in the financial system are low relative to the period leading up to the crisis. Borrowing by households has risen roughly in line with household incomes and has been concentrated among prime borrowers. Nonetheless, debt owed by businesses is high, and credit standards, especially within segments of the loan market focused on lower-rated or unrated firms, deteriorated in the second half of 2018.

Asset valuations increased to the high end of their historical ranges in many markets over 2017 and the first half of 2018, supported by the solid economic expansion and an apparent increase in investors' appetite for risk. However, compared with July 2018, around the time of the previous *Monetary Policy Report*, valuation pressures have eased somewhat in the equity, corporate bond, and leveraged loan markets. Over the same period, amid substantial market volatility, the forward equity price-to-earnings ratio of S&P 500 firms, a metric of valuations in equity markets, declined a touch, on net, and it currently stands just below the top quartile of its historical distribution (figure A). Spreads on both investment- and speculative-grade corporate bonds over comparable-maturity Treasury securities widened modestly to levels close to the medians of their historical ranges since 1997 (figure B). Spreads on newly issued leveraged loans widened markedly in the fourth quarter of 2018. In real estate markets, commercial real estate prices have been growing faster than rents for several years, leaving valuations stretched.

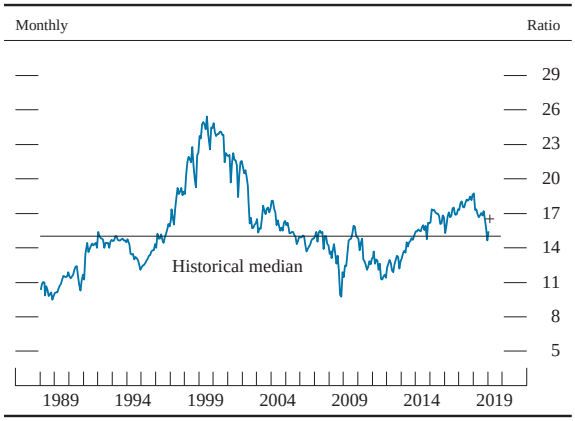
Since the 2007–09 recession, household debt and business debt have diverged (figure C). Over the past several years, borrowing by households has stayed in line with income growth and has been concentrated among borrowers with strong credit histories.

(continued)

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

2. See Board of Governors of the Federal Reserve System (2018), *Financial Stability Report* (Washington: Board of Governors, November), https://www.federalreserve.gov/publications/2018-november-financial-stability-report-purpose.htm.

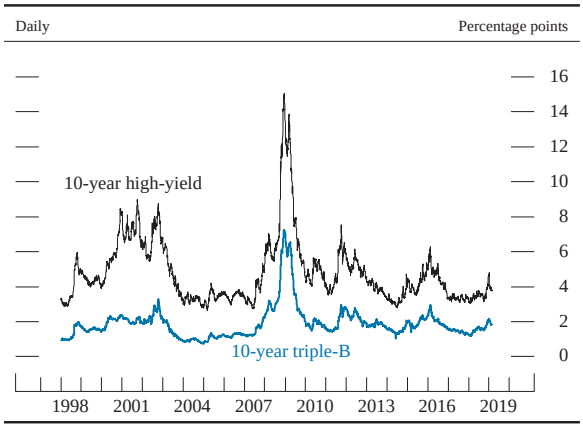
A. Forward price-to-earnings ratio of S&P 500 firms



NOTE: Aggregate forward price-to-earnings ratio of S&P 500 firms. Data are based on expected earnings for 12 months ahead. The plus sign shows daily data corresponding to February 20, 2019.

SOURCE: Federal Reserve Board staff calculations using Refinitiv (formerly Thomson Reuters), IBES Estimates.

B. Corporate bond spreads to similar-maturity Treasury securities

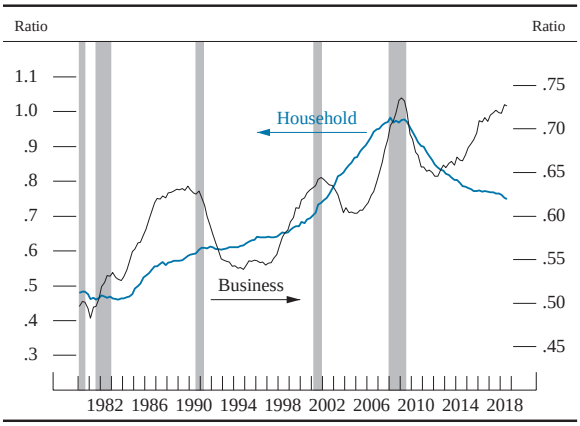


NOTE: The 10-year triple-B reflects the effective yield of the ICE BofAML 7-to-10-year triple-B U.S. Corporate Index (C4A4), and the 10-year high-yield reflects the effective yield of the ICE BofAML 7-to-10-year U.S. Cash Pay High Yield Index (J4A0). Treasury yields from smoothed yield curve estimated from off-the-run securities.

SOURCE: ICE Data Indices, LLC, used with permission; Department of the Treasury.

By contrast, borrowing by businesses, including riskier firms, has expanded significantly. For speculative-grade and unrated firms, the ratio of debt to assets has increased steadily since 2010 and remains near its historical peak. Further, growth in debt to businesses with lower credit ratings and with already elevated levels of borrowing, such as high-yield bonds and leveraged loans, has been substantial over the past

C. Business- and household-sector credit-to-GDP ratio



NOTE: Data are quarterly and extend through 2018:Q3. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research. GDP is gross domestic product.

SOURCE: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States"; Bureau of Economic Analysis via Haver Analytics, national income and product accounts, Table 1.1.5: Gross Domestic Product; Board staff calculations.

two years (figure D). Issuance of these instruments slowed significantly in November and December 2018 because of the sharply higher spreads demanded by investors to hold them, but issuance has rebounded somewhat in early 2019.

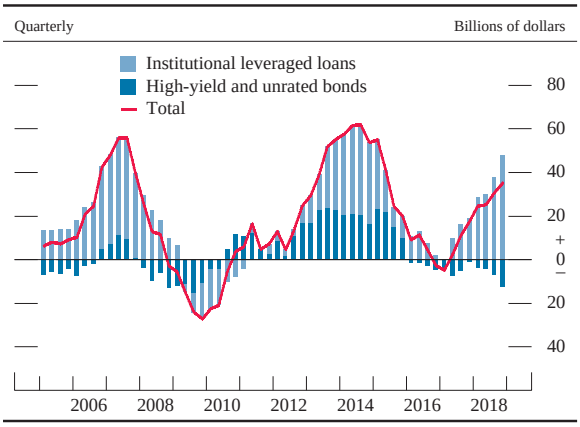
Credit standards for new leveraged loans deteriorated over the second half of 2018. The share of newly issued large loans to corporations with high leverage—defined as those with ratios of debt to EBITDA (earnings before interest, taxes, depreciation, and amortization) above 6—increased through 2018 to levels exceeding previous peaks observed in 2007 and 2014, when underwriting quality was notably poor. In addition, issuance of covenant-lite loans—loans with few or no traditional maintenance covenants—remained high during the second half of 2018, although this elevated level may reflect, in part, a greater prevalence of investors who do not traditionally monitor and exercise loan covenants.[3] Nonetheless, the strong economy has helped sustain solid credit performance of leveraged loans in 2018, with the default rate on such loans near the low end of its historical range.

(continued on next page)

3. Collateralized loan obligations, which are predominantly backed by leveraged loans, have grown rapidly over the past year and, as of year-end 2018, purchase about 60 percent of leveraged loans at origination. Similarly, mutual funds hold about 20 percent of leveraged loans.

Financial Stability *(continued)*

D. Net issuance of risky business debt



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

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

The credit quality of nonfinancial high-yield corporate bonds was roughly stable over the past several years, with the share of high-yield bonds outstanding that are rated B3/B- or below staying flat and below the financial crisis peak. In contrast, the distribution of ratings among investment-grade corporate bonds deteriorated. The share of bonds rated at the lowest investment-grade level (for example, an S&P rating of triple-B) reached near-record levels. As of December 2018, around 42 percent of corporate bonds outstanding were at the lowest end of the investment-grade segment, amounting to about $3 trillion.

Vulnerabilities from financial-sector leverage continue to be low relative to historical standards, in part because of regulatory reforms enacted since the financial crisis. Core financial intermediaries, including large banks, insurance companies, and broker-dealers, appear well positioned to weather economic stress. As of the third quarter of 2018, regulatory capital ratios for the U.S. global systemically important banks remained well above regulatory requirements and were close to historical highs. Those banks will be subject to the 2019 Dodd-Frank Act stress tests and Comprehensive Capital Assessment and Review. Consistent with the Federal Reserve Board's public framework, this year's scenarios feature a larger increase in unemployment and a deeper recession than in 2018 as well as typically large declines in financial asset prices. Capital levels at insurance companies and broker-dealers also remained relatively robust by historical standards. A range of indicators suggest that hedge fund leverage was roughly unchanged over 2018; however, comprehensive data, available with a significant time lag, from early 2018 showed that leverage remained at the upper end of its range over the past eight years.

Vulnerabilities associated with funding risk—that is, the financing of illiquid assets or long-maturity assets with short-maturity debt—continue to be low, in part because of the post-crisis implementation of liquidity regulations for banks and the 2016 money market reforms.[4] Banks are holding higher levels of liquid assets, while their use of short-term wholesale funding as a share of liabilities is near historical lows. Assets under management at prime funds, institutions that proved vulnerable to runs in the past, have risen somewhat in recent months but remained far below pre-reform levels.

Potential downside risks to international financial stability include a downturn in global growth, political and policy uncertainty, an intensification of trade tensions, and broadening stress in emerging market economies (EMEs). In many advanced foreign economies, financial conditions tightened somewhat in the second half of 2018, partly reflecting a deterioration in the fiscal outlook of Italy and Brexit uncertainty. The United Kingdom and the European Union (EU) have not yet ratified the terms for the United Kingdom's March 2019 withdrawal from the EU (Brexit). Without such a withdrawal agreement, there will be no transition period for important trade and financial interactions between U.K. and EU residents, and, despite preparations for a "no-deal Brexit," a wide range of economic and financial activities could be disrupted. EMEs also experienced heightened financial stress in the second half of 2018. Although that stress has receded somewhat more recently, many EMEs continue to harbor important vulnerabilities, reflecting one or more of substantial corporate leverage, fiscal concerns, or excessive reliance on foreign funding.

4. See U.S. Securities and Exchange Commission (2014), "SEC Adopts Money Market Fund Reform Rules," press release, July 23, https://www.sec.gov/news/press-release/2014-143.

International Developments

Economic activity in most foreign economies weakened in the second half of 2018

After expanding briskly in 2017, foreign GDP growth moderated in 2018. While part of this slowdown is likely due to temporary factors, it also appears to reflect weaker underlying momentum against the backdrop of somewhat tighter financial conditions, increased policy uncertainty, and ongoing debt deleveraging.

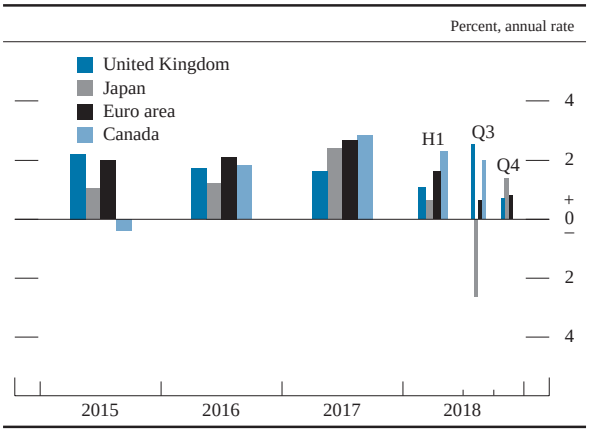
The growth slowdown was particularly pronounced in advanced foreign economies

Real GDP growth in several advanced foreign economies (AFEs) slowed markedly in the second half of the year (figure 38). This slowdown was concentrated in the manufacturing sector against the backdrop of softening global trade flows. In Japan, real GDP contracted in the second half of 2018, as economic activity, which was disrupted by a series of natural disasters in the third quarter, rebounded only partly in the fourth quarter. Growth in the euro area slowed in the second half of the year: Transportation bottlenecks and complications in meeting tighter emissions standards for new motor vehicles weighed on German economic activity, while output contracted in Italy. Although some of these headwinds appear to be fading, recent indicators—especially for the manufacturing sector—point to only a limited recovery of activity in the euro area at the start of 2019.

Inflation pressures remain contained in advanced foreign economies . . .

In recent months, headline inflation has fallen below central bank targets in many major AFEs, reflecting large declines in energy prices (figure 39). In the euro area and Japan, low headline inflation rates also reflect subdued core inflation. In Canada and the United Kingdom, instead, core inflation rates have been close to 2 percent.

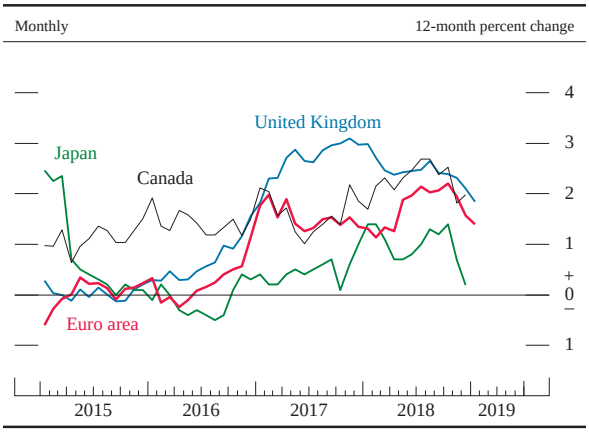
38. Real gross domestic product growth in selected advanced foreign economies



NOTE: The data for the euro area, Japan, and the U.K. incorporate preliminary estimates for 2018:Q4. The data for Canada extend through 2018:Q3.

SOURCE: For the United Kingdom, Office for National Statistics; for Japan, Cabinet Office, Government of Japan; for the euro area, Eurostat; for Canada, Statistics Canada; all via Haver Analytics.

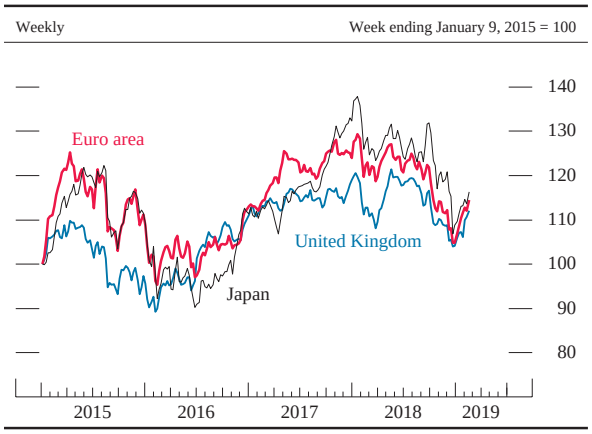
39. Consumer price inflation in selected advanced foreign economies



NOTE: The data for the euro area incorporate the flash estimate for January 2019. The data for the United Kingdom extend through January 2019. The data for Canada and Japan extend through December 2018.

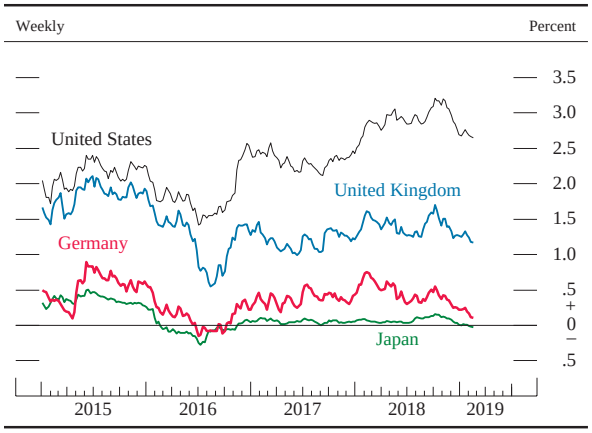
SOURCE: For the United Kingdom, Office for National Statistics; for Japan, Ministry of International Affairs and Communications; for the euro area, Statistical Office of the European Communities; for Canada, Statistics Canada; all via Haver Analytics.

40. Equity indexes for selected foreign economies



NOTE: The data are weekly averages of daily data and extend through February 20, 2019.
SOURCE: For euro area, DJ Euro Stoxx Index; for Japan, TOPIX Stock Index; for United Kingdom, FTSE 100 Stock Index; all via Bloomberg.

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



NOTE: The data are weekly averages of daily benchmark yields and extend through February 20, 2019.
SOURCE: Bloomberg.

. . . prompting central banks to withdraw accommodation only gradually

With underlying inflation still subdued, the Bank of Japan and the European Central Bank (ECB) kept their short-term policy rates at negative levels. Although the ECB concluded its asset purchase program in December, it signaled an only very gradual removal of policy accommodation going forward. The Bank of England (BOE) and the Bank of Canada, which both began raising interest rates in 2017, increased their policy rates further in the second half of 2018 but to levels that are still low by historical standards. The BOE noted that elevated uncertainty around the United Kingdom's exit from the European Union (EU) weighed on the country's economic outlook.

Political uncertainty and slower economic growth weighed on AFE asset prices

Moderation in global growth, protracted budget negotiations between the Italian government and the EU, and developments related to the United Kingdom's withdrawal from the EU weighed on AFE asset prices in the second half of 2018 (figure 40). Broad stock price indexes in the AFEs fell, interest rates on sovereign bonds in several countries in the European periphery remained elevated, and European bank shares underperformed, although these moves have partially retraced in recent weeks. Market-implied paths of policy in major AFEs and long-term sovereign bond yields declined somewhat, as economic data disappointed (figure 41).

Growth slowed in many emerging market economies

Chinese GDP growth slowed in the second half of 2018 as an earlier tightening of credit policy, aimed at restraining the buildup of debt, caused infrastructure investment to fall sharply and squeezed household spending (figure 42). However, increased concerns about a sharper-than-expected slowdown in

growth, as well as prospective effects of trade policies, prompted Chinese authorities to ease monetary and fiscal policy somewhat. Elsewhere in emerging Asia, growth remained well below its 2017 pace amid headwinds from moderating global growth. Tighter financial conditions also weighed on growth in other EMEs—notably, Argentina and Turkey.

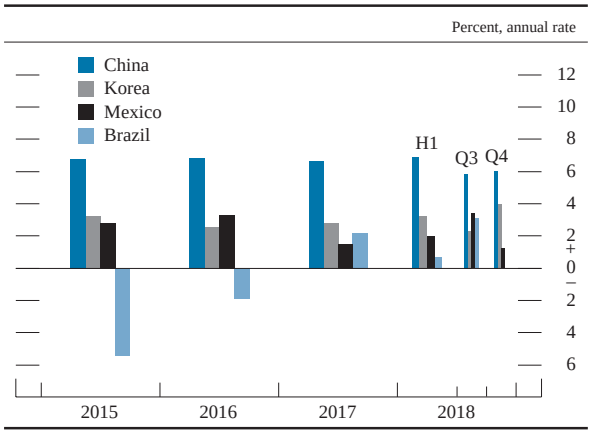
Economic activity strengthened somewhat in Mexico and Brazil, but uncertainty about policy developments remains elevated

In Mexico, economic activity increased at a more rapid rate in the third quarter after modest advances earlier in the year. However, growth weakened again in the fourth quarter, as perceptions that the newly elected government would pursue less market-friendly policies led to a sharp tightening in financial conditions. Amid a sharp peso depreciation and above-target inflation, the Bank of Mexico raised its policy rate to 8.25 percent in December. Brazilian real GDP growth rebounded in the third quarter after being held down by a nationwide trucker's strike in May, and financial markets have rallied on expectations that Brazil's new government will pursue economic policies that support growth. However, investors continued to focus on whether the new administration would pass significant fiscal reforms.

Financial conditions in many emerging market economies were volatile but are, on net, little changed since July

Financial conditions in the EMEs generally tightened in the second half of 2018, as investor concerns about vulnerabilities in several EMEs intensified against the backdrop of higher policy uncertainty, slowing global growth, and rising U.S. interest rates. Trade policy tensions between the United States and China weighed on asset prices, especially in China and other Asian economies. Broad measures of EME sovereign bond spreads over U.S. Treasury yields rose, and benchmark EME equity indexes declined. However,

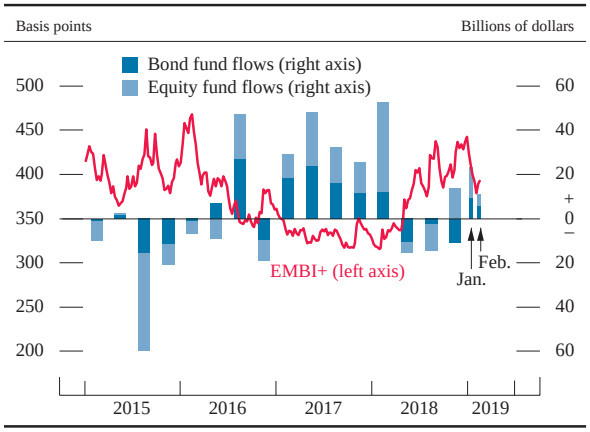
42. Real gross domestic product growth in selected emerging market economies



NOTE: The data for China are seasonally adjusted by Board staff. The data for Korea, Mexico, and Brazil are seasonally adjusted by their respective government agencies. The data for Korea and Mexico incorporate preliminary estimates for 2018:Q4. The data for Brazil extend through 2018:Q3.

SOURCE: For China, China National Bureau of Statistics; for Korea, Bank of Korea; for Mexico, Instituto Nacional de Estadistica y Geografia; for Brazil, Instituto Brasileiro de Geografia e Estatistica; all via Haver Analytics.

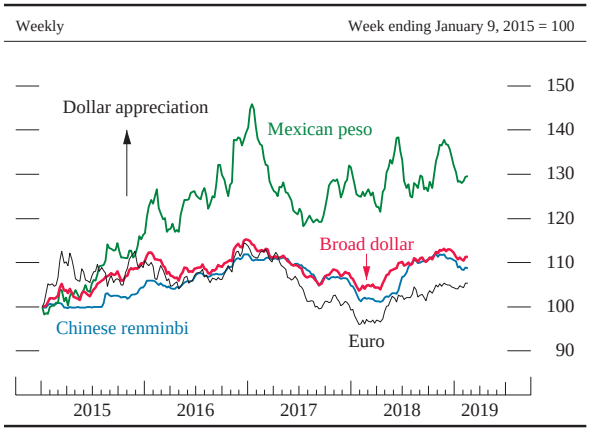
43. Emerging market mutual fund flows and spreads



NOTE: The bond and equity fund flows data are quarterly sums of weekly data from January 1, 2015, to December 31, 2018, and monthly sums of weekly data from January 1, 2019, to February 20, 2019. The fund flows data exclude funds located in China. The J.P. Morgan Emerging Markets Bond Index Plus (EMBI+) data are weekly averages of daily data and extend through February 19, 2019.

SOURCE: For bond and equity fund flows, EPFR Global; for EMBI+, J.P. Morgan Emerging Markets Bond Index Plus via Bloomberg.

44. U.S. dollar exchange rate indexes



NOTE: The data, which are in foreign currency units per dollar, are weekly averages of daily data and extend through February 20, 2019. As indicated by the arrow, increases in the data represent U.S. dollar appreciation, and decreases represent U.S. dollar depreciation.

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

financial conditions improved significantly in recent months, supported in part by more positive policy developments—including the U.S.-Mexico-Canada Agreement and progress on U.S.–China trade negotiations—and FOMC communications indicating a more gradual normalization of U.S. interest rates. EME mutual fund inflows resumed in recent months after experiencing outflows in the middle of 2018 (figure 43). While movements in asset prices and capital flows have been sizable for a number of economies, broad indicators of financial stress in EMEs are below those seen during other periods of stress in recent years.

The dollar appreciated slightly

The foreign exchange value of the U.S. dollar is bit a higher than in July (figure 44). Concerns about the global outlook, uncertainty about trade policy, and monetary policy normalization in the United States contributed to the appreciation of the dollar. The Chinese renminbi depreciated against the dollar slightly, on net, amid ongoing trade negotiations and increased concerns about growth prospects in China. The Mexican peso has been volatile amid ongoing political developments and trade negotiations but has, on net, declined only modestly against the dollar. Sharp declines in oil prices also weighed on the currencies of some energy-exporting economies.

Part 2
Monetary Policy

The Federal Open Market Committee continued to gradually increase the federal funds rate in the second half of last year

From late 2015 through the first half of last year, the Federal Open Market Committee (FOMC) gradually increased its target range for the federal funds rate as the economy continued to make progress toward the Committee's congressionally mandated objectives of maximum employment and price stability. In the second half of 2018, the FOMC continued this gradual process of monetary policy normalization, raising the federal funds rate at its September and December meetings, bringing the target range to 2¼ to 2½ percent (figure 45).[14] The FOMC's decisions to increase the federal funds rate reflected the solid performance of the U.S. economy, the continued strengthening of the labor market, and the fact that inflation had moved near the Committee's 2 percent longer-run objective.

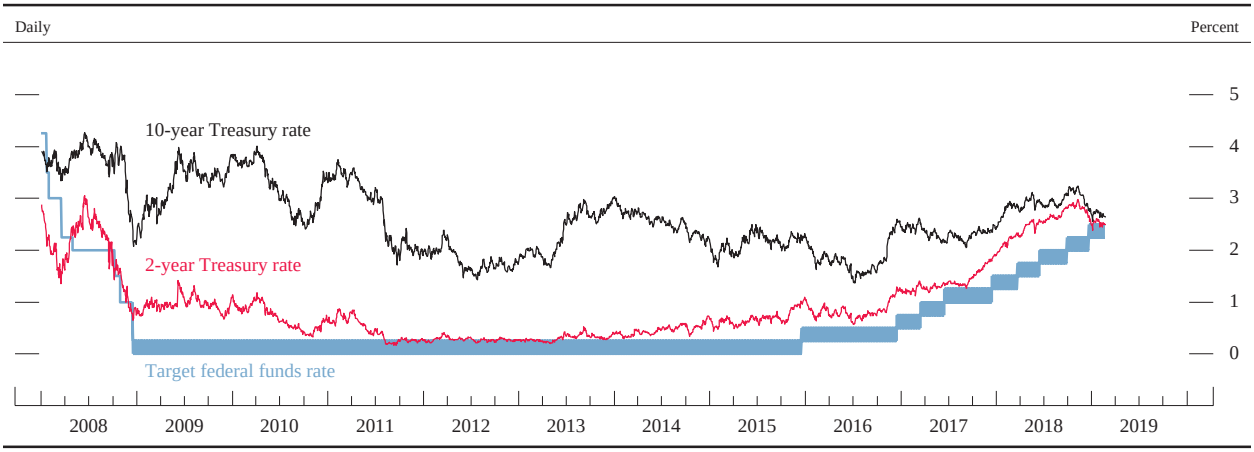
Looking ahead, the FOMC will be patient as it determines what future adjustments to the target range for the federal funds rate may be appropriate

With the gradual reductions in the amount of policy accommodation to date, the federal funds rate is now at the lower end of the range of estimates of its longer-run neutral level—that is, the level of the federal funds rate that is neither expansionary nor contractionary.

Developments at the time of the December FOMC meeting, including volatility in financial markets and increased concerns about global growth, made the appropriate extent and timing of future rate increases more uncertain than earlier. Against that backdrop, the Committee indicated it would monitor global economic and financial developments and assess their implications for the economic outlook. In the Summary

14. See Board of Governors of the Federal Reserve System (2018), "Federal Reserve Issues FOMC Statement," press release, September 26, https://www.federalreserve.gov/newsevents/pressreleases/monetary20180926a.htm; and Board of Governors of the Federal Reserve System (2018), "Federal Reserve Issues FOMC Statement," press release, December 19, https://www.federalreserve.gov/newsevents/pressreleases/monetary20181219a.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.

of Economic Projections (SEP) from the December meeting—the most recent SEP available—participants generally revised down their individual assessments of the appropriate path for monetary policy relative to their assessments at the time of the September meeting.[15]

In January, the Committee stated that it continued to view sustained expansion of economic activity, strong labor market conditions, and inflation near the Committee's symmetric 2 percent objective as the most likely outcomes. Nonetheless, in light of global economic and financial developments and muted inflation pressures, the Committee will be patient as it determines what future adjustments to the federal funds rate may be appropriate to support these outcomes.

Future changes in the federal funds rate will depend on the economic outlook as informed by incoming data

The FOMC has continued to emphasize that the actual path of monetary policy will depend on the evolution of the economic outlook as informed by incoming data. Specifically, in deciding on the timing and size of future adjustments to the federal funds rate, the Committee will assess realized and expected economic conditions relative to its objectives of maximum employment and 2 percent inflation. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments.

In addition to evaluating a wide range of economic and financial data and information gathered from business contacts and other informed parties around the country, policymakers routinely consult prescriptions for the policy interest rate from a variety of rules, which can serve as useful guidance to the FOMC. However, many practical considerations make it undesirable for the FOMC to mechanically follow the prescriptions of any specific rule. Consequently, the FOMC's framework for conducting systematic monetary policy respects key principles of good monetary policy and, at the same time, provides flexibility to address many of the limitations of these policy rules (see the box "Monetary Policy Rules and Systematic Monetary Policy").

The FOMC has continued to implement its program to gradually reduce the Federal Reserve's balance sheet

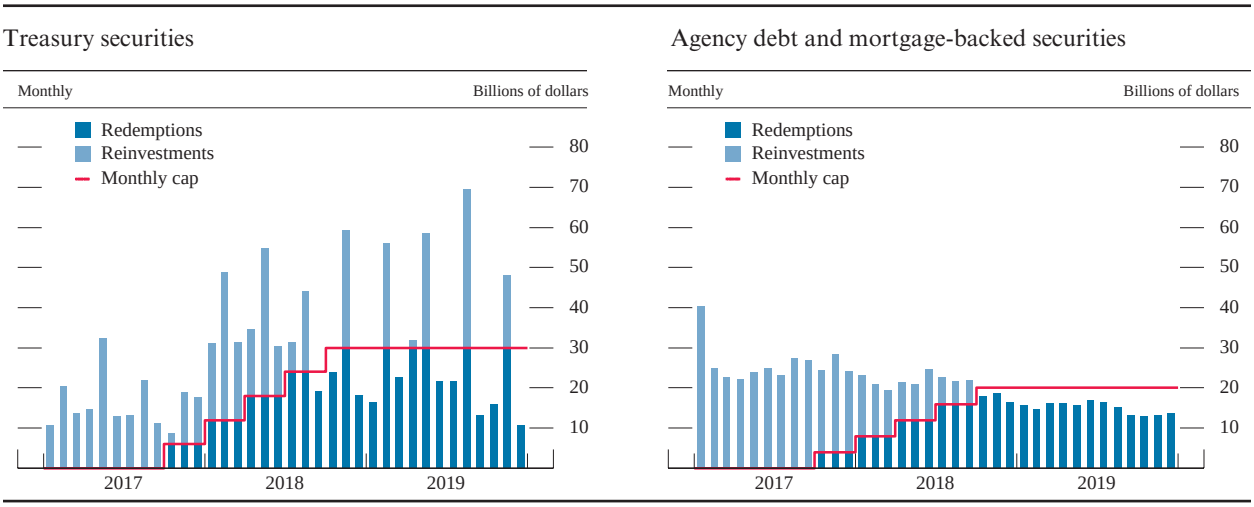
The Committee has continued to implement the balance sheet normalization program that has been under way since October 2017.[16] Under this program, the FOMC has been reducing its holdings of Treasury and agency securities in a gradual and predictable manner by decreasing its reinvestment of the principal payments it received from these securities. Specifically, such payments have been reinvested only to the extent that they exceeded gradually rising caps (figure 46).

In the third quarter of 2018, the Federal Reserve reinvested principal payments from its holdings of Treasury securities maturing during each calendar month in excess of $24 billion. It also reinvested in agency mortgage-backed securities (MBS) the amount of principal payments from its holdings of agency debt and agency MBS received during each calendar month in excess of $16 billion. In the fourth quarter, the FOMC increased the caps for Treasury securities and for agency securities to their respective maximums of $30 billion and $20 billion. Of note,

15. See the December Summary of Economic Projections, which appeared as an addendum to the minutes of the December 18–19, 2018, meeting of the FOMC and is presented in Part 3 of this report.

16. For more information, see the Addendum to the Policy Normalization Principles and Plans, which is available on the Board's website at https://www.federalreserve.gov/monetarypolicy/files/FOMC_PolicyNormalization.20170613.pdf.

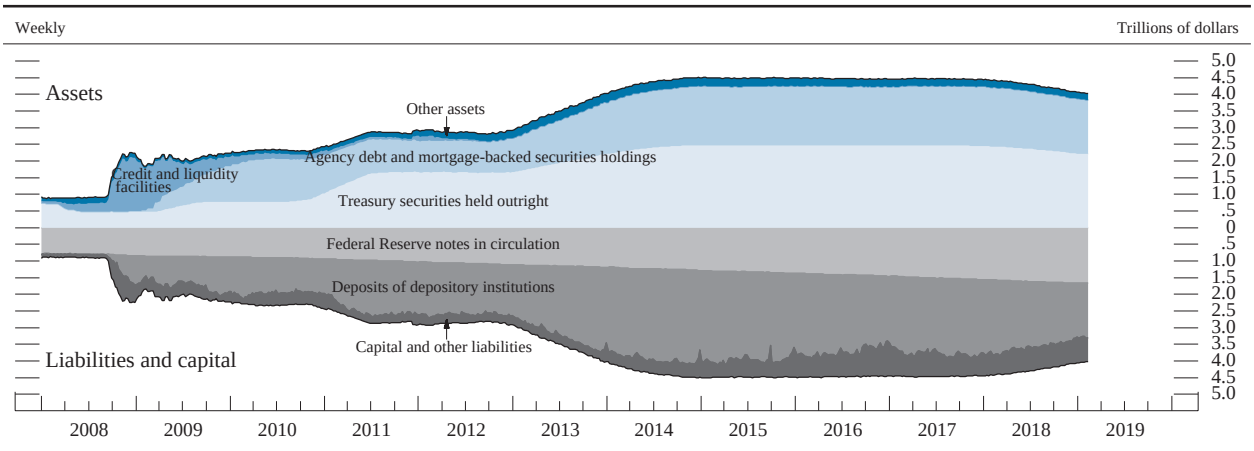
46. Principal payments on SOMA securities



NOTE: Reinvestment and redemption amounts of Treasury securities are projections starting in February 2019. Reinvestment and redemption amounts of agency debt and mortgage-backed securities are projections starting in February 2019. Cap amounts are projections beyond March 2019. The data extend through December 2019.

SOURCE: Federal Reserve Bank of New York; Federal Reserve Board staff calculations.

47. Federal Reserve assets and liabilities



NOTE: "Credit and liquidity facilities" consists of primary, secondary, and seasonal credit; term auction credit; central bank liquidity swaps; support for Maiden Lane, Bear Stearns, and AIG; and other credit facilities, including the Primary Dealer Credit Facility, the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility, the Commercial Paper Funding Facility, and the Term Asset-Backed Securities Loan Facility. "Other assets" includes unamortized premiums and discounts on securities held outright. "Capital and other liabilities" includes reverse repurchase agreements, the U.S. Treasury General Account, and the U.S. Treasury Supplementary Financing Account. The data extend through February 13, 2019.

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

reinvestments of agency debt and agency MBS ceased in October as principal payments fell below the maximum redemption caps.

The Federal Reserve's total assets have continued to decline from about $4.3 trillion last July to about $4.0 trillion at present, with holdings of Treasury securities at approximately $2.2 trillion and holdings of agency debt and agency MBS at approximately $1.6 trillion (figure 47).

As the Federal Reserve has continued to gradually reduce its securities holdings, the level of reserve balances in the banking system has declined. In particular, the level of reserve balances has decreased by about $350 billion since the middle of last year, and

Monetary Policy Rules and Systematic Monetary Policy

Monetary policy rules are mathematical formulas that relate a policy interest rate, such as the federal funds rate, to a small number of other economic variables—typically including the deviation of inflation from its target value and a measure of resource slack in the economy. The prescriptions for the policy interest rate from these rules can provide helpful guidance for the Federal Open Market Committee (FOMC). This discussion provides information on how policy rules inform the FOMC's systematic conduct of monetary policy, as well as practical considerations that make it undesirable for the FOMC to mechanically follow the prescriptions of any specific rule. The FOMC's approach for conducting monetary policy provides sufficient flexibility to address the intrinsic complexities and uncertainties in the economy while keeping monetary policy predictable and transparent.

Policy Rules and Historical Prescriptions

The effectiveness of monetary policy is enhanced when it is well understood by the public.[1] In simple models of the economy, good economic performance can be achieved by following a specific monetary policy rule that fosters public understanding and that incorporates key principles of good monetary policy.[2] One such principle is that monetary policy should respond in a predictable way to changes in economic conditions and the economic outlook. A second principle is that monetary policy should be accommodative when inflation is below policymakers' longer-run inflation objective and employment is below its maximum sustainable level; conversely, monetary policy should be restrictive when the opposite holds. A third principle is that, to stabilize inflation, the policy rate should be adjusted by more than one-for-one in response to persistent increases or decreases in inflation.

Economists have analyzed many monetary policy rules, including the well-known Taylor (1993) rule. Other rules include the "balanced approach" rule, the "adjusted Taylor (1993)" rule, the "price level" rule, and the "first difference" rule (figure A).[3] These policy rules embody the three key principles of good monetary policy and take into account estimates of how far the economy is from the Federal Reserve's dual-mandate goals of maximum employment and price stability. Four of the five rules include the difference between the rate of unemployment that is sustainable in the longer run and the current unemployment rate (the unemployment rate gap); the first-difference rule includes the change in the unemployment gap rather than its level.[4] In addition, four of the five rules include the difference

(continued)

1. For a discussion of how the public's understanding of monetary policy matters for the effectiveness of monetary policy, see Janet L. Yellen (2012), "Revolution and Evolution in Central Bank Communications," speech delivered at the Haas School of Business, University of California at Berkeley, Berkeley, Calif., November 13, https://www.federalreserve.gov/newsevents/speech/yellen20121113a.htm.

2. For a discussion regarding principles for the conduct of monetary policy, see Board of Governors of the Federal Reserve System (2018), "Monetary Policy Principles and Practice," Board of Governors, https://www.federalreserve.gov/monetarypolicy/monetary-policy-principles-and-practice.htm.

3. The Taylor (1993) rule was suggested 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. A price-level rule was discussed in Robert E. Hall (1984), "Monetary Strategy with an Elastic Price Standard," in *Price Stability and Public Policy*, proceedings of a symposium sponsored by the Federal Reserve Bank of Kansas City, held in Jackson Hole, Wyo., August 2–3 (Kansas City: Federal Reserve Bank of Kansas City), pp. 137–59, https://www.kansascityfed.org/publicat/sympos/1984/s84.pdf. Finally, 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 comprehensive 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.

4. The Taylor (1993) rule represented slack in resource utilization using an output gap (the difference between the current level of real gross domestic product (GDP) and the level that GDP would be if the economy were operating at maximum employment). The rules in figure A represent slack in resource utilization using the unemployment gap instead, because that gap better captures the FOMC's statutory goal to promote maximum employment. However, 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	$R_t^{BA} = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + 2(u_t^{LR} - u_t)$
Taylor (1993) rule, adjusted	$R_t^{T93\,adj} = maximum\ \{R_t^{T93} - Z_t, 0\}$
Price-level rule	$R_t^{PL} = maximum\ \{r_t^{LR} + \pi_t + (u_t^{LR} - u_t) + 0.5(PLgap_t), 0\}$
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^{T93adj}, R_t^{PL}, and R_t^{FD} represent the values of the nominal federal funds rate prescribed by the Taylor (1993), balanced-approach, adjusted Taylor (1993), price-level, and first-difference rules, respectively.

R_t denotes the actual nominal federal funds rate for quarter t, π_t is four-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, on average, is expected to be consistent with sustaining maximum employment and inflation at the FOMC's 2 percent longer-run objective, π^{LR}. In addition, u_t^{LR} is the rate of unemployment 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 zero. $PLgap_t$ is the percent deviation of the actual level of prices from a price level that rises 2 percent per year from its level in a specified starting period.

The Taylor (1993) rule and other policy rules are generally written in terms of 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) in order to represent the rules in terms of the FOMC's statutory goals. Historically, movements in the output and unemployment gaps have been highly correlated. Box note 3 provides references for the policy rules.

between recent inflation and the FOMC's longer-run objective (2 percent as measured by the annual change in the price index for personal consumption expenditures, or PCE), while the price-level rule includes the gap between the level of prices today and the level of prices that would be observed if inflation had been constant at 2 percent from a specified starting year ($\boldsymbol{PLgap_t}$).[5] The price-level rule thereby takes account of the deviation of inflation from the long-run objective in earlier periods as well as the current period.

The adjusted Taylor (1993) rule recognizes that the federal funds rate cannot be reduced materially below zero, and that following the prescriptions of the standard Taylor (1993) rule after a recession during which the federal funds rate has fallen to its lower bound may therefore not provide enough policy accommodation. To make up for the cumulative shortfall in accommodation ($\boldsymbol{Z_t}$), the adjusted rule prescribes only a gradual return of the policy rate to the (positive) levels prescribed by the standard Taylor (1993) rule after the economy begins to recover. The version of the price-level rule specified in figure A also recognizes that the federal funds rate cannot be reduced materially below zero. If inflation runs below the 2 percent objective during periods when the price-level rule prescribes setting the federal funds rate well below zero, the rule will, over time, call for more accommodation to make up for the past inflation shortfall.

As shown in figure B, the different monetary policy rules often differ in their prescriptions for the federal funds rate.[6] Although almost all of the simple policy

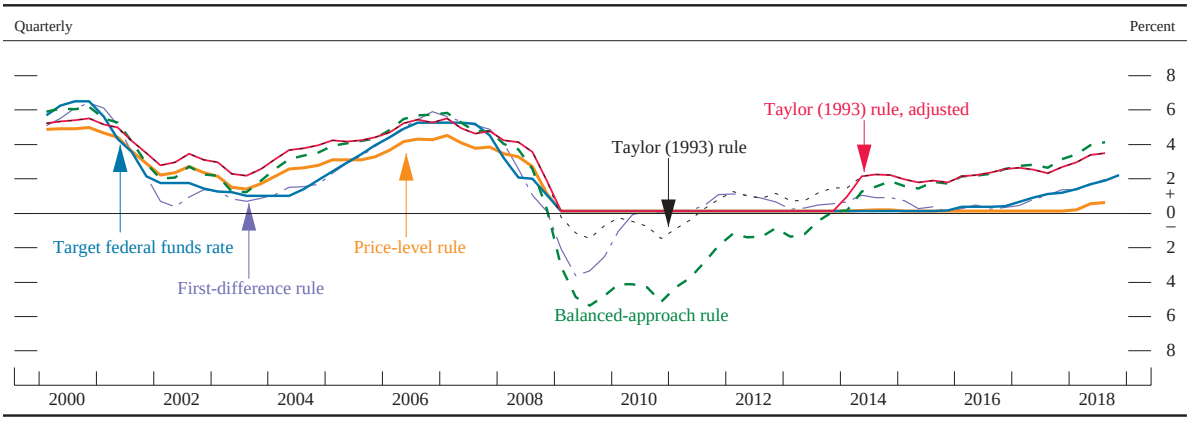
(continued on next page)

5. Calculating the prescriptions of the price-level rule requires selecting a starting year for the price level from which to cumulate the 2 percent annual rate of inflation. Figure B uses 1998 as the starting year. Around that time, the underlying trend of inflation and longer-term inflation expectations stabilized at a level consistent with PCE price inflation being close to 2 percent.

6. These prescriptions are calculated using (1) published data for inflation and the unemployment rate and (2) survey-based estimates of the longer-run value of the neutral real interest rate and the longer-run value of the unemployment rate.

Monetary Policy Rules *(continued)*

B. Historical federal funds rate prescriptions from simple policy rules



NOTE: The rules use historical values of inflation, the federal funds rate, and the unemployment rate. Inflation is measured as the 4-quarter percent change in the price index for personal consumption expenditures (PCE) excluding food and energy. Quarterly projections of long-run values for the federal funds rate and the unemployment rate are derived through interpolations of biannual projections from Blue Chip Economic Indicators. The long-run value for inflation is taken as 2 percent. The target value of the price level is the average level of the price index for PCE excluding food and energy in 1998 extrapolated at 2 percent per year. The data extend through 2018:Q3, with the exception of the target federal funds rate data, which go through 2018:Q4.

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

rules would have called for values for the federal funds rate that were increasing over time in recent years, the prescribed values vary widely across rules. In general, there is no unique criterion for favoring one rule over another.

Systematic Monetary Policy in Practice

Although monetary policy rules seem appealing for obtaining and communicating current and future policy rate prescriptions, the usefulness of these rules for policymakers is limited by a range of practical considerations. According to simple monetary policy rules, the policy interest rate must respond mechanically to a small number of variables. However, these variables may not reflect important information available to policymakers at the time they make decisions. For example, none of the inputs into the Taylor (1993) rule include financial and credit market conditions or indicators of consumer and business sentiment; these factors are often very informative for the future course of the economy. Similarly, monetary policy rules tend to include only the current values of the selected variables in the rule. But the relationship between the current values of these variables and the outlook for the economy changes over time for a number of reasons. For example, the structure of the economy is evolving over time and is not known with certainty at any given point in time.[7] To complicate matters further, monetary policy affects the Federal Reserve's goal variables of inflation and employment with long and variable lags. For these reasons, good monetary policy must take into account the information contained in the real-time forecast of the economy. Finally, simple policy rules do not take into account that the risks to the economic outlook may be asymmetric, such as during the period when the federal funds rate was still close to zero. At that time, the FOMC took into consideration that it would have limited scope to respond to an unexpected weakening in the economy by cutting the federal funds rate, but that it would have ample scope to increase the policy rate in response to an unexpected strengthening in the economy. This asymmetric risk provided a rationale for increasing the federal funds rate more gradually than prescribed by some policy rules shown in figure B.[8]

(continued)

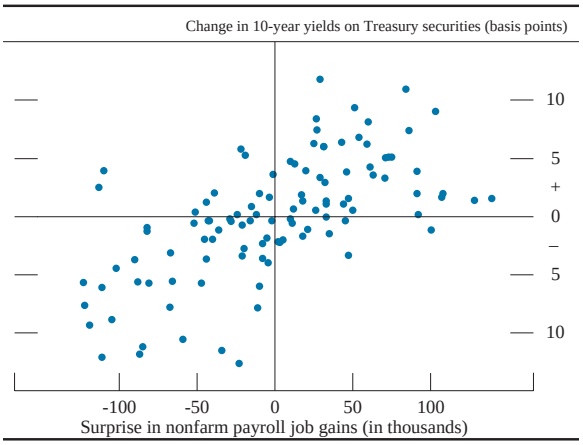
7. The box "Complexities of Monetary Policy Rules" in the July 2018 *Monetary Policy Report* discusses how shifts in the structure of the economy cause the longer-run value of the neutral real interest rate to vary over time and thus complicate its estimation. See Board of Governors of the Federal Reserve System (2018), *Monetary Policy Report* (Washington: Board of Governors, July), pp. 37–41, https://www.federalreserve.gov/monetarypolicy/files/20180713_mprfullreport.pdf.

8. For further discussion regarding the challenges of using monetary policy rules in practice, see Board of Governors of the Federal Reserve System (2018), "Challenges Associated with Using Rules to Make Monetary Policy," Board of Governors, https://www.federalreserve.gov/monetarypolicy/challenges-associated-with-using-rules-to-make-monetary-policy.htm.

The FOMC conducts systematic monetary policy in a framework that respects the key principles of good monetary policy while providing sufficient flexibility to address many of the practical concerns described earlier. At the core of this framework lies the FOMC's firm commitment to the Federal Reserve's statutory mandate of promoting maximum employment and price stability, a commitment that the Committee reaffirms on a regular basis.[9] To explain its monetary policy decisions to the public as clearly as possible, the FOMC communicates about the economic data that are relevant to its policy decisions. As part of this communication strategy, the Federal Reserve regularly describes the economic and financial data used to inform its policy decisions in the *Monetary Policy Report* and the FOMC meeting minutes. These data include, but are not limited to, measures of labor market conditions, inflation, household spending and business investment, asset prices, and the global economic environment. The FOMC postmeeting statements and the meeting minutes detail how the data inform the Committee's overall economic outlook, the risks to this outlook, and, in turn, the Committee's assessment about the appropriate stance of monetary policy. This appropriate stance depends on the FOMC's longer-run goals, the economic outlook and the risks to the outlook, and the channels through which monetary policy actions influence economic activity and prices. The FOMC combines all of these elements in determining the timing and size of adjustments of the policy interest rates. The quarterly Summary of Economic Projections provides additional information about each FOMC participant's forecasts for the economy and the longer-run assessments of the economy, under her or his individual views concerning appropriate policy.

These policy communications help the public understand the FOMC's approach to monetary policymaking and the principles that underlie it. Consequently, in response to incoming information, market participants tend to adjust their expectations regarding monetary policy in the direction consistent with achieving the maximum-employment and price-stability goals of the FOMC.[10] Evidence that market participants adjust their expectations for policy in this manner is shown in figure C. The figure plots the change in the 10-year yield on Treasury securities in a one-hour window around the release of employment reports on the vertical axis against the difference in the actual value of nonfarm payroll job gains and the expectations of private-sector analysts immediately before the release of the data on the horizontal axis—that is, a proxy for "surprises" in nonfarm payroll job gains. When actual nonfarm payroll job gains turn out to be higher than market participants expect, the yield on 10-year Treasury securities tends to increase. The rise in the 10-year yield reflects market participants' expectation that, as a result of stronger-than-expected labor market data, the path of short-term interest rates will be higher in the future. Conversely, the 10-year yield tends to decline after negative surprises in nonfarm payroll data, reflecting the path of short-term interest rates will be somewhat lower in the future. These adjustments in the 10-year yield help stabilize the economy even before the FOMC changes the level of the federal funds rate in the direction consistent with achieving its goals, as higher long-term interest rates tend to slow the labor market while lower rates tend to strengthen it.

C. Change in 10-year yield in response to Employment Situation report



NOTE: The data are monthly, and the sample period starts in February 2010. The change in 10-year yields on Treasury securities is measured within a 1-hour window after the data release. The surprise in nonfarm payroll job gains is measured as the difference in the actual nonfarm payroll job gains in thousands and the median expected nonfarm payroll job gains in the Bloomberg Survey of Economists before the data release.
SOURCE: Bureau of Labor Statistics; Bloomberg.

9. See the Statement on Longer-Run Goals and Monetary Policy Strategy, which is available on the Board's website at https://www.federalreserve.gov/monetarypolicy/files/FOMC_LongerRunGoals.pdf.

10. New economic information can be composed of data surprises or of factors that may pose risks to future economic outcomes but are not yet reflected in the data.

by about $1.2 trillion since its peak in 2014.[17] At the January meeting, the Committee released an updated Statement Regarding Monetary Policy Implementation and Balance Sheet Normalization to provide additional information regarding its plans to implement monetary policy over the longer run.[18] In this statement, the Committee indicated that it intends to continue to implement monetary policy in a regime in which an ample supply of reserves ensures that control over the level of the federal funds rate and other short-term interest rates is exercised primarily through the setting of the Federal Reserve's administered rates, and in which active management of the supply of reserves is not required. This operating procedure is often called a "floor system." The FOMC judges that this approach provides good control of short-term money market rates in a variety of market conditions and effective transmission of those rates to broader financial conditions. In addition, the FOMC stated that it is prepared to adjust any of the details for completing balance sheet normalization in light of economic and financial developments.

Although reserve balances play a central role in the ongoing balance sheet normalization process, in the longer run, the size of the balance sheet will also be importantly determined by trend growth in nonreserve liabilities. The box "The Role of Liabilities in Determining the Size of the Federal Reserve's Balance Sheet" discusses various factors that influence the size of reserve and nonreserve liabilities.

Meanwhile, interest income on the Federal Reserve's securities holdings has continued to support substantial remittances to the U.S. Treasury. Preliminary financial statement results indicate that the Federal Reserve remitted about $65 billion in 2018.

The Federal Reserve's implementation of monetary policy has continued smoothly

As with the previous federal funds rate increases since late 2015, the Federal Reserve successfully raised the effective federal funds rate in September and December by increasing the interest rate paid on reserve balances and the interest rate offered on overnight reverse repurchase agreements (ON RRPs). Specifically, the Federal Reserve raised the interest rate paid on required and excess reserve balances to 2.20 percent in September and to 2.40 percent in December. In addition, the Federal Reserve increased the ON RRP offering rate to 2.00 percent in September and to 2.25 percent in December. The Federal Reserve also approved a ¼ percentage point increase in the discount rate (the primary credit rate) in both September and December. Yields on a broad set of money market instruments moved higher, roughly in line with the federal funds rate, in response to the FOMC's policy decisions in September and December. Usage of the ON RRP facility has remained low, excluding quarter-ends.

The effective federal funds rate moved to parity with the interest rate paid on reserve balances in the months before the December meeting. At its December meeting, the Committee made a second small technical adjustment by setting the interest on excess reserves rate 10 basis points below the top of the target range for the federal funds rate; this adjustment was intended to foster trading in the federal funds market at rates well within the FOMC's target range.

The Federal Reserve will conduct a review of its strategic framework for monetary policy in 2019

With labor market conditions close to maximum employment and inflation near the Committee's 2 percent objective, the FOMC

17. Since the start of the normalization program, reserve balances have dropped by approximately $600 billion.

18. See the Statement Regarding Monetary Policy Implementation and Balance Sheet Normalization, which is available on the Board's website at https://www.federalreserve.gov/newsevents/pressreleases/monetary20190130c.htm.

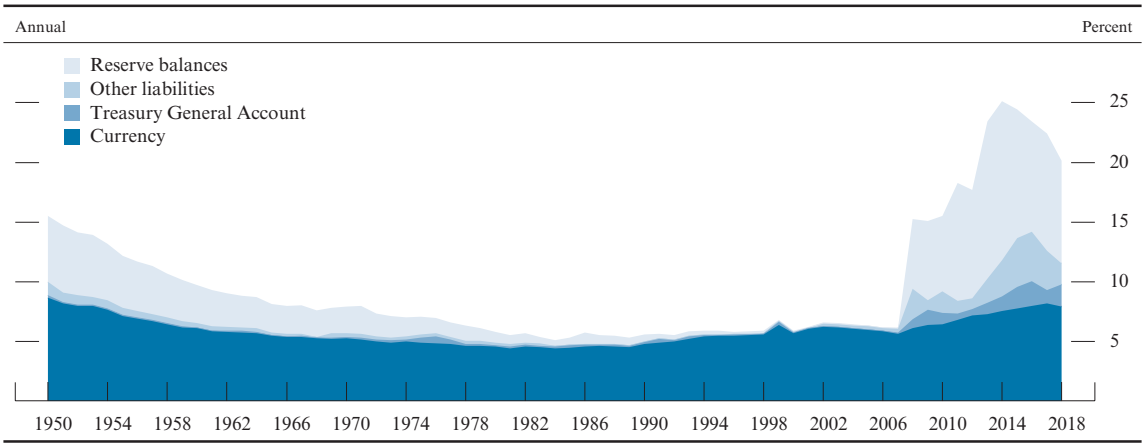
The Role of Liabilities in Determining the Size of the Federal Reserve's Balance Sheet

The size of the Federal Reserve's balance sheet increased from $900 billion at the end of 2006 to about $4.5 trillion at the end of 2014—or from 6 percent of gross domestic product (GDP) to about 25 percent of GDP—mainly as a result of the large-scale asset purchase (LSAP) programs conducted in response to persistent economic weakness following the financial crisis. The expansion of total assets that stemmed from the LSAPs was primarily matched by higher reserve balances of depository institutions, which peaked in the fall of 2014 at $2.8 trillion, or almost 16 percent of GDP, rising from about $10 billion at the end of 2006. Liabilities other than reserves have also grown significantly and played a role in the expansion of the balance sheet. The magnitude of these nonreserve liabilities as well as the flows affecting their variability are not closely related to monetary policy decisions. Since October 2017, the Federal Reserve has been gradually reducing its securities holdings resulting from crisis-era purchases. Once these holdings have unwound to the point at which reserve balances have declined to their longer-run level, the size of the balance sheet will be determined by factors affecting the demand for Federal Reserve liabilities. This discussion describes the Federal Reserve's most significant liabilities and reviews the factors that influenced their size since the financial crisis. Many of the Federal Reserve's liabilities arise from statutory responsibilities, such as supplying currency and serving as the Treasury Department's fiscal agent. Each liability provides social benefits to the economy and plays an important role as a safe and liquid asset for the public, the banking system, the U.S. government, or other institutions.

Figure A plots the evolution of the Federal Reserve's main liabilities relative to nominal GDP over the post–World War II period. Federal Reserve notes outstanding have traditionally been the largest Federal Reserve liability and, over the past three decades, have been slowly growing as a share of U.S. nominal GDP. U.S. currency is an important medium of exchange and store of value, both domestically and abroad. Despite the increasing use of electronic means of payment, currency remains widely used in retail transactions in the United States. Demand for currency tends to increase with the size of the economy because households and businesses need more currency to use in exchange for a growing volume of economic transactions. In addition, with heavy usage of U.S. currency overseas, changes in global growth as well as in financial and geopolitical stability can also

(continued on next page)

A. Liabilities as a share of nominal gross domestic product



NOTE: Data for 2018 pertain to Q3 and are from the *Federal Reserve Banks Combined Quarterly Financial Report* (Unaudited); data for 1950 through 2017 are from the *104th Annual Report, 2017.*

SOURCE: Board of Governors of the Federal Reserve System (2018), *104th Annual Report, 2017,* Table 6: Reserves of Depository Institutions, Federal Reserve Bank Credit, and Related Items (Table 6A: Year-End 1984-2017 and Month-End 2017; Table 6B: Year-End 1918-1983) (Washington: Board of Governors), pp. 302-09, https://www.federalreserve.gov/publications/files/2017-annual-report.pdf; Board of Governors of the Federal Reserve System (2018), *Federal Reserve Banks Combined Quarterly Financial Report* (Unaudited), Table: Combined Statements of Condition (Washington: Board of Governors, September 30), p. 3, https://www.federalreserve.gov/aboutthefed/files/quarterly-report-20180930.pdf.

The Role of Liabilities *(continued)*

materially affect the rate of currency growth. Since the start of the Global Financial Crisis, notes in circulation have more than doubled and, as of the end of 2018, stood at about $1.67 trillion, equivalent to about 8 percent of U.S. GDP, implying that accommodating demand for currency alone requires a larger balance sheet than before the crisis.

Reserve balances are currently the second-largest liability in the Federal Reserve's balance sheet, totaling $1.66 trillion at the end of 2018, or nearly 8 percent of nominal GDP. This liability item consists of deposits held at Federal Reserve Banks by depository institutions, including commercial banks, savings banks, credit unions, thrift institutions, and most U.S. branches and agencies of foreign banks. These balances include reserves held to fulfill reserve requirements as well as reserves held in excess of these requirements. Reserve balances allow banks to facilitate daily payment flows, both in ordinary times and in stress scenarios, without borrowing funds or selling assets. Reserve balances have been declining for several years, in part as a result of the ongoing balance sheet normalization program initiated in October 2017, and now stand about $1.2 trillion below their peak in 2014. At its January 2019 meeting, the Federal Open Market Committee decided that it would continue to implement monetary policy in a regime with an ample supply of reserves, which is often called a "floor system" or an "abundant reserves system."[1] Going forward, the banking system's overall demand for reserve balances and the Committee's judgment about the quantity that is appropriate for the efficient and effective implementation of monetary policy will determine the longer-run level of reserve balances. Although the level of reserve balances that banks will eventually demand is not yet known with certainty, it is likely to be appreciably higher than before the crisis. Banks' higher demand for reserves appears to reflect in part an increased focus on liquidity risk management in the context of regulatory changes.

Liabilities other than currency and reserves include the Treasury General Account (TGA), reverse repurchase agreements conducted with foreign official account holders, and deposits held by designated financial market utilities (DFMUs). By statute, the Federal Reserve serves a special role as fiscal agent or banker for the federal government. Consequently, the U.S. Treasury holds cash balances at the Federal Reserve in the TGA, using this account to receive taxes and proceeds of securities sales and to pay the government's bills, including interest and principal on maturing securities. Before 2008, the Treasury targeted a steady, low balance of $5 billion in the TGA on most days, and it used private accounts at commercial banks to manage the variability in its cash flows. Since 2008, the Treasury has used the TGA as the primary account for managing cash flows. In May 2015, the Treasury announced its intention to hold in the TGA a level of cash generally sufficient to cover one week of outflows, subject to a minimum balance objective of roughly $150 billion. Since this policy change, the TGA balance has generally been well above this minimum; at the end of 2018, it was about $370 billion, or nearly 2 percent of GDP. The current policy helps protect against the risk that extreme weather or other technical or operational events might cause an interruption in access to debt markets and leave the Treasury unable to fund U.S. government operations—a scenario that could have serious consequences for financial stability.

Reverse repurchase agreements with foreign official accounts, also known as the foreign repo pool, also rose during recent years. The Federal Reserve has long offered this service as part of a suite of banking and custody services to foreign central banks, foreign governments, and international official institutions.

(continued)

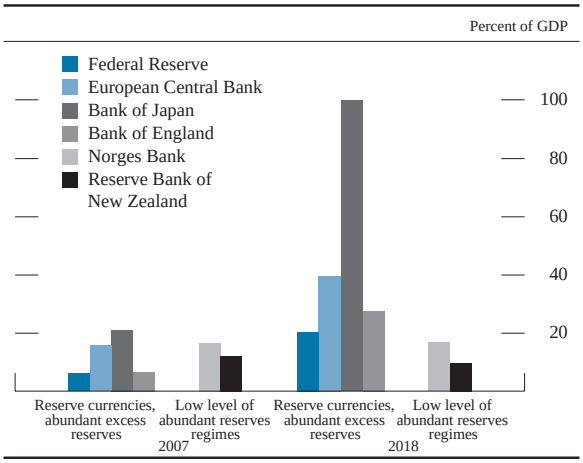
1. See footnote 18 in the main text.

Accounts at the Federal Reserve provide foreign official institutions with access to immediate dollar liquidity to support operational needs, to clear and settle securities in their accounts, and to address unexpected dollar shortages or exchange rate volatility. The foreign repo pool has grown from an average level of around $30 billion before the crisis to a current average of about $250 billion, equivalent to a little more than 1 percent of GDP. The rise in foreign repo pool balances has reflected in part central banks' preference to maintain robust dollar liquidity buffers.

Finally, "other deposits" with the Federal Reserve Banks have also risen steadily over recent years, from less than $1 billion before the crisis to about $80 billion at the end of 2018. Although "other deposits" include balances held by international and multilateral organizations, government-sponsored enterprises, and other miscellaneous items, the increase has largely been driven by the establishments of accounts for DFMUs. DFMUs provide the infrastructure for transferring, clearing, and settling payments, securities, and other transactions among financial institutions. The Dodd-Frank Wall Street Reform and Consumer Protection Act provides that DFMUs—those financial market utilities designated as systemically important by the Financial Stability Oversight Council—can maintain accounts at the Federal Reserve and earn interest on balances maintained in those accounts.

Putting together all of these elements—that is, projected trend growth for currency in circulation, the Committee's decision to continue operating with ample reserves, and the higher levels for the TGA, the foreign repo pool, and DFMU balances—explains why the longer-run size of the Federal Reserve's balance sheet will be considerably larger than before the crisis. At the end of 2018, the Federal Reserve's balance sheet totaled $4.1 trillion, or about 20 percent of GDP. Figure B considers the size of the balance sheet in an international context. In response to the Global Financial Crisis, central bank balance sheets increased in many jurisdictions. Relative to GDP, the Federal Reserve's balance sheet remains smaller than those of other reserve-currency central banks in major advanced foreign economies that currently operate with abundant reserves—such as the European Central Bank, the Bank of Japan, and the Bank of England—although this difference is partly due to the Federal Reserve being much further along in the policy normalization process after the crisis. In addition, the Federal Reserve's balance sheet relative to GDP is only modestly larger than those of central banks, such as the Norges Bank and the Reserve Bank of New Zealand, that aim to operate at a relatively low level of abundant reserves. Of course, differences in central bank balance sheets also reflect differences in financial systems across countries.

B. Central bank balance sheets relative to gross domestic product



NOTE: Data for 2018 pertain to Q3, except for the Bank of England, whose data pertain to 2017:Q3. Norges Bank data exclude assets of Norway's Government Pension Fund Global.

SOURCE: Haver Analytics.

judges it is an opportune time for the Federal Reserve to conduct a review of its strategic framework for monetary policy—including the policy strategy, tools, and communication practices. The goal of this assessment is to identify possible ways to improve the Committee's current policy framework in order to ensure that the Federal Reserve is best positioned going forward to achieve its statutory mandate of maximum employment and price stability.

Specific to the communications practices, the Federal Reserve judges that transparency is essential to accountability and the effectiveness of policy, and therefore the Federal Reserve seeks to explain its policymaking approach and decisions to the Congress and the public as clearly as possible. The box "Federal Reserve Transparency: Rationale and New Initiatives" discusses the steps and new initiatives the Federal Reserve has taken to improve transparency.

Federal Reserve Transparency: Rationale and New Initiatives

Over the past 25 years, the Federal Reserve and other major central banks have taken steps to improve transparency, which provides three important benefits. First, transparency helps ensure that central banks are held accountable to the public and its elected representatives. Accountability is essential to democratic legitimacy and is particularly important for central banks that have been granted extensive operational independence, as is the case for the Federal Reserve. Second, transparency enhances the effectiveness of monetary policy. If the public understands the central bank's views on the economy and monetary policy, then households and businesses will take those views into account in making their spending and investment plans. Third, transparency supports a central bank's efforts to promote the safety and soundness of financial institutions and the overall financial system, including by helping financial institutions know what is expected of them. Thus, for each of these reasons, the Federal Reserve seeks to explain its policymaking approach and decisions to the Congress and the public as clearly as possible.

To foster transparency and accountability, the Federal Reserve uses a wide variety of communications, including semiannual testimony by the Chairman in conjunction with this report, the *Monetary Policy Report*. In addition, the Federal Open Market Committee (FOMC) has released a statement after every regularly scheduled meeting for almost 20 years, and detailed minutes of FOMC meetings have been released since 1993.[1] In 2007, the Federal Reserve expanded the economic projections that have accompanied the *Monetary Policy Report* since 1979 into the Summary of Economic Projections, which FOMC participants submit every quarter. And in 2012, the FOMC first released its Statement on Longer-Run Goals and Monetary Policy Strategy, which it reaffirms annually.[2]

The Federal Reserve continues to make improvements to its communications. In January, the Chairman began holding a press conference after each FOMC meeting, doubling the frequency of the press conferences that were introduced in 2011. These press conferences are held 30 minutes after the release of the postmeeting statement and provide additional information about the economic outlook, the Committee's policy decision, and policy tools. Press conferences also allow the Chairman to answer questions on monetary policy and other issues in a timely fashion.

In November 2018, the Federal Reserve announced that it would conduct a broad review of its monetary policy framework—specifically, of the policy strategy, tools, and communication practices that the FOMC uses in the pursuit of its dual-mandate goals of maximum employment and price stability. The Federal Reserve's existing policy framework is the result of decades of learning and refinements and has allowed the FOMC to pursue effectively its dual-mandate goals. Central banks in a number of other advanced economies have also found it useful, at times, to conduct reviews of their monetary policy frameworks. Such a review seems particularly appropriate when the economy appears to have changed in ways that matter for the conduct of monetary policy. For example, the neutral level of the policy interest rate appears to have fallen in the United States and abroad, increasing the risk that a central bank's policy rate will be constrained by its effective lower bound in future economic downturns. The review will consider ways to ensure that the Federal Reserve's monetary policy strategy, tools, and communications going forward provide the best means to achieve and maintain the dual-mandate objectives.

The review will include outreach to and consultation with a broad range of stakeholders in the U.S. economy through a series of "Fed Listens" events. The Reserve Banks will hold forums around the country, in a town hall format, allowing the Federal Reserve to gather perspectives from the public, including representatives of business and industry, labor leaders, community and economic development officials, academics, nonprofit organizations, community bankers, local government officials, and representatives of congressional offices in Reserve Bank Districts.[3] In addition, the Federal Reserve

(continued on next page)

1. In December 2004, the FOMC decided to begin publishing the minutes three weeks after every meeting, expediting the publication schedule to provide the public with more timely information.

2. The statement is reprinted at the beginning of this report on p. ii. The FOMC also publishes transcripts of its meetings after a five-year lag. For a review of the main communication tools used by the Federal Reserve and other central banks, see the document "Monetary Policy Strategies of Major Central Banks," which is available on the webpage "Monetary Policy Principles and Practice" on the Board's website at https://www.federalreserve.gov/monetarypolicy/monetary-policy-principles-and-practice.htm.

3. "Fed Listens" events will be held at the Federal Reserve Bank of Dallas this February and at the Federal Reserve Bank of Minneapolis this April. Other "Fed Listens" events will be announced in coming weeks.

Federal Reserve Transparency *(continued)*

System will sponsor a research conference this June at the Federal Reserve Bank of Chicago, with academic speakers and non-academic panelists from outside the Federal Reserve System.

Beginning around the middle of 2019, as part of their review of how to best pursue the Fed's statutory mandate, Federal Reserve policymakers will discuss relevant economic research as well as the perspectives offered during the outreach events. At the end of the process, policymakers will assess the information and perspectives gathered and will report their findings and conclusions to the public.

This review complements other recent changes to the Federal Reserve's communication practices. In November 2018, the Board inaugurated two reports, the *Supervision and Regulation Report* and the *Financial Stability Report*.[4] These reports provide information about the Board's responsibility, shared with other government agencies, to foster the safety and soundness of the U.S. banking system and to promote financial stability. Transparency is key to these efforts, as it enhances public confidence, allows for the consideration of outside ideas, and makes it easier for regulated entities to know what is expected of them and how best to comply.

The *Supervision and Regulation Report* provides an overview of banking conditions and the current areas of focus of the Federal Reserve's regulatory policy framework, including pending rules, and key themes, trends, and priorities regarding supervisory programs. The report distinguishes between large financial institutions and regional and community banking organizations because supervisory approaches and priorities for these institutions frequently differ. The report provides information to the public in conjunction with semiannual testimony before the Congress by the Vice Chairman for Supervision.

The *Financial Stability Report* summarizes the Board's monitoring of vulnerabilities in the financial system. The Board monitors four broad categories of vulnerabilities, including elevated valuation pressures (as signaled by asset prices that are high relative to economic fundamentals or historical norms), excessive borrowing by businesses and households, excessive leverage within the financial sector, and funding risks (risks associated with a withdrawal of funds from a particular financial institution or sector, for example as part of a "financial panic"). Assessments of these vulnerabilities inform Federal Reserve actions to promote the resilience of the financial system, including through its supervision and regulation of financial institutions.

Through all of these efforts to improve its communications, the Federal Reserve seeks to enhance transparency and accountability regarding how it pursues its statutory responsibilities.

4. The *Supervision and Regulation Report* and the *Financial Stability Report* are available on the Board's website at, respectively, https://www.federalreserve.gov/publications/2018-november-supervision-and-regulation-report-preface.htm and https://www.federalreserve.gov/publications/2018-november-financial-stability-report-purpose.htm.

Part 3
Summary of Economic Projections

The following material appeared as an addendum to the minutes of the December 18–19, 2018, meeting of the Federal Open Market Committee.

In conjunction with the Federal Open Market Committee (FOMC) meeting held on December 18–19, 2018, 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 2018 to 2021 and over the longer run.[19] Each participant's projections were based on information available at the time of the meeting, together with his or her 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.[20] "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.

All participants who submitted longer-run projections expected that, under appropriate monetary policy, growth in real GDP in 2019 would run somewhat above their individual estimate of its longer-run rate. Most participants continued to expect real GDP growth to slow throughout the projection horizon, with a majority of participants projecting growth in 2021 to be a little below their estimate of its longer-run rate. Almost all participants who submitted longer-run projections continued to expect that the unemployment rate would run below their estimate of its longer-run level through 2021. Most participants projected that inflation, as measured by the four-quarter percentage change in the price index for personal consumption expenditures (PCE), would increase slightly over the next two years, and nearly all participants expected that it would be at or slightly above the Committee's 2 percent objective in 2020 and 2021. Compared with the Summary of Economic Projections (SEP) from September, many participants marked down slightly their projections for real GDP growth and inflation in 2019. Table 1 and figure 1 provide summary statistics for the projections.

As shown in figure 2, participants generally continued to expect that the evolution of the economy, relative to their objectives of maximum employment and 2 percent inflation, would likely warrant some further gradual increases in the federal funds rate. Compared with the September submissions, the median projections for the federal funds rate for the end of 2019 through 2021 and over the longer run were a little lower. Most participants expected that the federal funds rate at the end of 2020 and 2021 would be modestly higher than their estimate of its level over the longer run; however, many marked down the extent to which it would exceed their estimate of the longer-run level relative to their September projections.

19. Five members of the Board of Governors, one more than in September 2018, were in office at the time of the December 2018 meeting and submitted economic projections.

20. One participant did not submit longer-run projections for real GDP growth, the unemployment rate, or the federal funds rate.

Table 1. Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents, under their individual assessments of projected appropriate monetary policy, December 2018

Percent

Variable	Median[1]					Central tendency[2]					Range[3]				
	2018	2019	2020	2021	Longer run	2018	2019	2020	2021	Longer run	2018	2019	2020	2021	Longer run
Change in real GDP	3.0	2.3	2.0	1.8	1.9	3.0–3.1	2.3–2.5	1.8–2.0	1.5–2.0	1.8–2.0	3.0–3.1	2.0–2.7	1.5–2.2	1.4–2.1	1.7–2.2
September projection	3.1	2.5	2.0	1.8	1.8	3.0–3.2	2.4–2.7	1.8–2.1	1.6–2.0	1.8–2.0	2.9–3.2	2.1–2.8	1.7–2.4	1.5–2.1	1.7–2.1
Unemployment rate	3.7	3.5	3.6	3.8	4.4	3.7	3.5–3.7	3.5–3.8	3.6–3.9	4.2–4.5	3.7	3.4–4.0	3.4–4.3	3.4–4.2	4.0–4.6
September projection	3.7	3.5	3.5	3.7	4.5	3.7	3.4–3.6	3.4–3.8	3.5–4.0	4.3–4.6	3.7–3.8	3.4–3.8	3.3–4.0	3.4–4.2	4.0–4.6
PCE inflation	1.9	1.9	2.1	2.1	2.0	1.8–1.9	1.8–2.1	2.0–2.1	2.0–2.1	2.0	1.8–1.9	1.8–2.2	2.0–2.2	2.0–2.3	2.0
September projection	2.1	2.0	2.1	2.1	2.0	2.0–2.1	2.0–2.1	2.1–2.2	2.0–2.2	2.0	1.9–2.2	2.0–2.3	2.0–2.2	2.0–2.3	2.0
Core PCE inflation[4]	1.9	2.0	2.0	2.0		1.8–1.9	2.0–2.1	2.0–2.1	2.0–2.1		1.8–1.9	1.9–2.2	2.0–2.2	2.0–2.3	
September projection	2.0	2.1	2.1	2.1		1.9–2.0	2.0–2.1	2.1–2.2	2.0–2.2		1.9–2.0	2.0–2.3	2.0–2.2	2.0–2.3	
Memo: Projected appropriate policy path															
Federal funds rate	2.4	2.9	3.1	3.1	2.8	2.4	2.6–3.1	2.9–3.4	2.6–3.1	2.5–3.0	2.1–2.4	2.4–3.1	2.4–3.6	2.4–3.6	2.5–3.5
September projection	2.4	3.1	3.4	3.4	3.0	2.1–2.4	2.9–3.4	3.1–3.6	2.9–3.6	2.8–3.0	2.1–2.4	2.1–3.6	2.1–3.9	2.1–4.1	2.5–3.5

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 September projections were made in conjunction with the meeting of the Federal Open Market Committee on September 25–26, 2018. 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 September 25–26, 2018, meeting, and one participant did not submit such projections in conjunction with the December 18–19, 2018, 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.

On balance, participants continued to view the uncertainty around their projections as broadly similar to the average of the past 20 years. While most participants viewed the risks to the outlook as balanced, a couple more participants than in September saw risks to real GDP growth as weighted to the downside, and one less participant viewed the risks to inflation as weighted to the upside.

The Outlook for Economic Activity

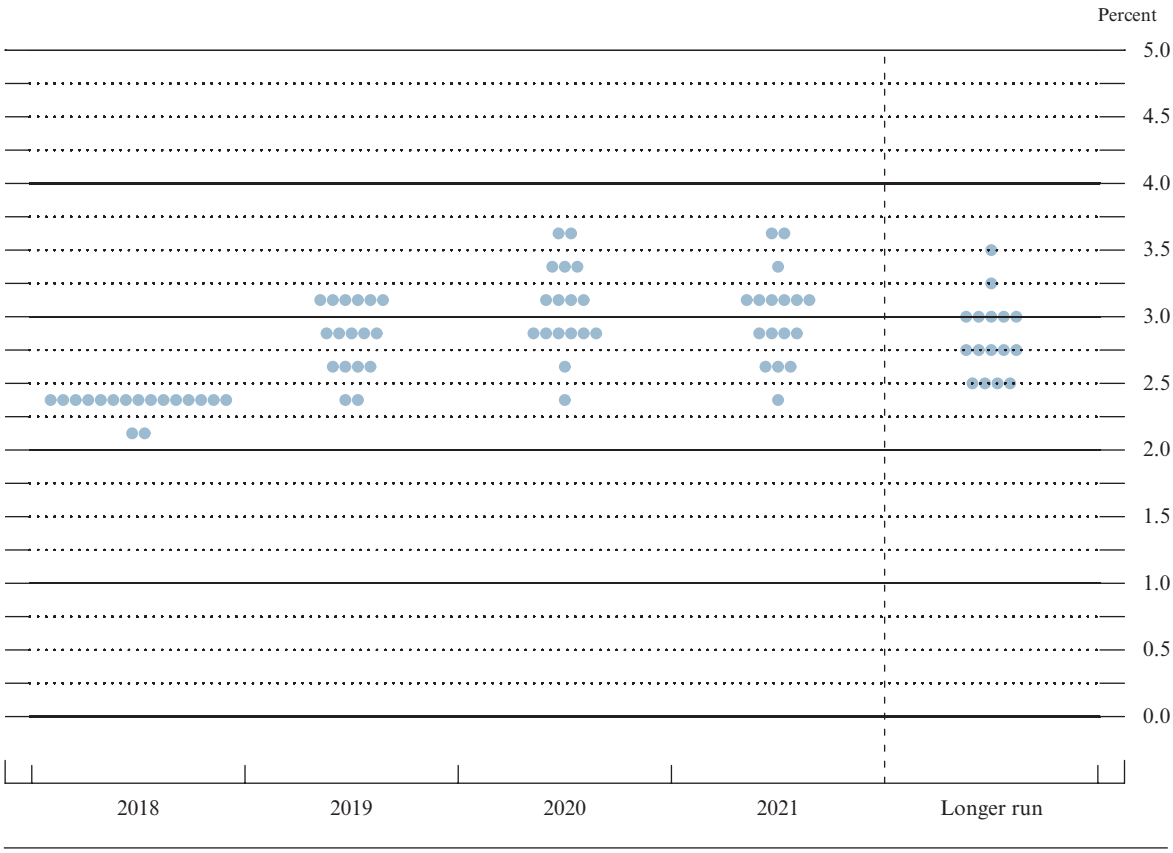
The median of participants' projections for the growth rate of real GDP for 2019, conditional on their individual assessment of appropriate monetary policy, was 2.3 percent, slower than the 3.0 percent pace expected for 2018. Most participants continued to expect GDP growth to slow throughout the projection horizon, with the median projection at 2.0 percent in 2020 and at 1.8 percent in 2021, a touch lower than the median estimate of its longer-run rate of 1.9 percent. Relative to the September SEP, the medians of the projections for real GDP growth for 2018 and 2019 were slightly lower, while the median for the longer-run rate of growth was a bit higher. Several participants mentioned tighter financial conditions or a softer global economic outlook as factors behind the downward revisions to their near-term growth estimates.

The median of projections for the unemployment rate in the fourth quarter of 2019 was 3.5 percent, unchanged from the September SEP and almost 1 percentage point below the median assessment of its longer-run normal level. With participants generally continuing to expect the unemployment rate to bottom out in 2019 or 2020, the median projections for 2020 and 2021 edged back up to 3.6 percent and 3.8 percent, respectively. Nevertheless, most participants continued to project that the unemployment rate in 2021 would still be well below their estimates of its longer-run level. The median estimate of the longer-run normal rate of unemployment was slightly lower than in September.

Figure 1. Medians, central tendencies, and ranges of economic projections, 2018–21 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.

Figures 3.A and 3.B show the distributions of participants' projections for real GDP growth and the unemployment rate from 2018 to 2021 and in the longer run. The distributions of individual projections for real GDP growth for 2019 and 2020 shifted down relative to those in the September SEP, while the distributions for 2021 and for the longer-run rate of GDP growth were little changed. The distribution of individual projections for the unemployment rate in 2019 was a touch more dispersed relative to the distribution of the September projections; the distribution moved slightly higher for 2020, while the distribution for the longer-run normal rate shifted toward the lower end of its range.

The Outlook for Inflation

The median of projections for total PCE price inflation was 1.9 percent in 2019, a bit lower than in the September SEP, while the medians for 2020 and 2021 were 2.1 percent, the same as in the previous projections. The medians of projections for core PCE price inflation over the 2019–21 period were 2.0 percent, a touch lower than in September. Some participants pointed to softer incoming data or recent declines in oil prices as reasons for shaving their projections for inflation.

Figures 3.C and 3.D provide information on the distributions of participants' views about

the outlook for inflation. On the whole, the distributions of projections for total PCE price inflation and core PCE price inflation beyond this year either shifted slightly to the left or were unchanged relative to the September SEP. Most participants revised down slightly their projections of total PCE price inflation for 2019. All participants expected that total PCE price inflation would be in a range from 2.0 to 2.3 percent in 2020 and 2021. Most participants projected that core PCE inflation would run at 2.0 to 2.1 percent throughout the projection horizon.

Appropriate Monetary Policy

Figure 3.E shows distributions of participants' judgments regarding the appropriate target—or midpoint of the target range—for the federal funds rate at the end of each year from 2018 to 2021 and over the longer run. The distributions for 2019 through 2021 were less dispersed and shifted slightly toward lower values. Compared with the projections prepared for the September SEP, the median federal funds rate was 25 basis points lower over the 2019–21 period. For the end of 2019, the median of federal funds rate projections was 2.88 percent, consistent with two 25 basis point rate increases over the course of 2019. Thereafter, the medians of the projections were 3.13 percent at the end of 2020 and 2021. Most participants expected that the federal funds rate at the end of 2020 and 2021 would be modestly higher than their estimate of its level over the longer run; however, many marked down the extent to which it would exceed their estimate of the longer-run level relative to their September projections. The median of the longer-run projections of the federal funds rate was 2.75 percent, 25 basis points lower than in September.

In discussing their projections, many participants continued to express the view that any further increases in the federal funds rate over the next few years would likely be gradual. That anticipated pace reflected a few factors, such as a short-term neutral real interest rate that is currently low and an inflation rate that has been rising only gradually to the Committee's 2 percent objective. Some participants cited a weaker near-term trajectory for economic growth or a muted response of inflation to tight labor market conditions as factors contributing to the downward revisions in their assessments of the appropriate path for the policy rate.

Uncertainty and Risks

In assessing the appropriate path of the federal funds rate, FOMC participants take account of the range of possible economic outcomes, the likelihood of those outcomes, and the potential benefits and costs should they occur. As a reference, table 2 provides measures of forecast uncertainty—based on the forecast errors of various private and government forecasts over the past 20 years—for real GDP growth, the unemployment rate, and total PCE price inflation. Those measures are represented graphically in the "fan charts" shown in the top panels of figures 4.A, 4.B, and 4.C. The fan charts display the median SEP projections for the three variables surrounded by symmetric confidence intervals derived from the forecast errors reported in table 2. If the degree of uncertainty attending these projections is similar to the typical magnitude

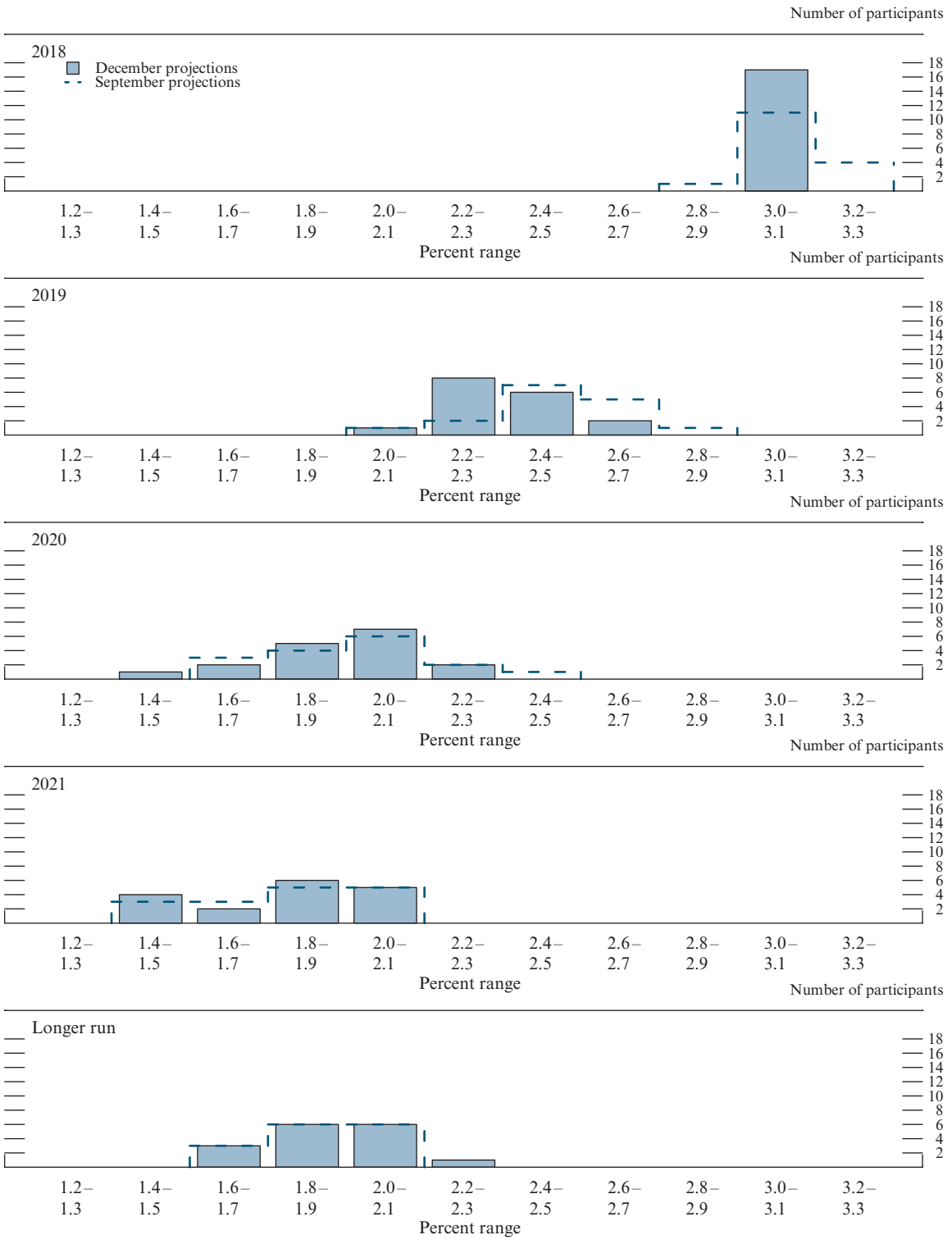
Table 2. Average historical projection error ranges
Percentage points

Variable	2018	2019	2020	2021
Change in real GDP[1]	±0.8	±1.6	±2.1	±2.1
Unemployment rate[1]	±0.1	±0.8	±1.5	±1.9
Total consumer prices[2]	±0.2	±1.0	±1.0	±1.0
Short-term interest rates[3]	±0.1	±1.4	±2.0	±2.4

Note: Error ranges shown are measured as plus or minus the root mean squared error of projections for 1998 through 2017 that were released in the winter 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.

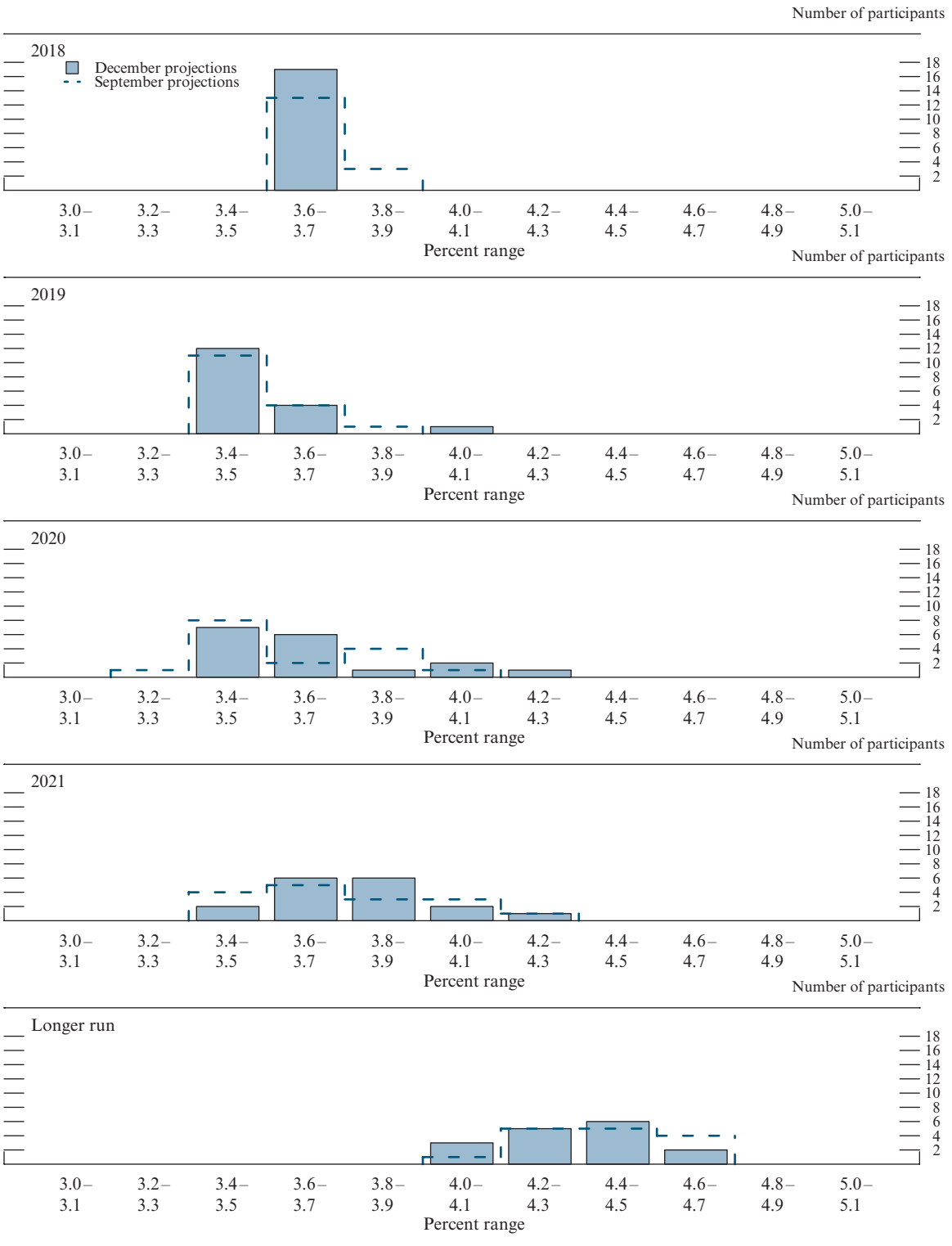
1. Definitions of variables are in the general note to table 1.
2. Measure is the overall consumer price index, the price measure that has been most widely used in government and private economic forecasts. Projections are percent changes on a fourth quarter to fourth quarter basis.
3. For Federal Reserve 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.

Figure 3.A. Distribution of participants' projections for the change in real GDP, 2018–21 and over the longer run



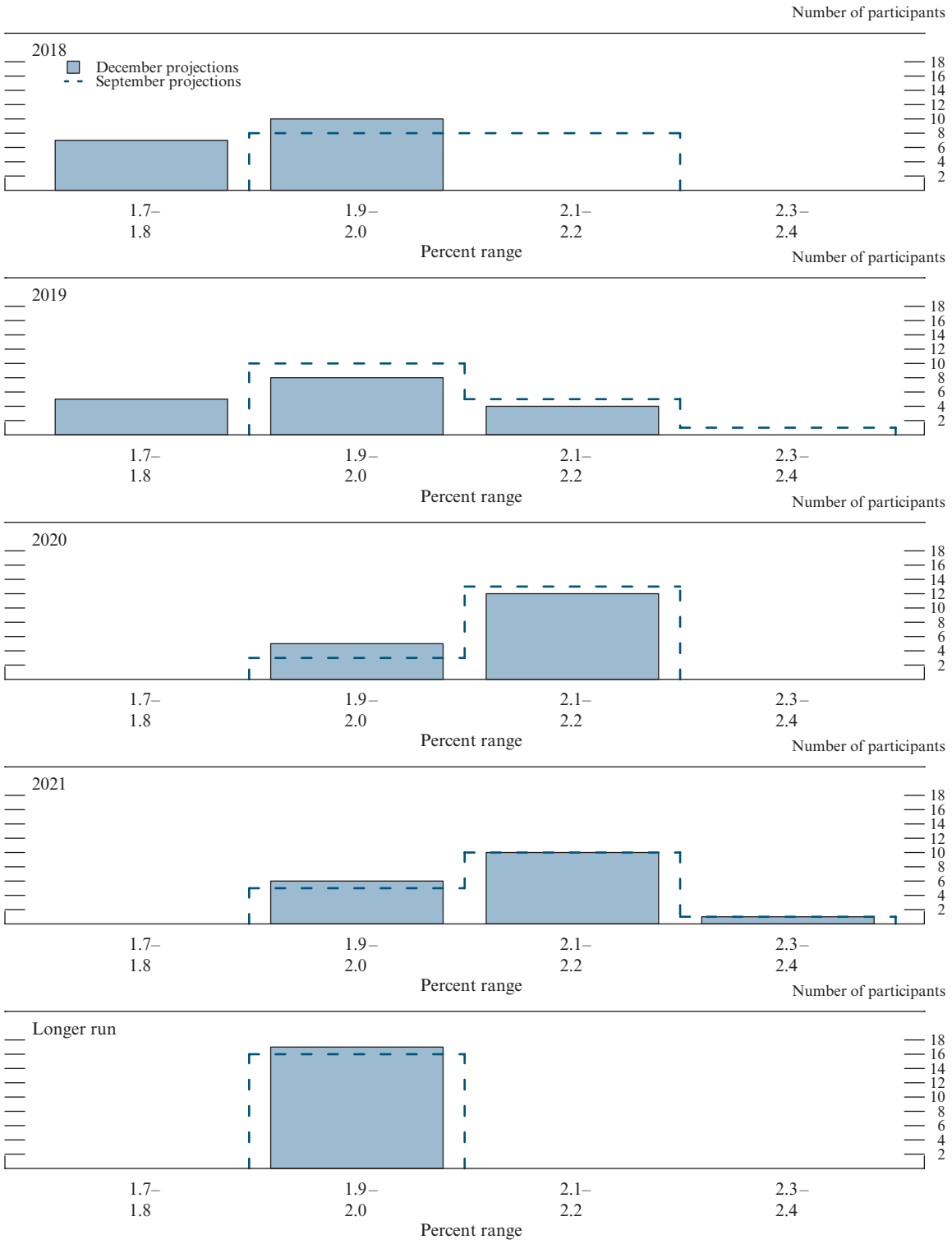
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.B. Distribution of participants' projections for the unemployment rate, 2018–21 and over the longer run



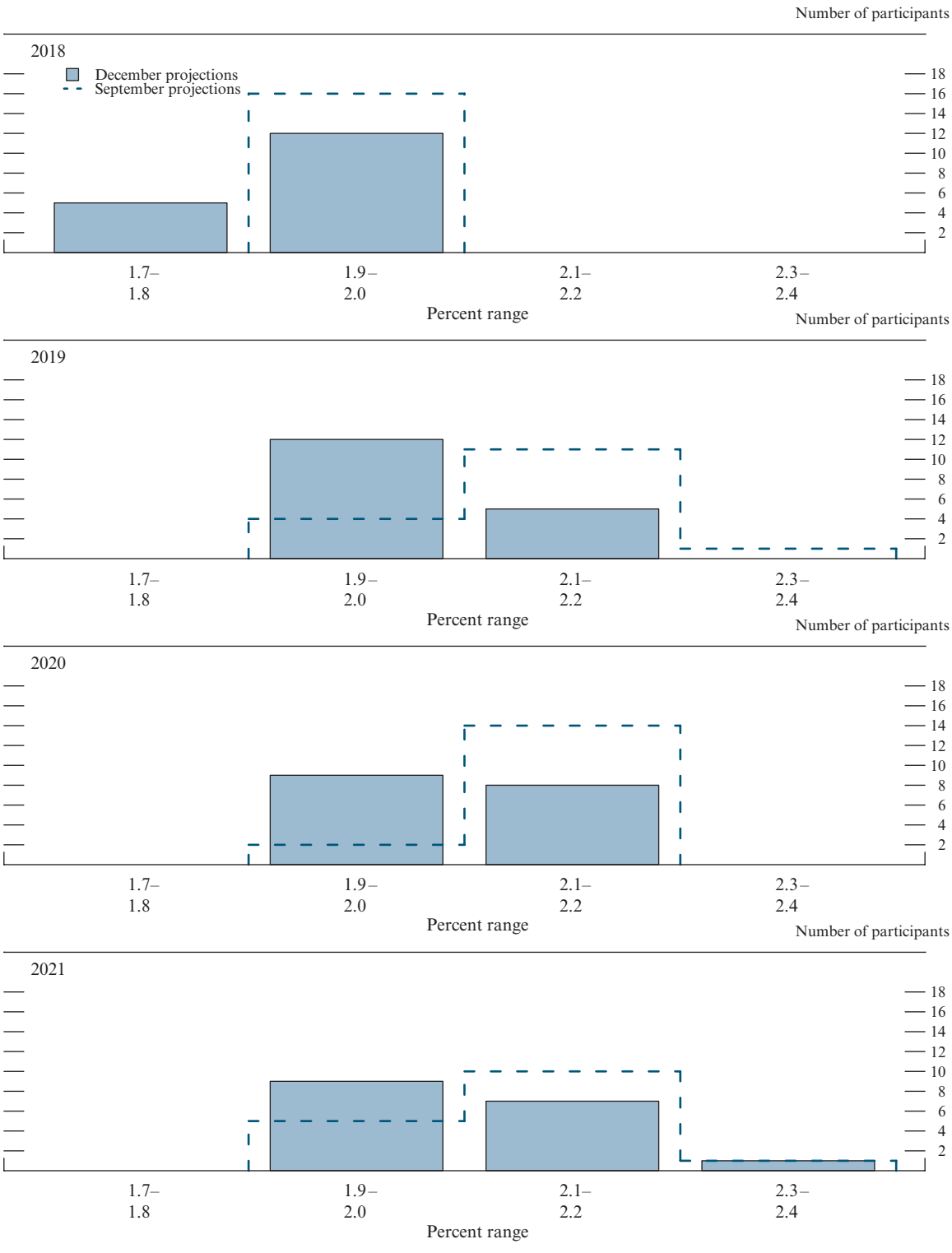
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.C. Distribution of participants' projections for PCE inflation, 2018–21 and over the longer run



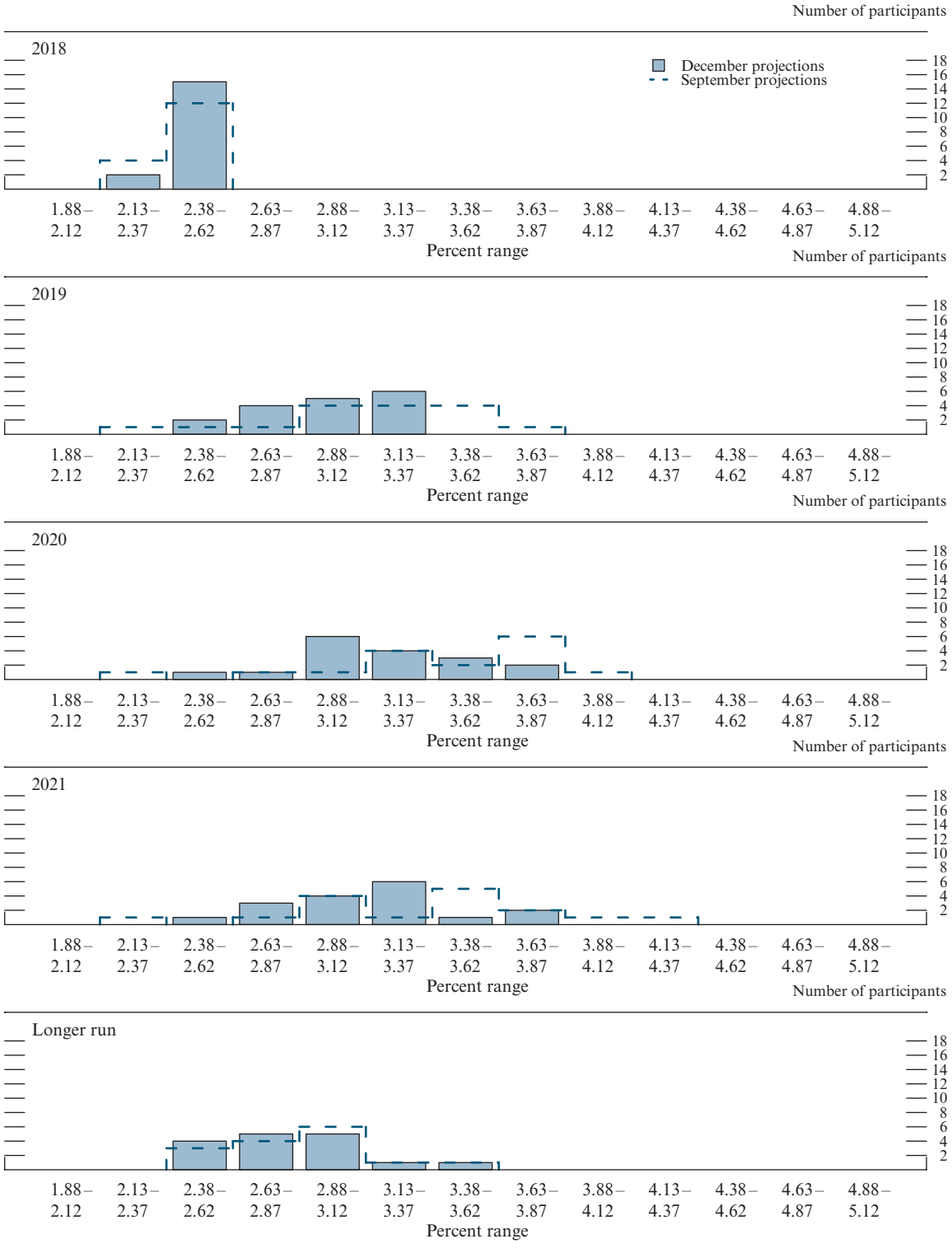
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.D. Distribution of participants' projections for core PCE inflation, 2018–21



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, 2018–21 and over the longer run



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

of past forecast errors and the risks around the projections are broadly balanced, then future outcomes of these variables would have about a 70 percent probability of being within these confidence intervals. For all three variables, this measure of uncertainty is substantial and generally increases as the forecast horizon lengthens.

Participants' assessments of the level of uncertainty surrounding their individual economic projections are shown in the bottom-left panels of figures 4.A, 4.B, and 4.C. Participants generally continued to view the degree of uncertainty attached to their economic projections for real GDP growth and inflation as broadly similar to the average of the past 20 years.[21] A couple more participants than in September viewed the uncertainty around the unemployment rate as higher than average.

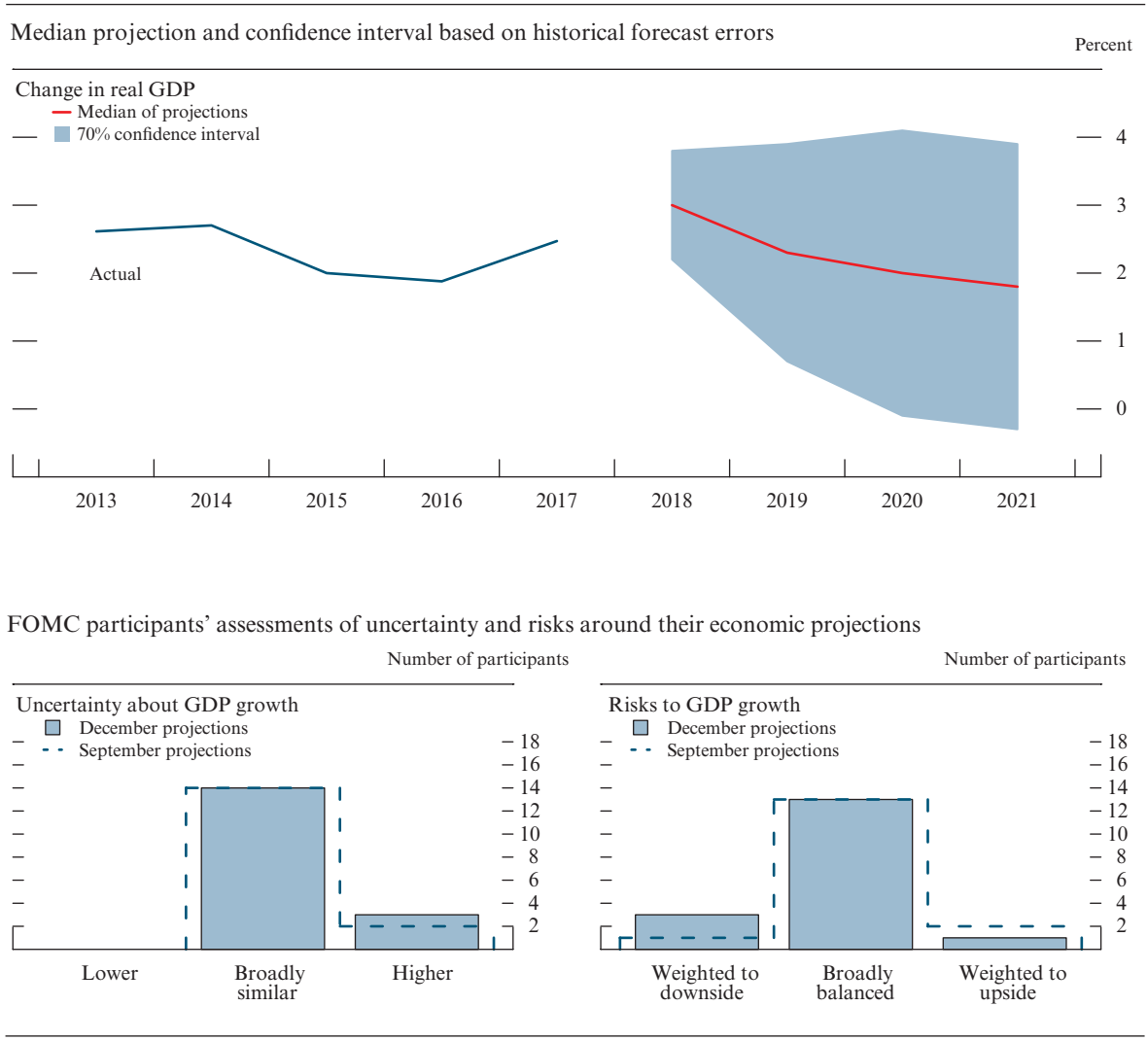
Because the fan charts are constructed to be symmetric around the median projections, they do not reflect any asymmetries in the balance of risks that participants may see in their economic projections. Participants' assessments of the balance of risks to their economic projections are shown in the bottom-right panels of figures 4.A, 4.B, and 4.C. Most participants generally judged the risks to the outlook for real GDP growth, the unemployment rate, headline inflation, and core inflation as broadly balanced—in other words, as broadly consistent with a symmetric fan chart. Two more participants than in September saw the risks to real GDP growth as weighted to the downside, and one less judged the risks as weighted to the upside. The balance of risks to the projection for the unemployment rate was unchanged, with three participants judging the risks to the unemployment rate as weighted to the downside and two participants viewing the risks as weighted to the upside. In addition, the balance of risks to the inflation projections shifted down slightly relative to September, as one less participant judged the risks to both total and core inflation as weighted to the upside and one more participant viewed the risks as weighted to the downside.

In discussing the uncertainty and risks surrounding their economic projections, participants mentioned trade tensions as well as financial and foreign economic developments as sources of uncertainty or downside risk to the growth outlook. For the inflation outlook, the effects of trade restrictions were cited as upside risks and lower energy prices and the stronger dollar as downside risks. Those who commented on U.S. fiscal policy viewed it as an additional source of uncertainty and noted that it might present two-sided risks to the outlook, as its effects could be waning faster than expected or turn out to be more stimulative than anticipated.

Participants' assessments of the appropriate future path of the federal funds rate were also subject to considerable uncertainty. Because the Committee adjusts the federal funds rate in response to actual and prospective developments over time in real GDP growth, the unemployment rate, and inflation, uncertainty surrounding the projected path for the federal funds rate importantly reflects the uncertainties about the paths for those key economic variables along with other factors. Figure 5 provides a graphical representation of this uncertainty, plotting the median SEP projection for the federal funds rate surrounded by confidence intervals derived from the results presented in table 2. As with the macroeconomic variables, the forecast uncertainty surrounding the appropriate path of the federal funds rate is substantial and increases for longer horizons.

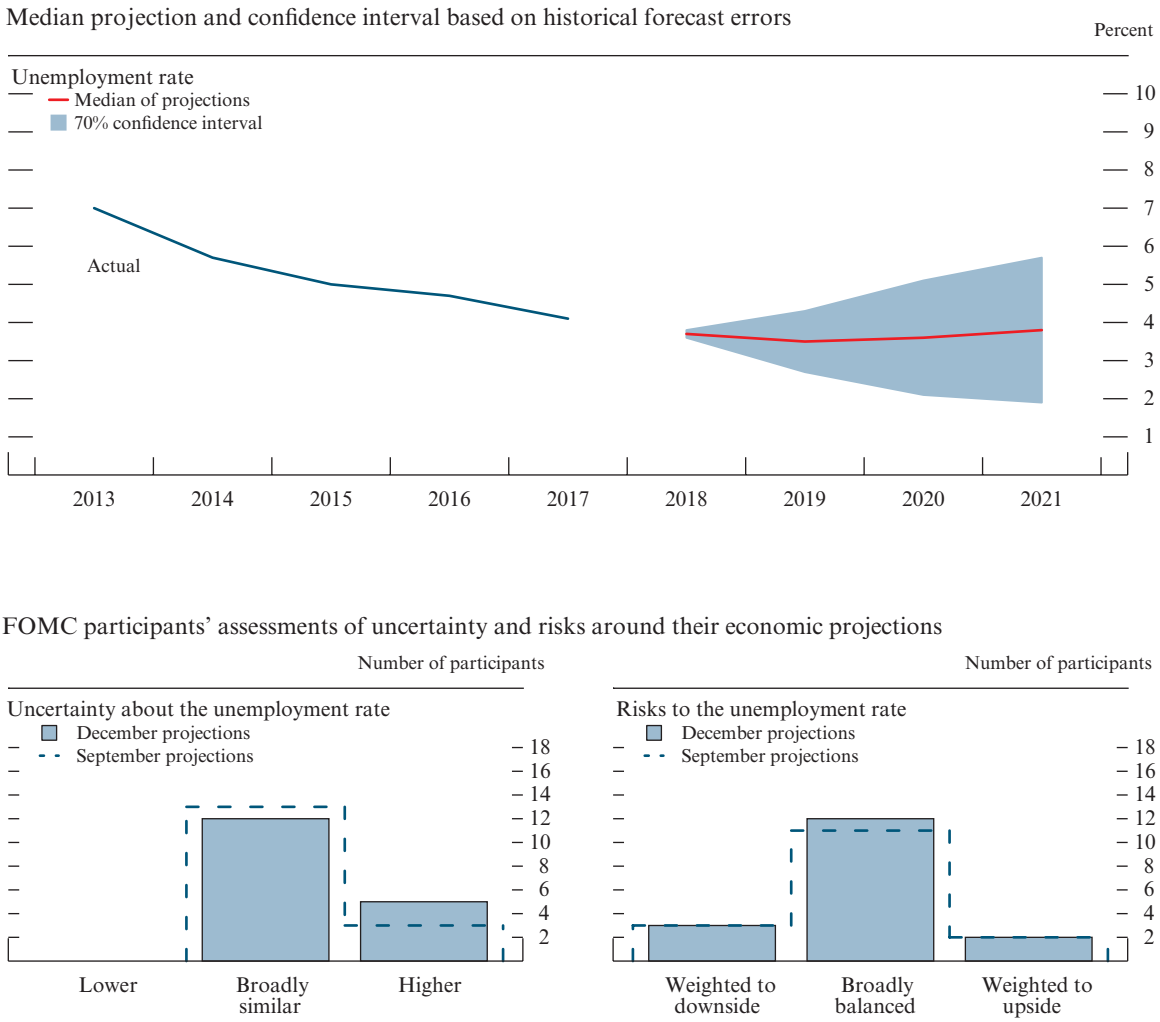
21. At the end of this summary, the box "Forecast Uncertainty" discusses the sources and interpretation of uncertainty surrounding the economic forecasts and explains the approach used to assess the uncertainty and risks attending the participants' projections.

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



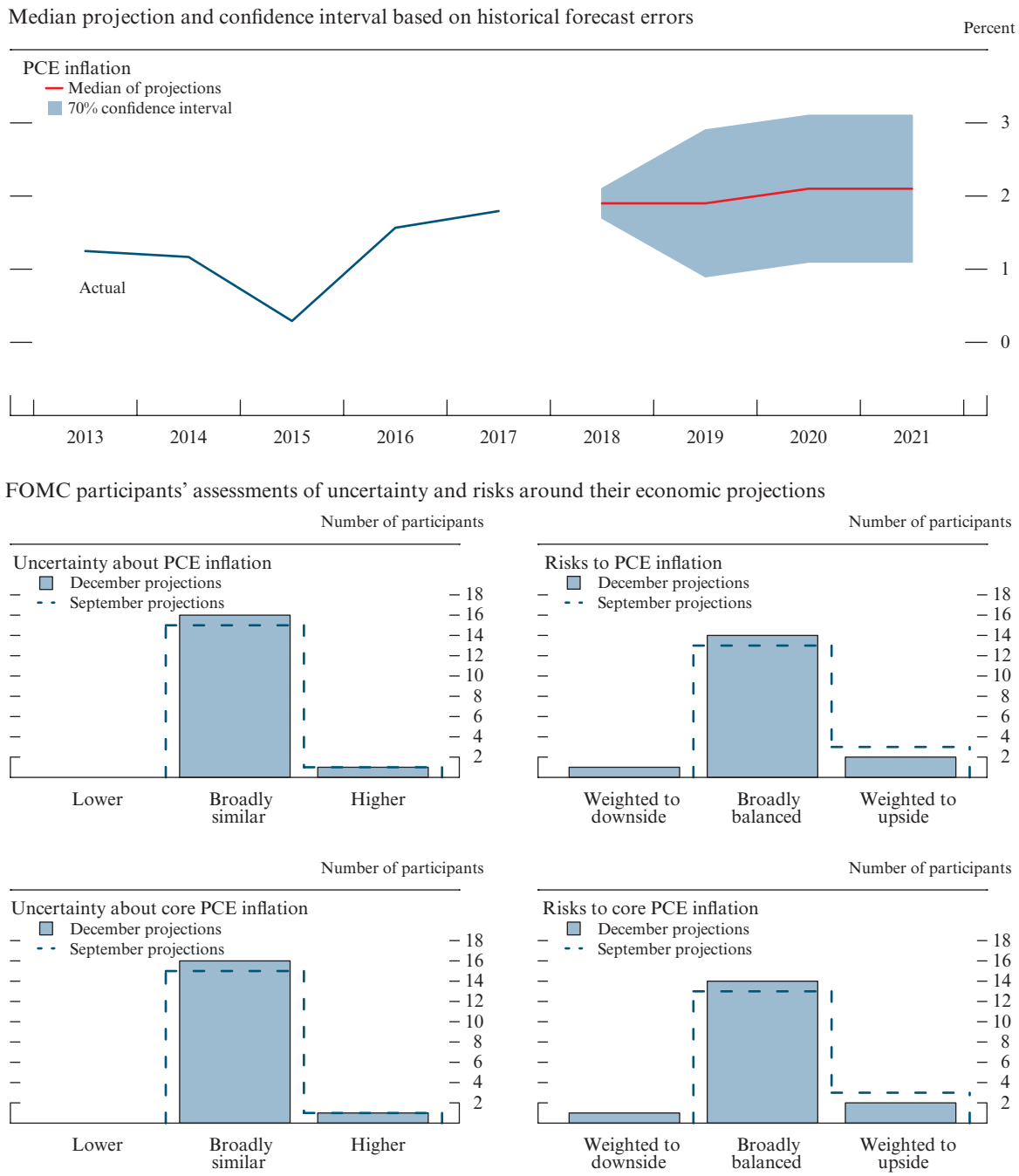
NOTE: The blue and red lines in the top panel show actual values and median projected values, respectively, of the percent change in real gross domestic product (GDP) from the fourth quarter of the previous year to the fourth quarter of the year indicated. The confidence interval around the median projected 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."

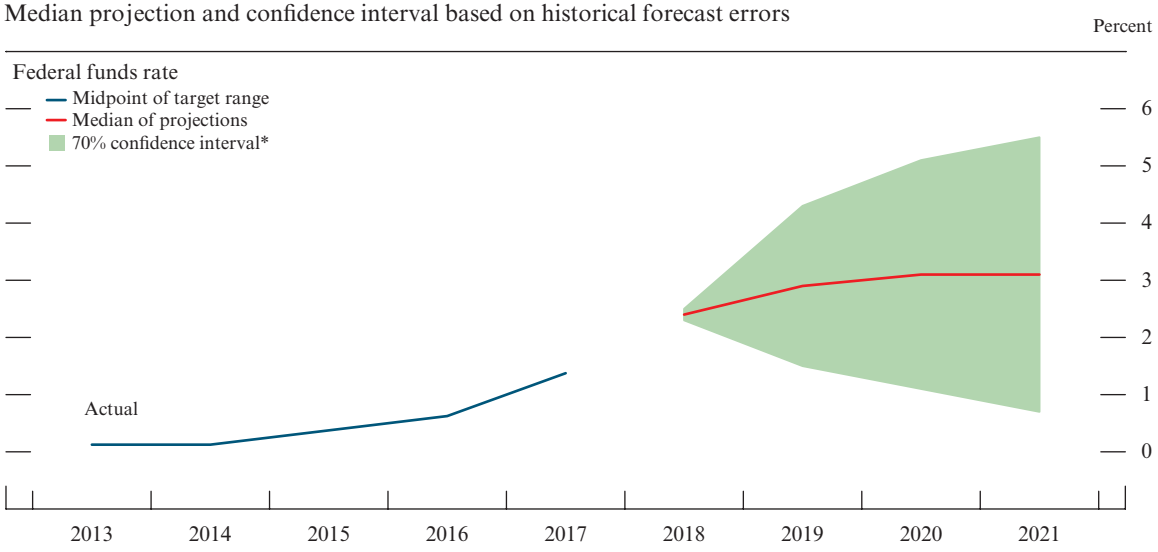
Figure 4.C. Uncertainty and risks in projections of PCE inflation



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 5. Uncertainty in projections of the federal funds rate

Median projection and confidence interval based on historical forecast errors



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.

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 Reports* 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 2.2 to 3.8 percent in the current year, 1.4 to 4.6 percent in the second year, and 0.9 to 5.1 percent in the third and fourth years. The corresponding 70 percent confidence intervals for overall inflation would be 1.8 to 2.2 percent in the current year and 1.0 to 3.0 percent in the second, third, and fourth years. 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

(continued)

panels 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
BOE	Bank of England
C&I	commercial and industrial
CRE	commercial real estate
DFMU	designated financial market utility
EBITDA	earnings before interest, taxes, depreciation, and amortization
ECB	European Central Bank
EME	emerging market economy
EPOP	employment-to-population
EU	European Union
FOMC	Federal Open Market Committee; also, the Committee
GDP	gross domestic product
JOLTS	Job Openings and Labor Turnover Survey
LFPR	labor force participation rate
LSAP	large-scale asset purchase
MBS	mortgage-backed securities
Michigan survey	University of Michigan Surveys of Consumers
ON RRP	overnight reverse repurchase agreement
PCE	personal consumption expenditures
SEP	Summary of Economic Projections
SLOOS	Senior Loan Officer Opinion Survey on Bank Lending Practices
SSDI	Social Security Disability Insurance
TCJA	Tax Cuts and Jobs Act
TGA	Treasury General Account
TIPS	Treasury Inflation-Protected Securities
VIX	implied volatility for the S&P 500 index