Minutes of the Federal Open Market Committee
September 19–20, 2017

A joint meeting of the Federal Open Market Committee and the Board of Governors was held in the offices of the Board of Governors of the Federal Reserve System in Washington, D.C., on Tuesday, September 19, 2017, at 1:00 p.m. and continued on Wednesday, September 20, 2017, at 9:00 a.m.[1]

PRESENT:
Janet L. Yellen, Chair
William C. Dudley, Vice Chairman
Lael Brainard
Charles L. Evans
Stanley Fischer
Patrick Harker
Robert S. Kaplan
Neel Kashkari
Jerome H. Powell

Raphael W. Bostic, Loretta J. Mester, Mark L. Mullinix, and John C. Williams, Alternate Members of the Federal Open Market Committee

James Bullard, Esther L. George, and Eric Rosengren, Presidents of the Federal Reserve Banks of St. Louis, Kansas City, and Boston, respectively

Brian F. Madigan, Secretary
Matthew M. Luecke, Deputy Secretary
David W. Skidmore, Assistant Secretary
Michelle A. Smith, Assistant Secretary
Mark E. Van Der Weide, General Counsel
Michael Held, Deputy General Counsel
Steven B. Kamin, Economist
Thomas Laubach, Economist
David W. Wilcox, Economist

James A. Clouse, Thomas A. Connors, Evan F. Koenig, William Wascher, Beth Anne Wilson, and Mark L.J. Wright, Associate Economists

Simon Potter, Manager, System Open Market Account

Lorie K. Logan, Deputy Manager, System Open Market Account

Ann E. Misback, Secretary, Office of the Secretary, Board of Governors

Matthew J. Eichner,[2] Director, Division of Reserve Bank Operations and Payment Systems, Board of Governors; Michael S. Gibson, Director, Division of Supervision and Regulation, Board of Governors; Andreas Lehnert, Director, Division of Financial Stability, Board of Governors

Michael T. Kiley, Deputy Director, Division of Financial Stability, Board of Governors; Stephen A. Meyer, Deputy Director, Division of Monetary Affairs, Board of Governors

Trevor A. Reeve, Senior Special Adviser to the Chair, Office of Board Members, Board of Governors

David Bowman, Joseph W. Gruber, David Reifschneider, and John M. Roberts, Special Advisers to the Board, Office of Board Members, Board of Governors

Linda Robertson, Assistant to the Board, Office of Board Members, Board of Governors

David E. Lebow and Michael G. Palumbo, Senior Associate Directors, Division of Research and Statistics, Board of Governors

Antulio N. Bomfim, Edward Nelson, and Joyce K. Zickler, Senior Advisers, Division of Monetary Affairs, Board of Governors

Jane E. Ihrig, Associate Director, Division of Monetary Affairs, Board of Governors; John J. Stevens and Stacey Tevlin, Associate Directors, Division of Research and Statistics, Board of Governors

[1] The Federal Open Market Committee is referenced as the "FOMC" and the "Committee" in these minutes.

[2] Attended the discussions of the proposed changes to Rules Regarding Availability of Information and developments in financial markets and open market operations.

Steven A. Sharpe, Deputy Associate Director, Division of Research and Statistics, Board of Governors; Min Wei, Deputy Associate Director, Division of Monetary Affairs, Board of Governors

Penelope A. Beattie,[3] Assistant to the Secretary, Office of the Secretary, Board of Governors

Michiel De Pooter, Section Chief, Division of Monetary Affairs, Board of Governors

David H. Small, Project Manager, Division of Monetary Affairs, Board of Governors

Martin Bodenstein, Principal Economist, Division of Monetary Affairs, Board of Governors

Randall A. Williams, Information Manager, Division of Monetary Affairs, Board of Governors

Mark A. Gould, First Vice President, Federal Reserve Bank of San Francisco

David Altig, Kartik B. Athreya, Glenn D. Rudebusch, and Geoffrey Tootell, Executive Vice Presidents, Federal Reserve Banks of Atlanta, Richmond, San Francisco, and Boston, respectively

Spencer Krane and Keith Sill, Senior Vice Presidents, Federal Reserve Banks of Chicago and Philadelphia, respectively

David C. Wheelock and Jonathan L. Willis, Vice Presidents, Federal Reserve Banks of St. Louis and Kansas City, respectively

Stefano M. Eusepi, Assistant Vice President, Federal Reserve Bank of New York

Edward S. Prescott, Senior Professional Economist, Federal Reserve Bank of Cleveland

Proposed Changes to Rules Regarding Availability of Information

The Committee unanimously voted to further amend its Rules Regarding Availability of Information (Rules) in order to incorporate input received during the public commenting process that followed the December 2016 publication in the *Federal Register* of an earlier version of the Rules.[4] The amendment approved at this meeting indicated that if, in the course of processing a Freedom of Information Act request, "an adverse determination is upheld on appeal, in whole or in part," the requester will be informed "of the availability of dispute resolution services from the Office of Government Information Services as a nonexclusive alternative to litigation." This notice will be provided in addition to the ongoing practice of informing the requester of the right to seek judicial review.

Secretary's note: The amended Rules adopted at this meeting were published in the *Federal Register* as a final rule on October 2, 2017, and will go into effect 30 days following publication.

Developments in Financial Markets and Open Market Operations

The manager of the System Open Market Account (SOMA) reported on developments in domestic and foreign financial markets over the period since the July FOMC meeting. Yields on longer-term Treasury securities had fallen modestly, the foreign exchange value of the dollar had declined, and broad equity price indexes had increased. Survey responses suggested that the vast majority of market participants expected the FOMC to announce a change in SOMA reinvestment policy at this meeting and that nearly all market participants anticipated that the FOMC would also leave the target range for the federal funds rate unchanged.

The deputy manager followed with a report on developments in money markets and open market operations over the intermeeting period. The effective federal funds rate remained near the center of the FOMC's target range except on month-ends. Take-up at the System's overnight reverse repurchase agreement facility averaged somewhat less than in the previous period. The deputy manager provided updates on developments with respect to reference interest rates and on small-value tests of open market operations, which are conducted routinely to promote operational readiness. The deputy manager also summarized the results of the staff's annual review of foreign reserves investment and its recommendations to the Foreign Currency Subcommittee for key parameters for foreign reserves investment for the forthcoming year, and the deputy manager

[3] Attended Tuesday session only.

[4] In compliance with the FOIA Improvement Act of 2016, the earlier version of the Rules was published in the *Federal Register* as an interim final rule on December 27, 2016.

noted that the Subcommittee would welcome any input from the Committee regarding those parameters.

> Secretary's note: On September 27, 2017, the Foreign Currency Subcommittee provided to the Federal Reserve Bank selected to conduct open market operations instructions that incorporated the staff recommendations for key parameters for foreign reserves investment.

Finally, the manager reviewed details of the operational approach that the Open Market Desk planned to follow if the Committee decided at this meeting to initiate the proposal for SOMA reinvestment policy described in the Committee's June 2017 Addendum to the Policy Normalization Principles and Plans.

By unanimous vote, the Committee ratified the Desk's domestic transactions over the intermeeting period. There were no intervention operations in foreign currencies for the System's account during the intermeeting period.

Staff Review of the Economic Situation

The information reviewed for the September 19–20 meeting showed that labor market conditions continued to strengthen in July and August and that real gross domestic product (GDP) appeared to be rising at a moderate pace in the third quarter before the landfall of Hurricanes Harvey and Irma. Only limited data pertaining to the economic effects of these hurricanes were available at the time of the meeting, but it appeared likely that the negative effects would restrain national economic activity only in the near term.[5] Total consumer price inflation, as measured by the 12-month change in the price index for personal consumption expenditures (PCE), continued to run below 2 percent in July and was lower than at the start of the year. Survey-based measures of longer-run inflation expectations were little changed on balance.

Total nonfarm payroll employment rose solidly in July and August, with strong gains in private-sector jobs and declines in government employment. The unemployment rate dipped to 4.3 percent in July and edged back up to 4.4 percent in August. The unemployment rates for African Americans, for Hispanics, and for whites were lower, on average, in recent months than around the start of the year, whereas the unemployment rate for Asians was a little higher. The overall labor force participation rate edged up in July and was unchanged in August, and the share of workers employed part time for economic reasons was little changed on net. The rate of private-sector job openings increased in June and July, the hiring rate ticked up, and the quits rate edged down. Initial claims for unemployment insurance benefits jumped in early September from a very low level, and the Department of Labor noted that Hurricane Harvey had an effect on claims. Changes in measures of labor compensation were mixed. Compensation per hour rose just 1¼ percent over the four quarters ending in the second quarter of 2017 (partly reflecting a significant downward revision to compensation per hour in the second half of 2016), the employment cost index for private workers increased 2½ percent over the 12 months ending in June, and average hourly earnings for all employees rose 2½ percent over the 12 months ending in August.

Total industrial production (IP) increased for a sixth consecutive month in July but then declined sharply in August. The decrease in August largely reflected the temporary effects of Hurricane Harvey on drilling, servicing, and extraction activity for oil and natural gas and on output in several manufacturing industries that are concentrated in the Gulf Coast region, including petroleum refining, organic chemicals, and plastics materials and resins. Production disruptions from Hurricane Harvey continued into September, and the effects of Hurricane Irma were anticipated to hold down IP in that month as well. Even so, anecdotal reports from the hurricane-affected regions, as well as daily data on capacity outages in selected Gulf Coast industries, indicated that production had already started to recover. Meanwhile, automakers' assembly schedules suggested that motor vehicle production would move up, on balance, over the remainder of the year despite a somewhat elevated level of dealers' inventories and a slowing in the pace of vehicle sales in recent months. Broader indicators of manufacturing production, such as the new orders indexes from national and regional manufacturing surveys, continued to point to moderate gains in factory output over the near term.

Several pieces of information suggested that real PCE was likely increasing at a slower rate in the third quarter than in the second. First, the components of the nominal retail sales data used by the Bureau of Economic Analysis to construct its estimate of PCE declined in August and were revised down in June and July. Second,

[5] The background materials prepared by the staff for this meeting were completed before the full effects of Hurricane Maria were evident.

the pace of light motor vehicle sales moved lower, on net, in July and August. Third, Hurricanes Harvey and Irma appeared likely to temporarily reduce consumer spending. However, recent readings on key factors that influence consumer spending—including continued gains in employment, real disposable personal income, and households' net worth—remained supportive of solid growth in real PCE. Consumer sentiment, as measured by the University of Michigan Surveys of Consumers, was upbeat through early September.

Recent information on housing activity suggested that real residential investment spending was decreasing in the third quarter after declining in the second quarter. Starts for new single-family homes edged down, on net, in July and August, and starts for multifamily units moved lower in both months. Building permit issuance for new single-family homes—which tends to be a good indicator of the underlying trend in construction—declined in July and August. Sales of both new and existing homes decreased in July.

Real private expenditures for business equipment and intellectual property appeared to be increasing at a solid rate in the third quarter. Nominal orders and shipments of nondefense capital goods excluding aircraft rose over the two months ending in July, and readings on business sentiment remained upbeat. In contrast, investment in nonresidential structures was poised to decline in the third quarter. Firms' nominal spending for nonresidential structures excluding drilling and mining fell sharply in June and July, and the number of oil and gas rigs in operation, an indicator of spending for structures in the drilling and mining sector, leveled out in the past couple of months after increasing steadily for the past year.

Total real government purchases looked to be roughly flat, on balance, in the third quarter. Nominal outlays for defense in July and August pointed to a small increase in real federal government purchases in the third quarter. However, payrolls for state and local governments declined in July and August, and nominal construction spending by these governments decreased in July.

The nominal U.S. international trade deficit narrowed substantially in June and was about unchanged in July. After increasing in June, exports retraced a bit of this gain in July, with lower exports of consumer goods, automotive products, and services. Imports decreased a little in both months. The available data suggested that net exports contributed positively to real GDP growth in the third quarter.

Total U.S. consumer prices, as measured by the PCE price index, increased nearly 1½ percent over the 12 months ending in July. Core PCE price inflation, which excludes consumer food and energy prices, also was about 1½ percent over that same period. Over the 12 months ending in August, the consumer price index (CPI) increased almost 2 percent, while core CPI inflation was 1¾ percent. Retail gasoline prices moved up sharply following the landfall of Hurricane Harvey and appeared likely to put temporary upward pressure on the 12-month change in total PCE prices. The median of inflation expectations over the next 5 to 10 years from the Michigan survey edged back up in the preliminary reading for September, and the median expectation for PCE price inflation over the next 10 years from the Survey of Professional Forecasters edged down. The medians of longer-run inflation expectations from the Desk's Survey of Primary Dealers and Survey of Market Participants were relatively little changed in September.

Foreign economic activity continued to expand at a solid pace. Economic growth picked up in the advanced foreign economies (AFEs) in the second quarter, especially in Canada, and incoming indicators suggested that growth slowed in the third quarter but remained firm. Recent indicators from the emerging market economies (EMEs) also pointed to continued strong economic growth, notwithstanding some slowing in the rate of expansion of activity in China. Headline inflation in most AFEs remained subdued, held down in part by falling retail energy prices, but data through August suggested that the drag from energy prices was diminishing. Inflation also remained low in most EMEs, although food prices continued to put upward pressure on inflation in Mexico.

Staff Review of the Financial Situation

Domestic financial market conditions remained generally accommodative over the intermeeting period. U.S. equity prices increased, longer-term Treasury yields declined, and the dollar depreciated. Investors' interpretations of FOMC communications, market perceptions of a reduced likelihood of U.S. fiscal policy changes, and heightened geopolitical risks all reportedly placed downward pressure on longer-term yields. At the same time, financing conditions for households and nonfinancial businesses continued to provide support for growth in spending and investment.

FOMC communications over the intermeeting period reportedly were interpreted as indicating a somewhat slower pace of increases in the target range for the federal funds rate than previously expected. Market participants were attentive to the Committee's assessment of recent below-expectations inflation data and the acknowledgment in the July FOMC minutes that inflation might continue to run below the Committee's 2 percent objective for longer than anticipated. Investors also took note of the Committee's guidance in the July FOMC statement that it expected to begin implementing its balance sheet normalization program relatively soon. By the end of the intermeeting period, market participants appeared nearly certain that the Committee would announce the implementation of its balance sheet normalization plan at the September meeting. The probability of an increase in the target range for the federal funds rate occurring at either the September or the November meeting, as implied by quotes on federal funds futures contracts, fell to essentially zero, while the probability of a 25 basis point increase by the end of the year stood near 50 percent and was little changed since the July meeting. Quotes on overnight index swaps (OIS) pointed to a slight flattening of the expected path of the federal funds rate through 2020, with a staff model attributing most of the declines in OIS rates to lower expected rates.

Yields on intermediate- and longer-term nominal Treasury securities decreased modestly over the intermeeting period. Treasury yields fell following the July FOMC meeting, reflecting the response of investors to the postmeeting statement, and then dropped further amid rising geopolitical tensions related to North Korea and market perceptions of reduced prospects for enactment of a fiscal stimulus program. Economic data releases appeared to have little net effect on Treasury yields over most of the period. A staff term structure model attributed about half of the decline in the 10-year Treasury yield to a decrease in the average expected future short-term rate and the remaining half to a lower term premium. Measures of inflation compensation over the next 5 years rose modestly, on net, partly in response to the release of higher-than-expected CPI data for August, while inflation compensation 5 to 10 years ahead was little changed.

Broad U.S. equity price indexes increased over the intermeeting period. One-month-ahead option-implied volatility of the S&P 500 index—the VIX—remained at historically low levels despite brief spikes associated with increased investor concerns about geopolitical tensions and political uncertainties. Over the intermeeting period, spreads of yields on investment- and speculative-grade nonfinancial corporate bonds over those on comparable-maturity Treasury securities widened a bit.

Short-dated Treasury bill yields were elevated for a time, reflecting concerns about potential delays in raising the federal debt limit. However, following news of an agreement to extend the debt ceiling by three months, rates on Treasury bills maturing in October retraced their entire increase from early in the intermeeting period. Conditions in other domestic short-term funding markets were stable. Yields on a broad set of money market instruments remained in the ranges observed since the FOMC increased the target range for the federal funds rate in June. Daily take-up at the System's overnight reverse repurchase agreement facility ran somewhat lower than in the previous intermeeting period.

Since the July FOMC meeting, asset price movements in global financial markets were driven by geopolitical tensions in the Korean peninsula, improving economic prospects abroad, communications from AFE central banks, and changes in prospects for fiscal policy legislation in the United States. The broad index of the foreign exchange value of the dollar decreased 1½ percent; the decline was widespread, led by the strengthening of the euro and the Chinese renminbi. The Canadian dollar appreciated following a rate hike by the Bank of Canada at its September meeting that came sooner than market participants expected. Similarly, sterling appreciated after the Bank of England signaled a potential rate hike in the coming months. Against this backdrop, longer-term yields rose slightly in Canada and the United Kingdom. In contrast, longer-term German yields declined moderately, despite better-than-expected economic data releases for the euro area, as market expectations shifted toward a more gradual withdrawal of stimulus by the European Central Bank (ECB) even though the ECB kept its policy stance unchanged.

Despite generally better-than-expected earnings releases, AFE equity prices were mixed over the period, with bank stocks underperforming broader indexes. Outside South Korea, most emerging market asset prices were little affected by the recent escalation of geopolitical concerns. Net flows to emerging market mutual funds briefly turned negative in early August, but they quickly returned to near the high levels seen since early this year. Yield spreads on EME sovereign bonds edged down.

Financing conditions for U.S. nonfinancial businesses continued to be accommodative. Issuance of corporate debt and equity was strong in July and August. Gross issuance of institutional leveraged loans continued its robust pace in June but slowed notably in July, as is typical during the summer. Meanwhile, the growth of commercial and industrial (C&I) loans on banks' books ticked up in July and August compared with its pace over the first half of the year; however, C&I loan growth from the fourth quarter of last year through August remained significantly lower than over recent years.

Gross issuance of municipal bonds was strong in August, and spreads of yields on municipal bonds over those on comparable-maturity Treasury securities increased a bit over the intermeeting period. The credit quality of state and local governments improved overall, as the number of ratings upgrades notably outpaced the number of downgrades in August.

The growth of commercial real estate (CRE) loans on banks' books continued to moderate in July and August, reflecting a slowdown in lending both for nonfarm nonresidential units and for construction and land development; nonetheless, CRE financing appeared to remain broadly available. Issuance of commercial mortgage-backed securities (CMBS) so far this year was similar to that in the same period a year earlier. Spreads on CMBS over Treasury securities narrowed a little over the intermeeting period and were near the bottom of their ranges of the past several years. Delinquency rates on loans in CMBS pools declined slightly but remained elevated for loans that were originated before the financial crisis.

Interest rates on 30-year fixed-rate residential mortgages moved lower over the intermeeting period, in line with comparable-maturity Treasury yields. Growth in mortgage lending for home purchases picked up in July and August compared with its pace over the second quarter. However, credit conditions remained tight for borrowers with low credit scores or hard-to-document incomes.

Consumer credit continued to be readily available for most borrowers, and overall loan balances rose at a moderate pace in the second quarter, reflecting further expansions in credit card, auto, and student loan balances. Issuance of asset-backed securities remained robust over the year to date and outpaced that of the previous year, providing support for consumer lending. However, standards and terms on auto and credit card loans were tighter for subprime borrowers, likely in response to rising delinquencies on such loans. Subprime auto loan balances have declined so far this year, partly reflecting the tighter lending standards, and the average credit score of all borrowers who obtained an auto loan in the second quarter remained near the upper end of its range of the past few years.

Staff Economic Outlook

The U.S. economic projection prepared by the staff for the September FOMC meeting was broadly similar to the previous forecast. Real GDP was expected to rise at a solid pace, on net, in the second half of the year, and by a little more than previously projected, reflecting data on spending that were stronger than expected on balance. The short-term disruptions to spending and production associated with Hurricanes Harvey and Irma were expected to reduce real GDP growth in the third quarter and to boost it in the fourth quarter as production returned to its pre-hurricane path and as a portion of the lost spending was made up. The hurricanes were also expected to depress payroll employment in September, with a reversal over the next few months. Beyond 2017, the forecast for real GDP growth was little revised. In particular, the staff continued to project that real GDP would expand at a modestly faster pace than potential output through 2019. The unemployment rate was projected to decline gradually over the next couple of years and to continue running below the staff's estimate of its longer-run natural rate over this period. Because of continued subdued inflation readings and, given real GDP growth, a larger-than-expected decline in the unemployment rate over much of the past year, the staff revised down slightly its estimate of the longer-run natural rate of unemployment in this projection.

The staff's forecast for consumer price inflation, as measured by the change in the PCE price index, was revised up somewhat for 2017 in response to hurricane-related effects on gasoline prices. The near-term forecast for core PCE price inflation was essentially unrevised. Total PCE price inflation this year was expected to run at the same pace as last year, with a slower increase in core PCE prices offset by a slightly larger increase in energy prices and an upturn in the prices for food and non-energy imports. Beyond 2017, the inflation forecast was little revised from the previous projection. The staff continued to project that inflation would edge higher in the next couple of years and that it would reach the Committee's longer-run objective in 2019.

The staff viewed the uncertainty around its projections for real GDP growth, the unemployment rate, and inflation as similar to the average of the past 20 years. On the one hand, many financial market indicators of uncertainty remained subdued, and the uncertainty associated with the foreign outlook still appeared to be less than last year; on the other hand, uncertainty about the direction of some economic policies was judged to have remained elevated. The staff saw the risks to the forecasts for real GDP growth and the unemployment rate as balanced. The risks to the projection for inflation were also seen as balanced. Downside risks included the possibilities that longer-term inflation expectations may have edged down or that the recent run of soft inflation readings could prove to be more persistent than the staff expected. These downside risks were seen as essentially counterbalanced by the upside risk that inflation could increase more than expected in an economy that was projected to continue operating above its longer-run potential.

Participants' Views on Current Conditions and the Economic Outlook

In conjunction with this FOMC meeting, members of the Board of Governors and Federal Reserve Bank presidents submitted their projections of the most likely outcomes for real output growth, the unemployment rate, and inflation for each year from 2017 through 2020 and over the longer run, based on their individual assessments of the appropriate path for the federal funds rate.[6] The longer-run projections represented each participant's assessment of the rate 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. These projections and policy assessments are described in the Summary of Economic Projections, which is an addendum to these minutes.

In their discussion of the economic situation and the outlook, meeting participants agreed that information received over the intermeeting period indicated that the labor market had continued to strengthen and that economic activity had been rising moderately so far this year. Job gains had remained solid in recent months, and the unemployment rate had stayed low. Household spending had been expanding at a moderate rate, and growth in business fixed investment had picked up in recent quarters. On a 12-month basis, overall inflation and the measure excluding food and energy prices had declined this year and were running below 2 percent. Market-based measures of inflation compensation remained low; survey-based measures of longer-term inflation expectations were little changed on balance.

Participants acknowledged that Hurricanes Harvey, Irma, and Maria would affect economic activity in the near term. They expected growth of real GDP in the third quarter to be held down by the severe disruptions caused by the storms but to rebound beginning in the fourth quarter as rebuilding got under way and economic activity in the affected areas resumed. Similarly, employment would be temporarily depressed by the hurricanes, but, abstracting from those effects, employment gains were anticipated to remain solid, and the unemployment rate was expected to decline a bit further by year-end.

Based on the estimated effects of past major hurricanes that made landfall in the United States, participants judged that the recent storms were unlikely to materially alter the course of the national economy over the medium term. Moreover, they generally viewed the information on spending, production, and labor market activity that became available over the intermeeting period, which was mostly not affected by the hurricanes, as suggesting little change in the outlook for economic growth and the labor market over the medium term. Consequently, they continued to expect that, with gradual adjustments in the stance of monetary policy, economic activity would expand at a moderate pace and labor market conditions would strengthen somewhat further. In the aftermath of the hurricanes, higher prices for gasoline and some other items were likely to boost inflation temporarily. Apart from that effect, inflation on a 12-month basis was expected to remain somewhat below 2 percent in the near term but to stabilize around the Committee's 2 percent objective over the medium term. Near-term risks to the economic outlook appeared roughly balanced, but participants agreed to continue to monitor inflation developments closely.

Consumer spending had been expanding at a moderate rate through the summer, and reports on retail activity from participants' contacts were generally positive. Participants expected some fluctuations in consumer spending to result from the hurricanes, but they generally judged that consumption growth would continue to be supported by still-solid fundamental determinants of household spending, including the income generated by the ongoing strength in the labor market, improved household balance sheets, and high levels of consumer confidence. Sales of autos and light trucks had softened over the summer, leading producers to slow production to address a buildup of inventories, but a couple of participants noted that automakers expected to see a temporary increase in demand as households and businesses replaced vehicles damaged during the storms.

Incoming data on business spending showed that equipment investment had picked up during 2017 after having been weak during much of 2016. Shipments and orders

[6] Four members of the Board of Governors, the same number as in June 2017, were in office at the time of the September 2017 meeting. The office of the president of the Federal Reserve Bank of Richmond was vacant at the time of both FOMC meetings; First Vice President Mark L. Mullinix submitted economic projections. One participant did not submit longer-run projections for real output growth, the unemployment rate, or the federal funds rate.

of nondefense capital goods had been on a steady uptrend over the first eight months of 2017. A number of participants reported that their business contacts appeared to have become more confident about the economic outlook, and it was noted that the National Federation of Independent Business reported that greater optimism among small businesses had contributed to a sharp increase in the proportion of small firms planning increases in their capital expenditures. A couple of participants commented that competitive pressures and tight labor markets were increasing the incentives for businesses to substitute capital for labor or to invest in information technology. In contrast, reports on the strength of nonresidential construction were mixed. And in energy-producing regions, the count of drilling rigs in operation had begun to level off before the onset of Hurricane Harvey.

Participants generally indicated that, before the recent hurricanes, business activity in their Districts was expanding at a moderate pace. Although industrial production in areas affected by the storms was estimated to have declined in August, a number of participants from other areas reported further solid gains in manufacturing activity in their Districts. Participants from the regions affected by the hurricanes reported that businesses in their Districts anticipated that the disruptions to business and sales would be relatively short lived. In the energy sector, Hurricane Harvey had shut down drilling and refining activity, but by the time of the meeting, these operations had substantially resumed. And many business contacts in the affected areas reported that they expected their operations to return to normal before the end of the year. Farming in some parts of the country had been affected by drought, and income in the agricultural sector was under downward pressure because of low crop prices.

Overall, the available information suggested that, although the storms would likely affect the quarterly pattern of changes in real GDP at least through the second half of the year, economic activity would continue to expand at a moderate rate over the medium term, supported by further gains in consumer spending and the pickup in business investment. In addition, improving global economic conditions and the depreciation of the dollar in recent months were anticipated to result in a modest positive contribution to domestic economic activity from net exports. In contrast, most participants had not assumed enactment of a fiscal stimulus package in their economic projections or had marked down the expected magnitude of any stimulus.

Labor market conditions strengthened further in recent months. The increases in nonfarm payroll employment in July and August remained well above the pace likely to be sustainable in the longer run. Although the unemployment rate was little changed from March to August, it remained below participants' estimates of its longer-run normal level. Other indicators suggested that labor market conditions had continued to tighten over recent quarters. The labor force participation rate had been moving sideways despite factors, such as demographic changes, that were contributing to a declining longer-run trend. In addition, the number of individuals working part time for economic reasons, as a share of household employment, had moved lower. The job openings rate, the quits rate, households' assessments of job availability, and the labor market conditions index prepared by the Federal Reserve Bank of Kansas City had returned to pre-recession levels. However, some participants still saw room for further increases in labor utilization, with a couple of them noting that the employment-to-population ratio and the participation rate for prime-age workers had not fully recovered to pre-recession levels.

Against the backdrop of the continued strengthening in labor market conditions, participants discussed recent wage developments. Increases in most aggregate measures of hourly wages and labor compensation remained subdued, and several participants commented that the absence of broad-based upward wage pressures suggested that the sustainable rate of unemployment might be lower than they currently estimated. Other factors that may have been contributing to the subdued pace of wage increases reported in the national data included low productivity growth, changes in the composition of the workforce, and competitive pressure on employers to hold down their costs. However, reports from business contacts in several Districts indicated that employers in labor markets in which demand was high or in which workers in some occupations were in short supply were raising wages noticeably to compete for workers and limit turnover. It was noted that the expected increase in demand for skilled construction workers for reconstruction in hurricane-affected areas would likely exacerbate existing shortages. Most participants expected wage increases to pick up over time as the labor market strengthened further; a couple of participants cautioned that a broader acceleration in wages may already have begun, consistent with already-tight labor market conditions.

Based on the available data, PCE price inflation over the 12 months ending in August was estimated to be about 1½ percent, remaining below the Committee's longer-run objective. In their review of the recent data and the outlook for inflation, participants discussed a number of factors that could be contributing to the low readings on consumer prices this year and weighed the extent to which those factors might be transitory or could prove more persistent. Many participants continued to believe that the cyclical pressures associated with a tightening labor market or an economy operating above its potential were likely to show through to higher inflation over the medium term. In addition, many judged that at least part of the softening in inflation this year was the result of idiosyncratic or one-time factors, and, thus, their effects were likely to fade over time. However, other developments, such as the effects of earlier changes to government health-care programs that had been holding down health-care costs, might continue to do so for some time. Some participants discussed the possibility that secular trends, such as the influence of technological innovations on competition and business pricing, also might have been muting inflationary pressures and could be intensifying. It was noted that other advanced economies were also experiencing low inflation, which might suggest that common global factors could be contributing to persistence of below-target inflation in the United States and abroad. Several participants commented on the importance of longer-run inflation expectations to the outlook for a return of inflation to 2 percent. A number of indicators of inflation expectations, including survey statistics and estimates derived from financial market data, were generally viewed as indicating that longer-run inflation expectations remained reasonably stable, although a few participants saw some of these measures as low or slipping.

Participants raised a number of important considerations about the implications of persistently low inflation for the path of the federal funds rate over the medium run. Several expressed concern that the persistence of low rates of inflation might imply that the underlying trend was running below 2 percent, risking a decline in inflation expectations. If so, the appropriate policy path should take into account the need to bolster inflation expectations in order to ensure that inflation returned to 2 percent and to prevent erosion in the credibility of the Committee's objective. It was also noted that the persistence of low inflation might result in the federal funds rate staying uncomfortably close to its effective lower bound. However, a few others pointed out the need to consider the lags in the response of inflation to tightening resource utilization and, thus, increasing upside risks to inflation as the labor market tightened further.

On balance, participants continued to forecast that PCE price inflation would stabilize around the Committee's 2 percent objective over the medium term. However, several noted that in preparing their projections for this meeting, they had taken on board the likelihood that convergence to the Committee's symmetric 2 percent inflation objective might take somewhat longer than they anticipated earlier. Participants generally agreed it would be important to monitor inflation developments closely. Several of them noted that interpreting the next few inflation reports would likely be complicated by the temporary run-up in energy costs and in the prices of other items affected by storm-related disruptions and rebuilding.

In financial markets, longer-term interest rates and the foreign exchange value of the dollar declined over the intermeeting period, and equity prices increased. It was noted that U.S. financial conditions recently appeared to be responding as much or more to economic and financial news from abroad as to domestic developments. Many participants viewed accommodative financial conditions, which had prevailed even as the Committee raised the federal funds rate, as likely to provide support for the economic expansion. However, a couple of those participants expressed concern that the persistence of highly accommodative financial conditions could, over time, pose risks to financial stability. In contrast, a few participants cautioned that these financial market conditions might not deliver much impetus to aggregate demand if they instead reflected a more pessimistic assessment of prospects for longer-run economic growth and, accordingly, a view that the longer-run neutral rate of interest in the United States would remain low.

In their discussion of monetary policy, all participants agreed that the economy had evolved broadly as they had anticipated at the time of the June meeting and that the incoming data had not materially altered the medium-term economic outlook. Consistent with those assessments, participants saw it as appropriate, at this meeting, to announce implementation of the plan for reducing the Federal Reserve's securities holdings that the Committee released in June. Many underscored that the reduction in securities holdings would be gradual and that financial market participants appeared to have a clear understanding of the Committee's planned approach for a gradual normalization of the size of the Federal Reserve's balance sheet. Consequently, participants generally expected that any reaction in financial markets to the start of balance sheet normalization would likely be limited.

With the medium-term outlook little changed, inflation below 2 percent, and the neutral rate of interest estimated to be quite low, all participants thought it would be appropriate for the Committee to maintain the current target range for the federal funds rate at this meeting, and nearly all supported again indicating in the postmeeting statement that a gradual approach to increasing the federal funds rate will likely be warranted. Nevertheless, many participants expressed concern that the low inflation readings this year might reflect not only transitory factors, but also the influence of developments that could prove more persistent, and it was noted that some patience in removing policy accommodation while assessing trends in inflation was warranted. A few of these participants thought that no further increases in the federal funds rate were called for in the near term or that the upward trajectory of the federal funds rate might appropriately be quite shallow. Some other participants, however, were more worried about upside risks to inflation arising from a labor market that had already reached full employment and was projected to tighten further. Their concerns were heightened by the apparent easing in financial conditions that had developed since the Committee's policy normalization process was initiated in December 2015. These participants cautioned that an unduly slow pace in removing policy accommodation could result in an overshoot of the Committee's inflation objective in the medium term that would likely be costly to reverse or could lead to an intensification of financial stability risks or to other imbalances that might prove difficult to unwind.

Consistent with the expectation that a gradual rise in the federal funds rate would be appropriate, many participants thought that another increase in the target range later this year was likely to be warranted if the medium-term outlook remained broadly unchanged. Several others noted that, in light of the uncertainty around their outlook for inflation, their decision on whether to take such a policy action would depend importantly on whether the economic data in coming months increased their confidence that inflation was moving up toward the Committee's objective. A few participants thought that additional increases in the federal funds rate should be deferred until incoming information confirmed that the low readings on inflation this year were not likely to persist and that inflation was clearly on a path toward the Committee's symmetric 2 percent objective over the medium term. All agreed that they would closely monitor and assess incoming data before making any further adjustment to the federal funds rate.

Committee Policy Action

In their discussion of monetary policy for the period ahead, members judged that information received since the Committee met in July indicated that the labor market had continued to strengthen and that economic activity had been rising moderately so far this year. Job gains had remained solid in recent months, and the unemployment rate had stayed low. Household spending had been expanding at a moderate rate, and growth in business fixed investment had picked up in recent quarters. On a 12-month basis, overall inflation and the measure excluding food and energy prices had declined this year and were running below 2 percent. Market-based measures of inflation compensation remained low; survey-based measures of longer-term inflation expectations were little changed on balance.

Members noted that Hurricanes Harvey, Irma, and Maria had devastated many communities, inflicting severe hardship. Members judged that storm-related disruptions and rebuilding would affect economic activity in the near term, but past experience suggested that the hurricanes were unlikely to materially alter the course of the national economy over the medium term. Consequently, the Committee continued to expect that, with gradual adjustments in the stance of monetary policy, economic activity would expand at a moderate pace, and labor market conditions would strengthen somewhat further. Higher prices for gasoline and some other items in the aftermath of the hurricanes would likely boost inflation temporarily; apart from that effect, inflation on a 12-month basis was expected to remain somewhat below 2 percent in the near term but to stabilize around the Committee's 2 percent objective over the medium term. Members saw near-term risks to the economic outlook as roughly balanced, but they agreed to continue to monitor inflation developments closely.

After assessing current conditions and the outlook for economic activity, the labor market, and inflation, members decided to maintain the target range for the federal funds rate at 1 to 1¼ percent. They noted that the stance of monetary policy remained accommodative, thereby supporting some further strengthening in labor market conditions and a sustained return to 2 percent inflation.

Members agreed that the timing and size of future adjustments to the target range for the federal funds rate would depend on their assessment of realized and expected economic conditions relative to the Committee's objectives of maximum employment and 2 percent inflation. They expected that economic conditions would evolve in a manner that would warrant gradual increases in the federal funds rate and that the federal funds rate was likely to remain, for some time, below levels that were expected to prevail in the longer run. Members also again stated that the actual path of the federal funds rate would depend on the economic outlook as informed by incoming data. In particular, they reaffirmed that they would carefully monitor actual and expected inflation developments relative to the Committee's symmetric inflation goal. Some members emphasized that, in considering the timing of further adjustments in the federal funds rate, they would be evaluating incoming information to assess the likelihood that recent low readings on inflation were transitory and that inflation was again on a trajectory consistent with achieving the Committee's 2 percent objective over the medium term.

Members agreed that, in October, the Committee would initiate the balance sheet normalization program described in the June 2017 Addendum to the Policy Normalization Principles and Plans. Several members observed that, in part because financial market participants appeared to have a clear understanding of the Committee's plan for gradually reducing the Federal Reserve's securities holdings, any reaction in financial markets to the announcement and implementation of the program would likely be limited.

At the conclusion of the discussion, the Committee voted to authorize and direct the Federal Reserve Bank of New York, until it was instructed otherwise, to execute transactions in the SOMA in accordance with the following domestic policy directive, to be released at 2:00 p.m.:

> "Effective September 21, 2017, the Federal Open Market Committee directs the Desk to undertake open market operations as necessary to maintain the federal funds rate in a target range of 1 to 1¼ percent, including overnight reverse repurchase operations (and reverse repurchase operations with maturities of more than one day when necessary to accommodate weekend, holiday, or similar trading conventions) at an offering rate of 1.00 percent, in amounts limited only by the value of Treasury securities held outright in the System Open Market Account that are available for such operations and by a per-counterparty limit of $30 billion per day.
>
> The Committee directs the Desk to continue rolling over at auction Treasury securities maturing during September, and to continue reinvesting in agency mortgage-backed securities the principal payments received through September from the Federal Reserve's holdings of agency debt and agency mortgage-backed securities.
>
> Effective in October 2017, the Committee directs the Desk to roll over at auction the amount of principal payments from the Federal Reserve's holdings of Treasury securities maturing during each calendar month that exceeds $6 billion, and to reinvest in agency mortgage-backed securities the amount of principal payments from the Federal Reserve's holdings of agency debt and agency mortgage-backed securities received during each calendar month that exceeds $4 billion. Small deviations from these amounts for operational reasons are acceptable.
>
> The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities transactions."

The vote also encompassed approval of the statement below to be released at 2:00 p.m.:

> "Information received since the Federal Open Market Committee met in July indicates that the labor market has continued to strengthen and that economic activity has been rising moderately so far this year. Job gains have remained solid in recent months, and the unemployment rate has stayed low. Household spending has been expanding at a moderate rate, and growth in business fixed investment has picked up in recent quarters. On a 12-month basis, overall inflation and the measure excluding food and energy prices have declined this year and are running below 2 percent. Market-based measures of inflation compensation remain low; survey-based measures of longer-term inflation expectations are little changed, on balance.
>
> Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. Hurricanes Harvey, Irma, and Maria have devastated many communities, inflicting severe hardship. Storm-related disruptions and rebuilding will affect economic activity in the near term, but past experience suggests that the storms are unlikely to materially

alter the course of the national economy over the medium term. Consequently, the Committee continues to expect that, with gradual adjustments in the stance of monetary policy, economic activity will expand at a moderate pace, and labor market conditions will strengthen somewhat further. Higher prices for gasoline and some other items in the aftermath of the hurricanes will likely boost inflation temporarily; apart from that effect, inflation on a 12-month basis is expected to remain somewhat below 2 percent in the near term but to stabilize around the Committee's 2 percent objective over the medium term. Near-term risks to the economic outlook appear roughly balanced, but the Committee is monitoring inflation developments closely.

In view of realized and expected labor market conditions and inflation, the Committee decided to maintain the target range for the federal funds rate at 1 to 1¼ percent. The stance of monetary policy remains accommodative, thereby supporting some further strengthening in labor market conditions and a sustained return to 2 percent inflation.

In determining the timing and size of future adjustments to the target range for 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. The Committee will carefully monitor actual and expected inflation developments relative to its symmetric inflation goal. The Committee expects that economic conditions will evolve in a manner that will warrant gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run. However, the actual path of the federal funds rate will depend on the economic outlook as informed by incoming data.

In October, the Committee will initiate the balance sheet normalization program described in the June 2017 Addendum to the Committee's Policy Normalization Principles and Plans."

Voting for this action: Janet L. Yellen, William C. Dudley, Lael Brainard, Charles L. Evans, Stanley Fischer, Patrick Harker, Robert S. Kaplan, Neel Kashkari, and Jerome H. Powell.

Voting against this action: None.

Consistent with the Committee's decision to leave the target range for the federal funds rate unchanged, the Board of Governors voted unanimously to leave the interest rates on required and excess reserve balances unchanged at 1¼ percent and voted unanimously to approve establishment of the primary credit rate (discount rate) at the existing level of 1¾ percent.[7]

It was agreed that the next meeting of the Committee would be held on Tuesday–Wednesday, October 31–November 1, 2017. The meeting adjourned at 10:05 a.m. on September 20, 2017.

Notation Vote

By notation vote completed on August 15, 2017, the Committee unanimously approved the minutes of the Committee meeting held on July 25–26, 2017.

Brian F. Madigan
Secretary

[7] The second vote of the Board also encompassed approval of the establishment of the interest rates for secondary and seasonal credit under the existing formulas for computing such rates.

Summary of Economic Projections

In conjunction with the Federal Open Market Committee (FOMC) meeting held on September 19–20, 2017, meeting participants submitted their projections of the most likely outcomes for real output growth, the unemployment rate, and inflation for each year from 2017 to 2020 and over the longer run.[1] 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.[2] "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 Federal Reserve's objectives of maximum employment and stable prices.

All participants who submitted longer-run projections expected that, under appropriate monetary policy, growth in real gross domestic product (GDP) this year would run somewhat above their individual estimates of its longer-run rate. Almost all participants projected that economic growth would moderate over the next three years, and almost all projected that real GDP growth in 2019 and 2020 would be at or close to their individual estimates of the economy's longer-run potential growth rate. All participants who submitted longer-run projections expected that the unemployment rate would run below their estimates of its longer-run normal level in 2017, and almost all projected that the unemployment rate would remain below their estimates of its longer-run level through 2020. All participants projected that inflation, as measured by the four-quarter percentage change in the price index for personal consumption expenditures (PCE), would run below 2 percent in 2017 and then step up in the next three years; about half of them projected that inflation would be at the Committee's 2 percent objective in 2019 and 2020, and all judged that inflation would be within a couple of tenths of a percentage point of the objective in those years. Most participants commented on the effects of Hurricanes Harvey and Irma and judged that there would likely be some effect on national economic activity and inflation in the near term but little effect in the medium term.[3] Table 1 and figure 1 provide summary statistics for the projections.

As shown in figure 2, participants generally expected that evolving economic conditions would likely warrant further gradual increases in the federal funds rate to achieve and sustain maximum employment and 2 percent inflation. Although some participants lowered their federal funds rate projections since June, the median projections for the federal funds rate in 2017 and 2018 were unchanged; the median projection for 2019 was slightly lower, and the median projection for the longer-run normal level of the federal funds rate edged down. However, because of considerable uncertainty about how the economy will evolve, the actual path of short-term interest rates, including the federal funds rate, can differ substantially from projections.

In general, participants viewed the uncertainty attached to their economic projections as broadly similar to the average of the past 20 years, and all participants saw the uncertainty associated with their forecasts for real GDP growth, the unemployment rate, and inflation as unchanged from June. Most participants judged the risks around their projections for economic growth, the unemployment rate, and inflation as broadly balanced.

The Outlook for Economic Activity

The median of participants' projections for the growth rate of real GDP, conditional on their individual assumptions about appropriate monetary policy, was 2.4 percent in 2017, about 2 percent in 2018 and 2019,

[1] Four members of the Board of Governors, the same number as in June 2017, were in office at the time of the September 2017 meeting. As in June 2017, the office of the president of the Federal Reserve Bank of Richmond was vacant at the time of this FOMC meeting; First Vice President Mark L. Mullinix again submitted economic projections.

[2] One participant did not submit longer-run projections for real output growth, the unemployment rate, or the federal funds rate. This participant's projections over the next several years were informed by the view that the U.S. economy is characterized by multiple medium-term regimes, that these regimes are persistent, and that optimal monetary policy is regime dependent. Because switches between regimes are difficult to predict and affect the longer-run outlook, this participant's forecast did not incorporate convergence to longer-term outcomes for variables other than inflation.

[3] Participants had completed their submissions for the Summary of Economic Projections before the full effects of Hurricane Maria were evident.

Table 1. Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents, under their individual assessments of projected appropriate monetary policy, September 2017

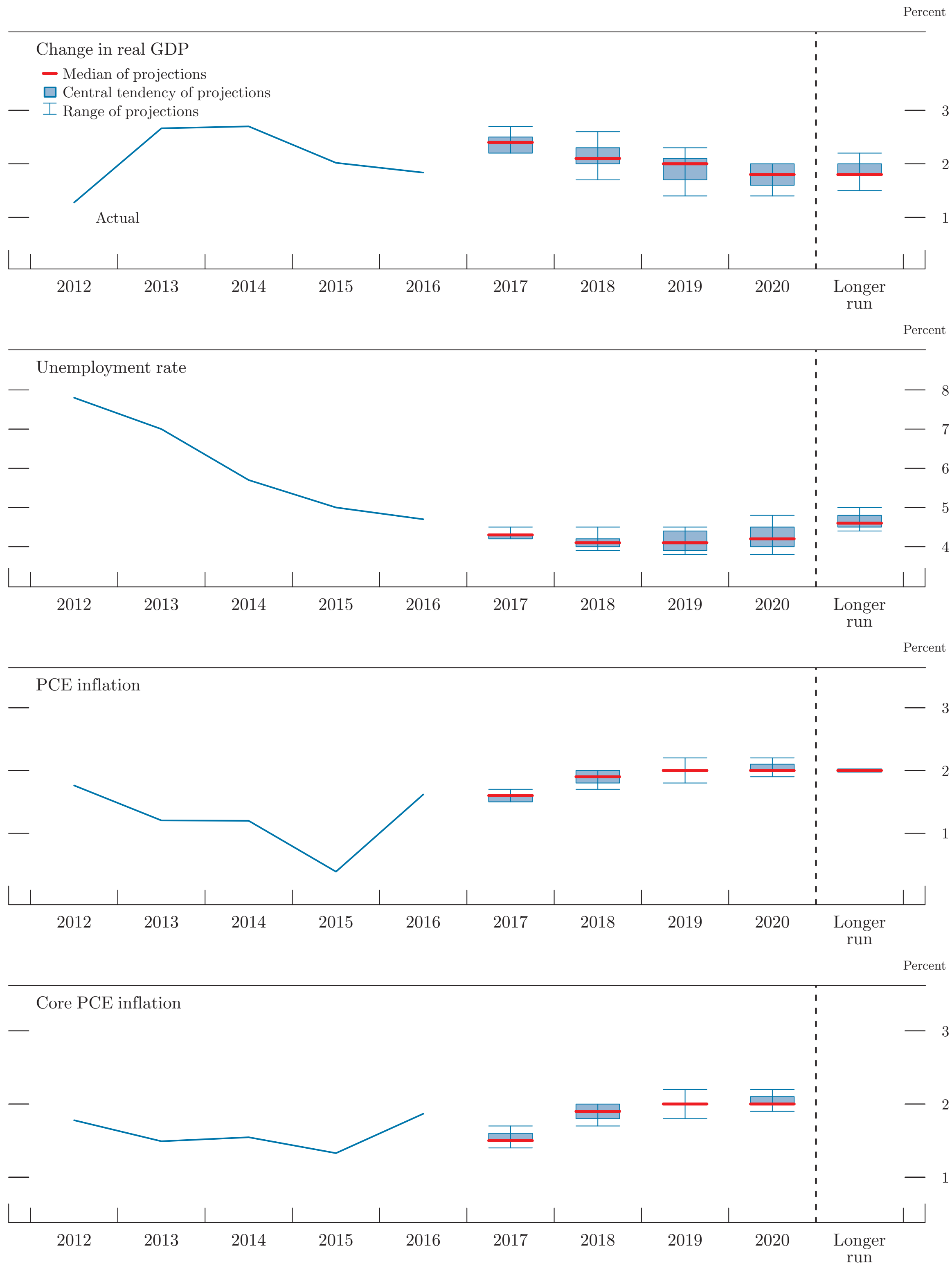
Percent

Variable	Median[1]					Central tendency[2]					Range[3]				
	2017	2018	2019	2020	Longer run	2017	2018	2019	2020	Longer run	2017	2018	2019	2020	Longer run
Change in real GDP	2.4	2.1	2.0	1.8	1.8	2.2 – 2.5	2.0 – 2.3	1.7 – 2.1	1.6 – 2.0	1.8 – 2.0	2.2 – 2.7	1.7 – 2.6	1.4 – 2.3	1.4 – 2.0	1.5 – 2.2
June projection	2.2	2.1	1.9	n.a.	1.8	2.1 – 2.2	1.8 – 2.2	1.8 – 2.0	n.a.	1.8 – 2.0	2.0 – 2.5	1.7 – 2.3	1.4 – 2.3	n.a.	1.5 – 2.2
Unemployment rate	4.3	4.1	4.1	4.2	4.6	4.2 – 4.3	4.0 – 4.2	3.9 – 4.4	4.0 – 4.5	4.5 – 4.8	4.2 – 4.5	3.9 – 4.5	3.8 – 4.5	3.8 – 4.8	4.4 – 5.0
June projection	4.3	4.2	4.2	n.a.	4.6	4.2 – 4.3	4.0 – 4.3	4.1 – 4.4	n.a.	4.5 – 4.8	4.1 – 4.5	3.9 – 4.5	3.8 – 4.5	n.a.	4.5 – 5.0
PCE inflation	1.6	1.9	2.0	2.0	2.0	1.5 – 1.6	1.8 – 2.0	2.0	2.0 – 2.1	2.0	1.5 – 1.7	1.7 – 2.0	1.8 – 2.2	1.9 – 2.2	2.0
June projection	1.6	2.0	2.0	n.a.	2.0	1.6 – 1.7	1.8 – 2.0	2.0 – 2.1	n.a.	2.0	1.5 – 1.8	1.7 – 2.1	1.8 – 2.2	n.a.	2.0
Core PCE inflation[4]	1.5	1.9	2.0	2.0		1.5 – 1.6	1.8 – 2.0	2.0	2.0 – 2.1		1.4 – 1.7	1.7 – 2.0	1.8 – 2.2	1.9 – 2.2	
June projection	1.7	2.0	2.0	n.a.		1.6 – 1.7	1.8 – 2.0	2.0 – 2.1	n.a.		1.6 – 1.8	1.7 – 2.1	1.8 – 2.2	n.a.	
Memo: Projected appropriate policy path															
Federal funds rate	1.4	2.1	2.7	2.9	2.8	1.1 – 1.4	1.9 – 2.4	2.4 – 3.1	2.5 – 3.5	2.5 – 3.0	1.1 – 1.6	1.1 – 2.6	1.1 – 3.4	1.1 – 3.9	2.3 – 3.5
June projection	1.4	2.1	2.9	n.a.	3.0	1.1 – 1.6	1.9 – 2.6	2.6 – 3.1	n.a.	2.8 – 3.0	1.1 – 1.6	1.1 – 3.1	1.1 – 4.1	n.a.	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 June projections were made in conjunction with the meeting of the Federal Open Market Committee on June 13–14, 2017. 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 June 13–14, 2017, meeting, and one participant did not submit such projections in conjunction with the September 19–20, 2017, meeting.

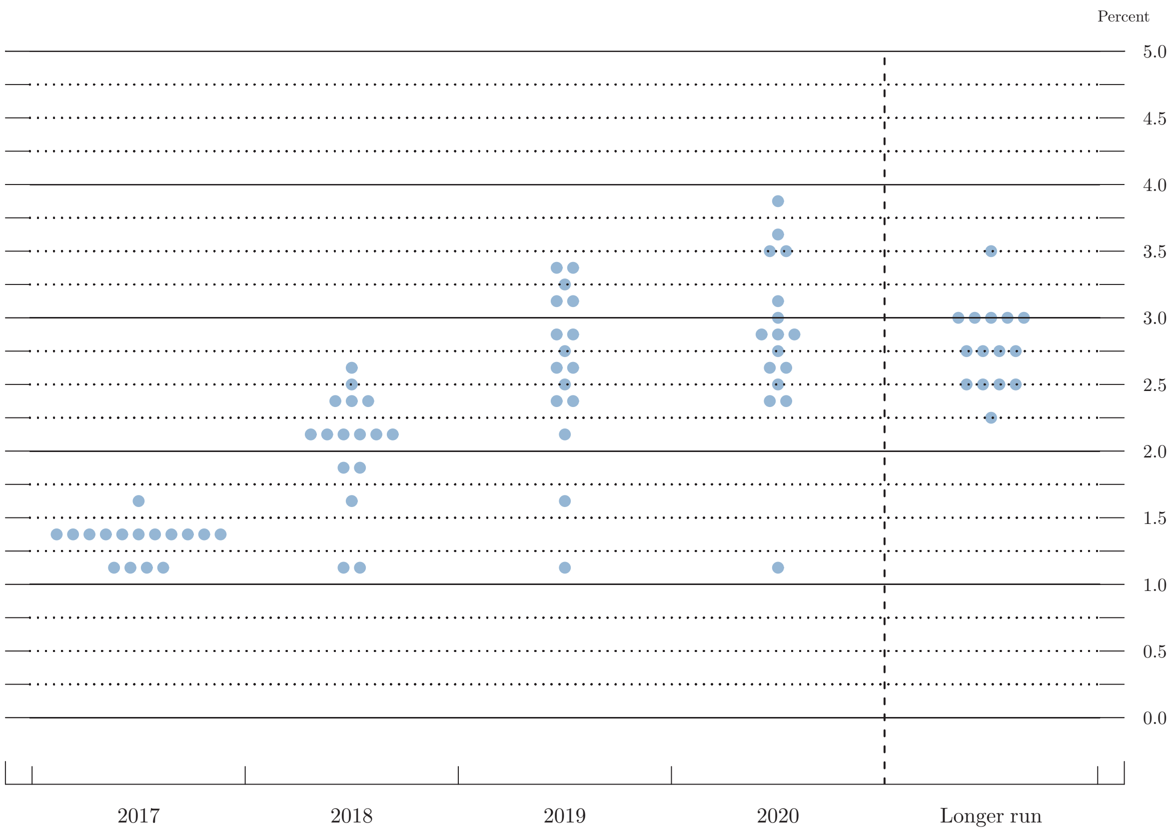
1. For each period, the median is the middle projection when the projections are arranged from lowest to highest. When the number of projections is even, the median is the average of the two middle projections.
2. The central tendency excludes the three highest and three lowest projections for each variable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

Figure 1. Medians, central tendencies, and ranges of economic projections, 2017–20 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.

and 1.8 percent in 2020; the median of projections for the longer-run normal rate of real GDP growth was 1.8 percent. Compared with the June Summary of Economic Projections (SEP), the median of the forecasts for real GDP growth for 2017 was a bit higher, while the medians for 2018 and 2019, as well as the median assessment of the longer-run growth rate, were mostly unchanged. Most participants did not incorporate expectations of fiscal stimulus in their projections. Several participants who included some fiscal stimulus indicated that they had marked down its expected magnitude relative to their June projections.

The median of projections for the unemployment rate in the fourth quarter of 2017 was 4.3 percent, unchanged from June and 0.3 percentage point below the median assessment of its longer-run normal level. The medians of the unemployment rate projections for 2018 through 2020 were a little above 4 percent. The median estimate of the longer-run normal rate of unemployment was 4.6 percent, unchanged from June.

Figures 3.A and 3.B show the distributions of participants' projections for real GDP growth and the unemployment rate from 2017 to 2020 and in the longer run. The distribution of individual projections for real GDP growth for this year shifted up, with half of the participants now expecting real GDP growth of 2.4 or 2.5 percent and none seeing it below 2.2 percent. The distribution of projected real GDP growth in 2018 also shifted up a bit, while the distributions in 2019 and in the longer run were broadly similar to the distributions of the June projections. The distributions of individual projections for the unemployment rate in 2018 and 2019 shifted down slightly.

The Outlook for Inflation

The median of projections for headline PCE inflation was 1.6 percent this year, 1.9 percent next year, and 2 percent in 2019 and 2020, about unchanged from June. Most participants anticipated that inflation would continue to run slightly below 2 percent in 2018, while no participants expected inflation above 2 percent in that year. About half projected that inflation would be equal to the Committee's objective in 2019 and 2020; others projected that inflation would run a little above or below the Committee's objective in one or both of those years. The median of projections for core PCE inflation was 1.5 percent in 2017 and 1.9 percent in 2018, a decline of 0.2 percentage point and 0.1 percentage point from June, respectively. The median projection for core PCE inflation in 2019 and 2020 was 2.0 percent.

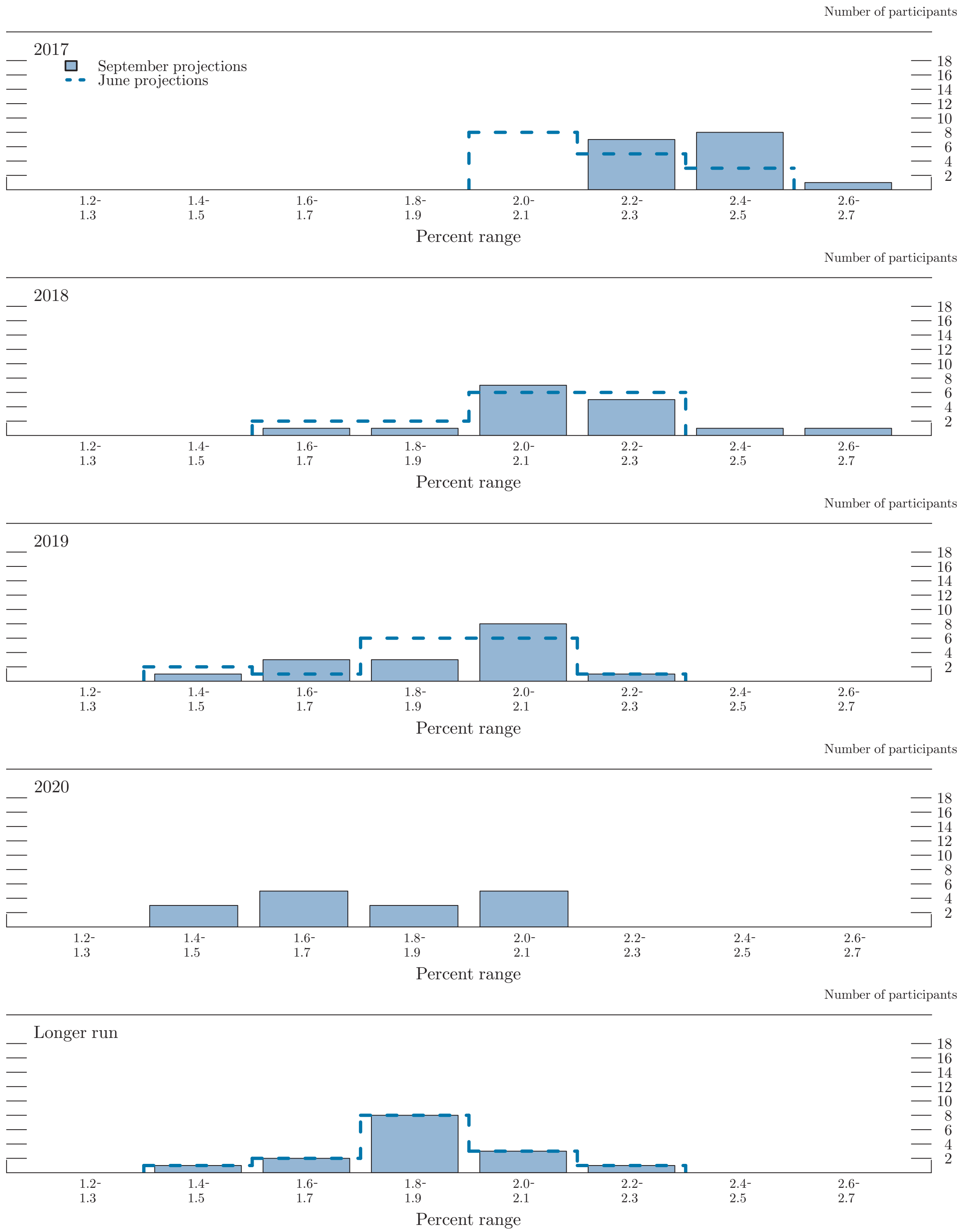
Figures 3.C and 3.D provide information on the distributions of participants' views about the outlook for inflation. The distributions of projections for headline PCE inflation and for core PCE inflation in 2017 moved down somewhat from June, and the distributions for both measures in 2018 shifted down slightly. Most participants indicated that the soft readings on inflation so far this year were a factor contributing to the revisions in their inflation forecasts.

Appropriate Monetary Policy

Figure 3.E provides the distribution 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 2017 to 2020 and over the longer run. The distributions for 2017 and 2018 became somewhat less dispersed compared with those in June. Even though the range of the distribution in 2019 was narrower than in June, other measures of dispersion were roughly unchanged. The median projections of the federal funds rate continued to show gradual increases, with the median assessment for 2017 standing at 1.38 percent, consistent with three 25 basis point increases this year. Thereafter, the medians of the projections were 2.13 percent at the end of 2018, 2.69 percent at the end of 2019, and 2.88 percent at the end of 2020. Compared with their projections prepared for the June SEP, some participants reduced their projection for the federal funds rate in the longer run; the median declined 0.25 percentage point, to 2.75 percent.

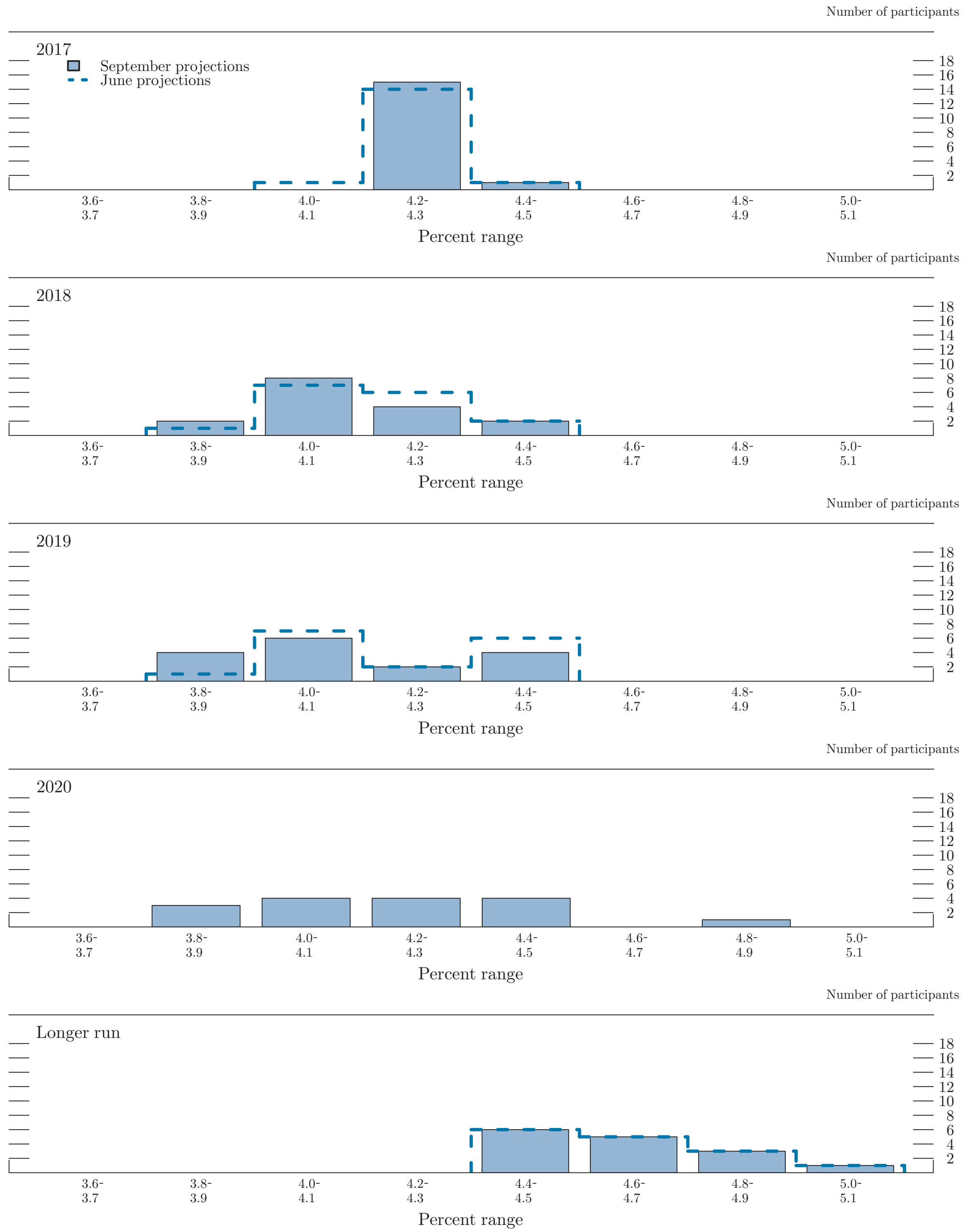
In discussing their September projections, many participants again expressed the view that the appropriate upward trajectory of the federal funds rate over the next few years would likely be gradual. That anticipated pace reflected a few factors, including a neutral real interest rate that was currently low and was expected to move up only slowly as well as a gradual return of inflation to the Committee's 2 percent objective. Some participants judged that a slightly lower path of the federal funds rate than in their previous projections would likely be appropriate, with a few citing a slower rate of progress toward the Committee's 2 percent inflation objective than previously expected or reduced prospects for fiscal stimulus. In their discussions of appropriate monetary policy, some of the participants mentioned their assumptions for the Committee's reinvestment policy; all of those who did so anticipated that the Committee would begin its program of balance sheet normalization, described in the Addendum to the Policy Normalization Principles and Plans released in June, before the end of this year.

Figure 3.A. Distribution of participants' projections for the change in real GDP, 2017–20 and over the longer run



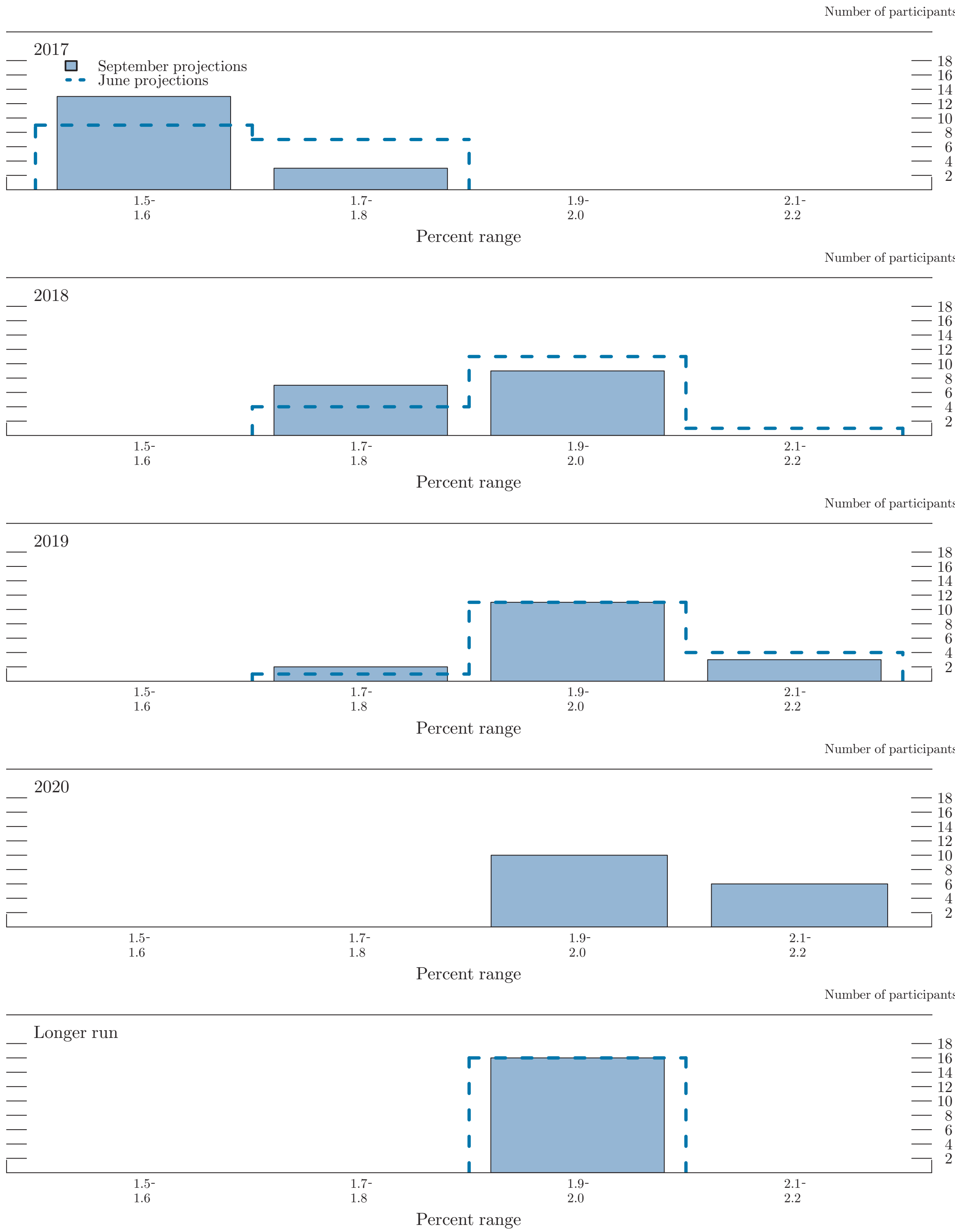
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.B. Distribution of participants' projections for the unemployment rate, 2017–20 and over the longer run



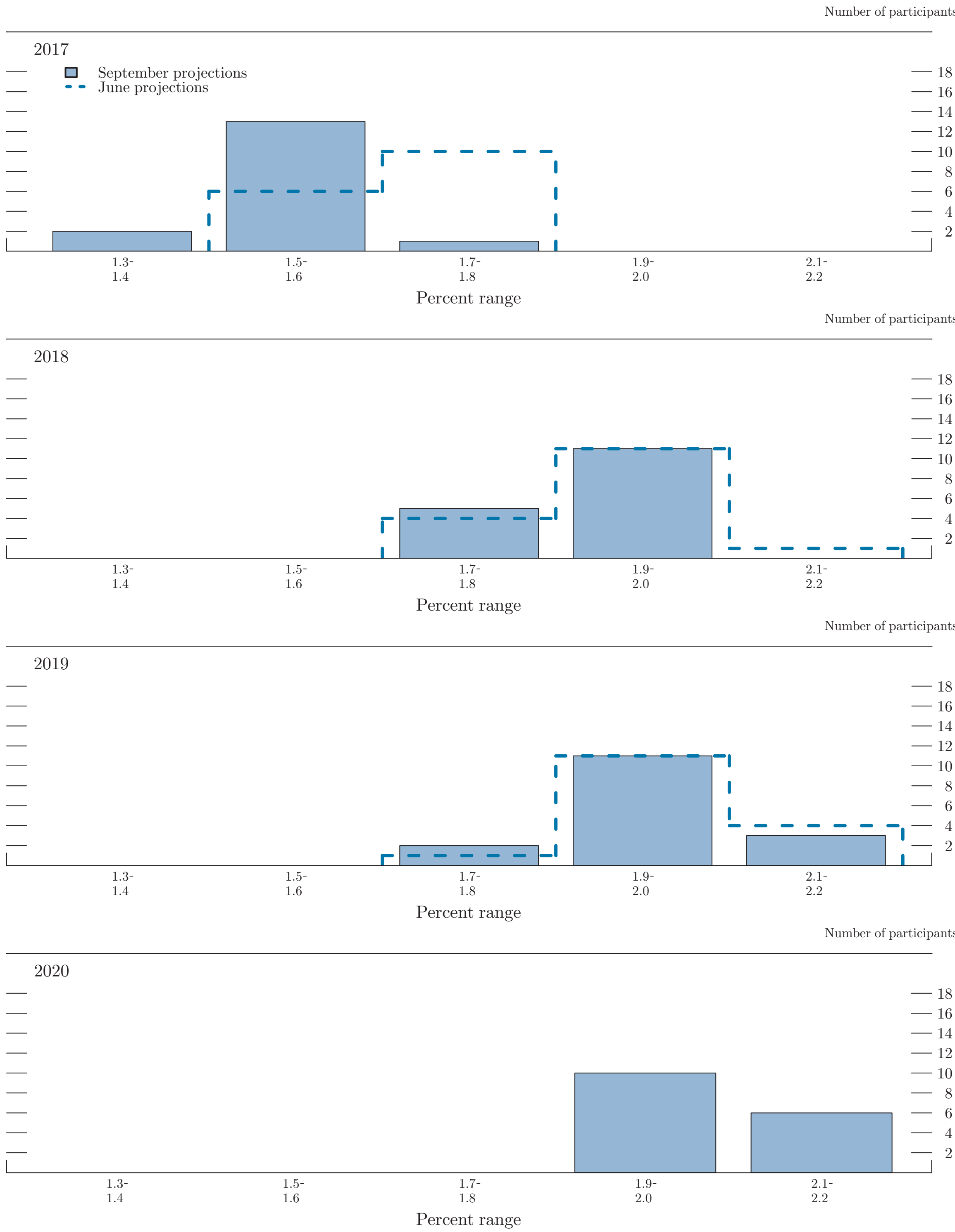
Note: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.C. Distribution of participants' projections for PCE inflation, 2017–20 and over the longer run



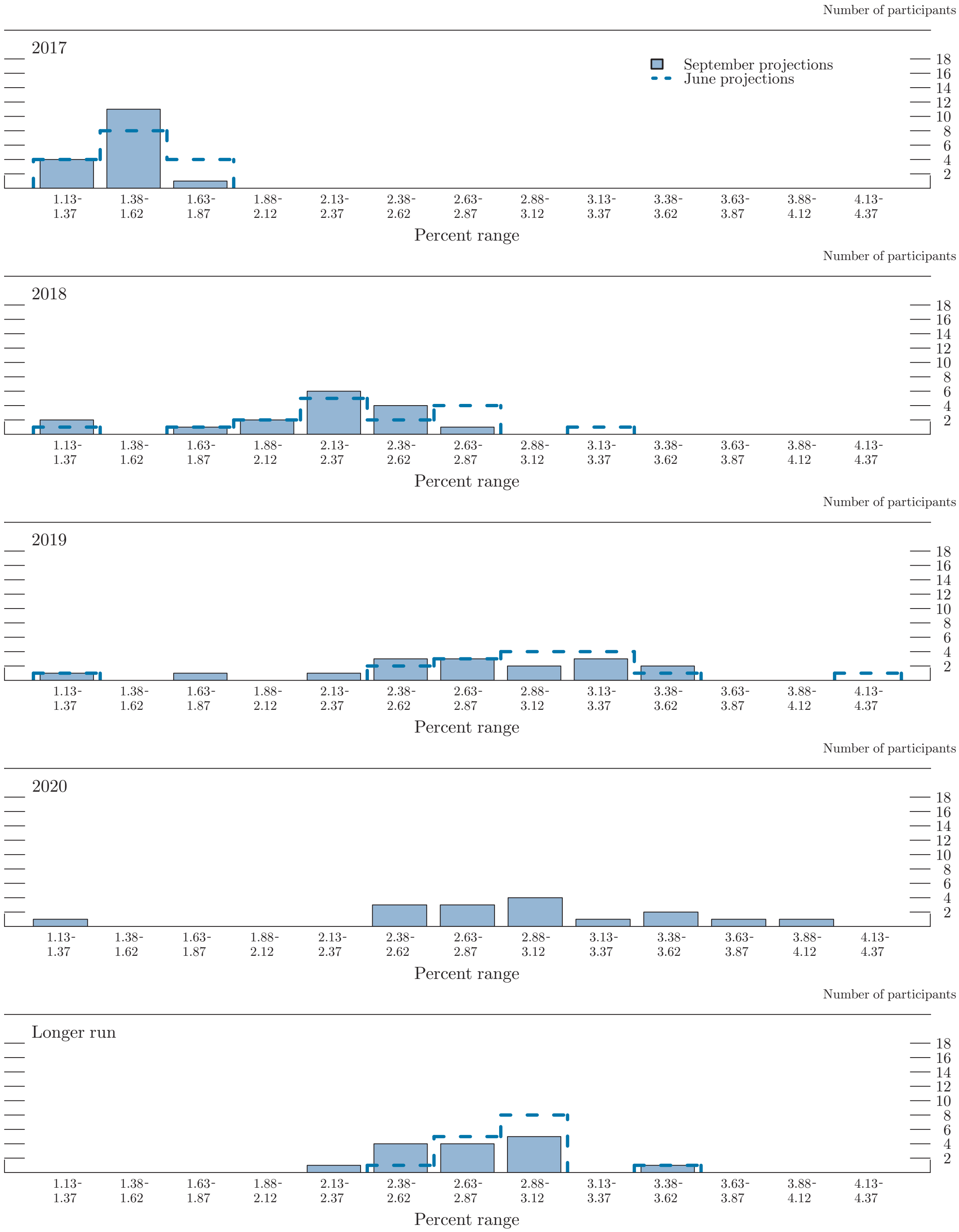
Note: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.D. Distribution of participants' projections for core PCE inflation, 2017–20



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, 2017–20 and over the longer run



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

Table 2. Average historical projection error ranges
Percentage points

Variable	2017	2018	2019	2020
Change in real GDP[1]	±1.2	±1.9	±2.0	±2.1
Unemployment rate[1]	±0.3	±1.1	±1.6	±2.0
Total consumer prices[2]	±0.8	±1.1	±1.2	±1.1
Short-term interest rates[3] . . .	±0.5	±1.7	±2.3	±2.7

NOTE: Error ranges shown are measured as plus or minus the root mean squared error of projections for 1997 through 2016 that were released in the fall 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), www.federalreserve.gov/econresdata/feds/2017/files/2017020pap.pdf.

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.

Uncertainty and Risks

The future outcomes of economic variables are subject to considerable uncertainty. In assessing the path of monetary policy that, in their view, is likely to be most appropriate, 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. Table 2 provides one measure of forecast uncertainty for the change in real GDP, the unemployment rate, and total consumer price inflation—the root mean squared error (RMSE) from forecast errors of various private and government projections made over the past 20 years. This measure of forecast uncertainty is incorporated graphically in the top panels of figures 4.A, 4.B, and 4.C, which display "fan charts" plotting the median SEP projections for the three variables surrounded by symmetric confidence intervals derived from the RMSEs presented in table 2. The width of the confidence interval for each variable at a given point is a measure of forecast uncertainty at that horizon. If the degree of uncertainty attending these projections is similar to the typical magnitude of past forecast errors and the risks around the projections are broadly balanced, future outcomes of these variables would have about a 70 percent probability of occurring within these confidence intervals. For all three variables, this measure of forecast uncertainty is substantial and generally increases as the forecast horizon lengthens.

FOMC participants may judge that the width of the historical fan charts shown in figures 4.A through 4.C does not adequately capture their current assessments of the degree of uncertainty that surrounds their economic projections. Participants' assessments of the current level of uncertainty surrounding their economic projections are shown in the bottom-left panels of figures 4.A, 4.B, and 4.C. All or nearly all participants viewed the degree of uncertainty attached to their economic projections about GDP growth, the unemployment rate, and inflation as broadly similar to the average of the past 20 years, and all participants saw the degree of uncertainty as unchanged from June.[4] In their discussion of the uncertainty attached to their current projections, a few participants judged that near-term uncertainty for economic activity and inflation had increased as a result of the effects of Hurricanes Harvey and Irma but commented that their assessment of medium-term prospects was unaffected.

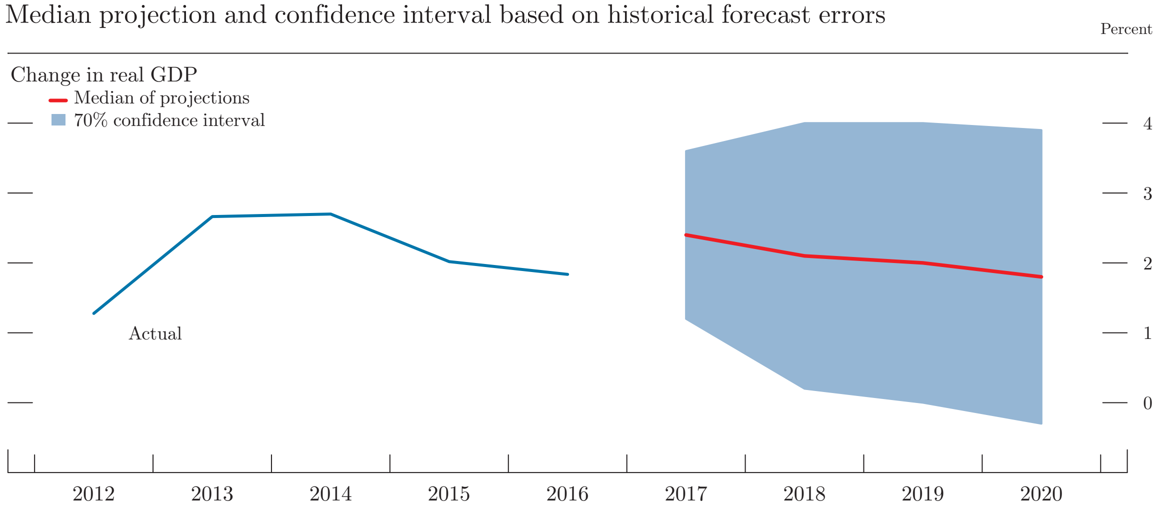
The fan charts, which are constructed so as to be symmetric around the median projections, also may not fully reflect participants' current assessments of the balance of risks to their economic projections. Participants' assessments of the balance of risks to their economic projections are shown in the bottom-right panels of figures 4.A, 4.B, and 4.C. As in June, most participants judged the risks to their projections of 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. One fewer participant than in June judged the risks to GDP growth as weighted to the upside, and one fewer participant judged the risks to the unemployment rate as weighted to the downside. Also, one fewer participant judged the risks to inflation to be weighted to the upside, and one more viewed the risks as weighted to the downside.

Participants' assessments of the future path of the federal funds rate consistent with appropriate policy are also subject to considerable uncertainty, reflecting in part uncertainty about the evolution of GDP growth, the unemployment rate, and inflation over time. The final line

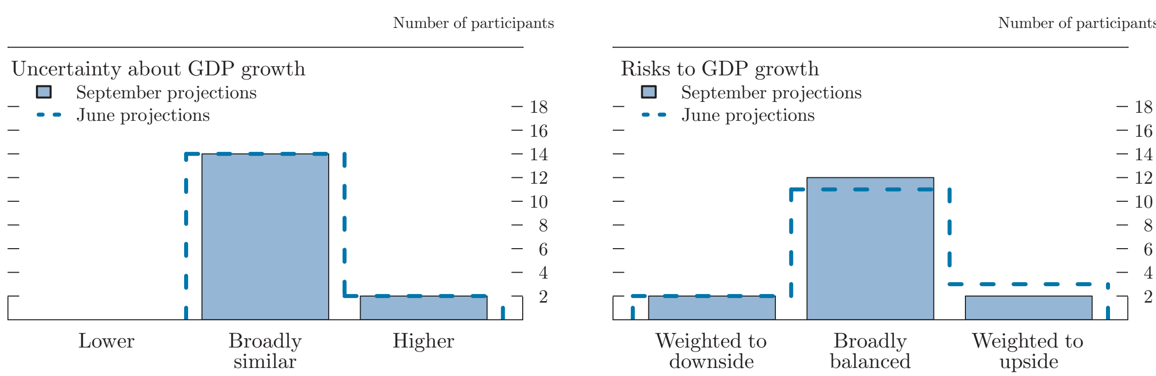
[4] At the end of this summary, the box "Forecast Uncertainty" discusses the sources and interpretation of uncertainty in the economic forecasts and explains the approach used to assess the uncertainty and risks attending the participants' projections.

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

Median projection and confidence interval based on historical forecast errors



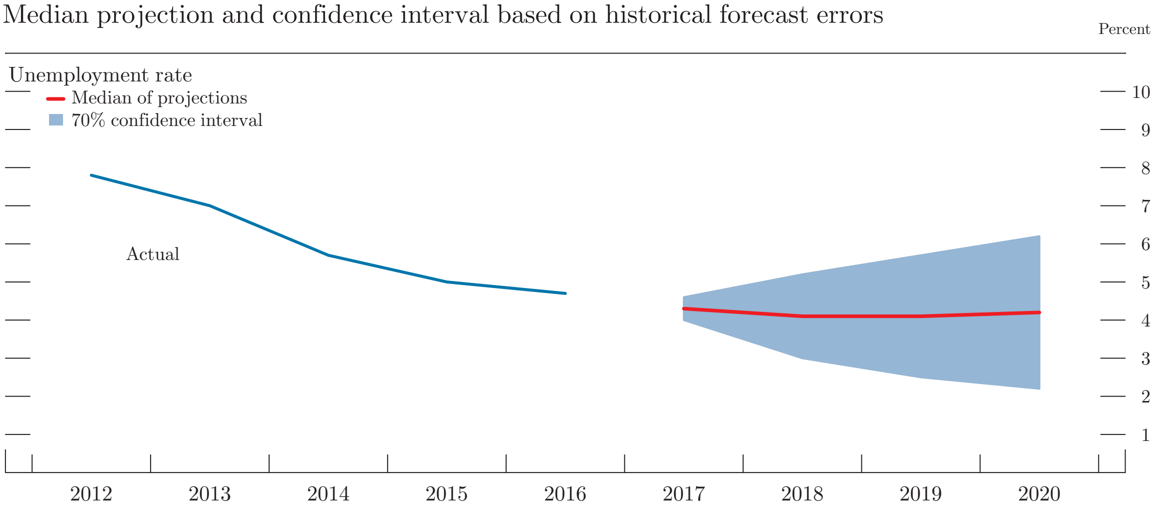
FOMC participants' assessments of uncertainty and risks around their economic projections



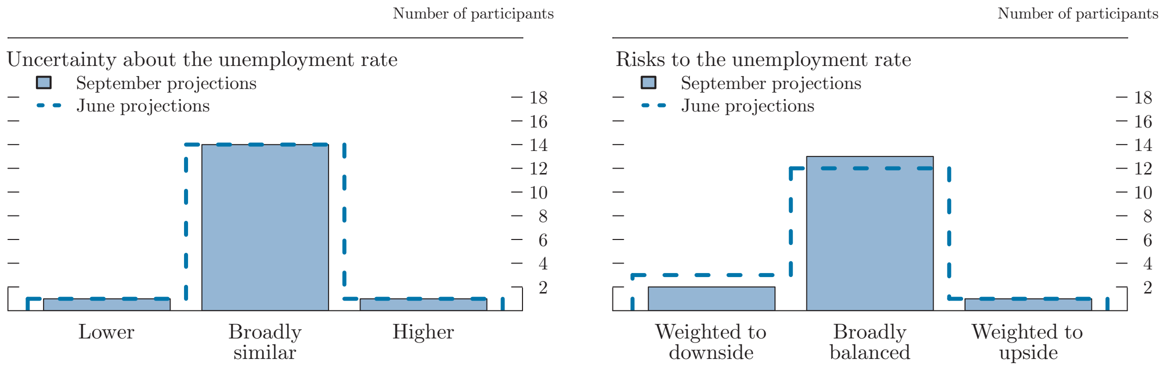
Note: The blue and red lines in the top panel show actual values and median projected values, respectively, of the percent change in real gross domestic product (GDP) from the fourth quarter of the previous year to the fourth quarter of the year indicated. The confidence interval around the median projected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

Median projection and confidence interval based on historical forecast errors



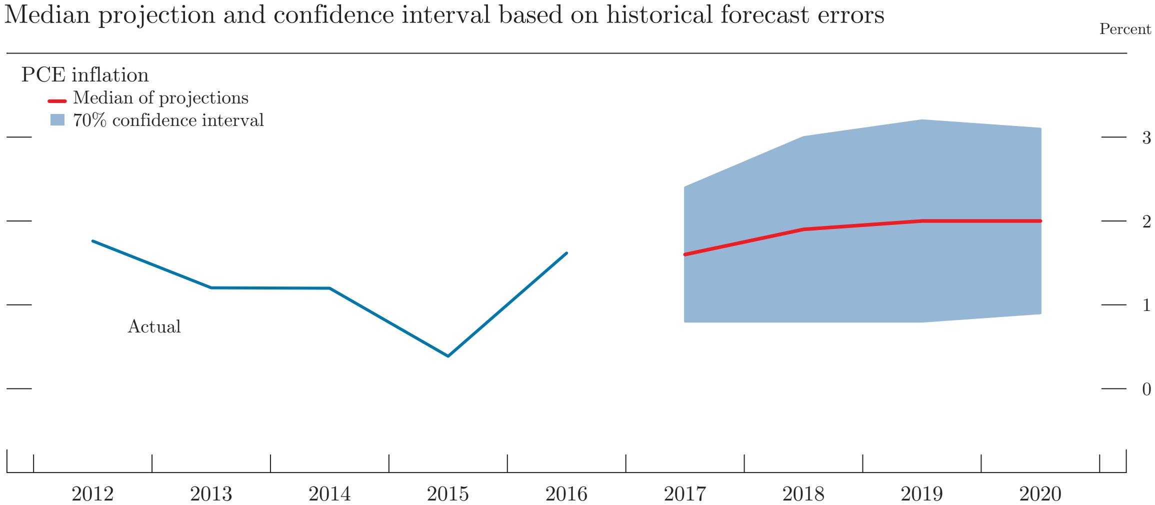
FOMC participants' assessments of uncertainty and risks around their economic projections



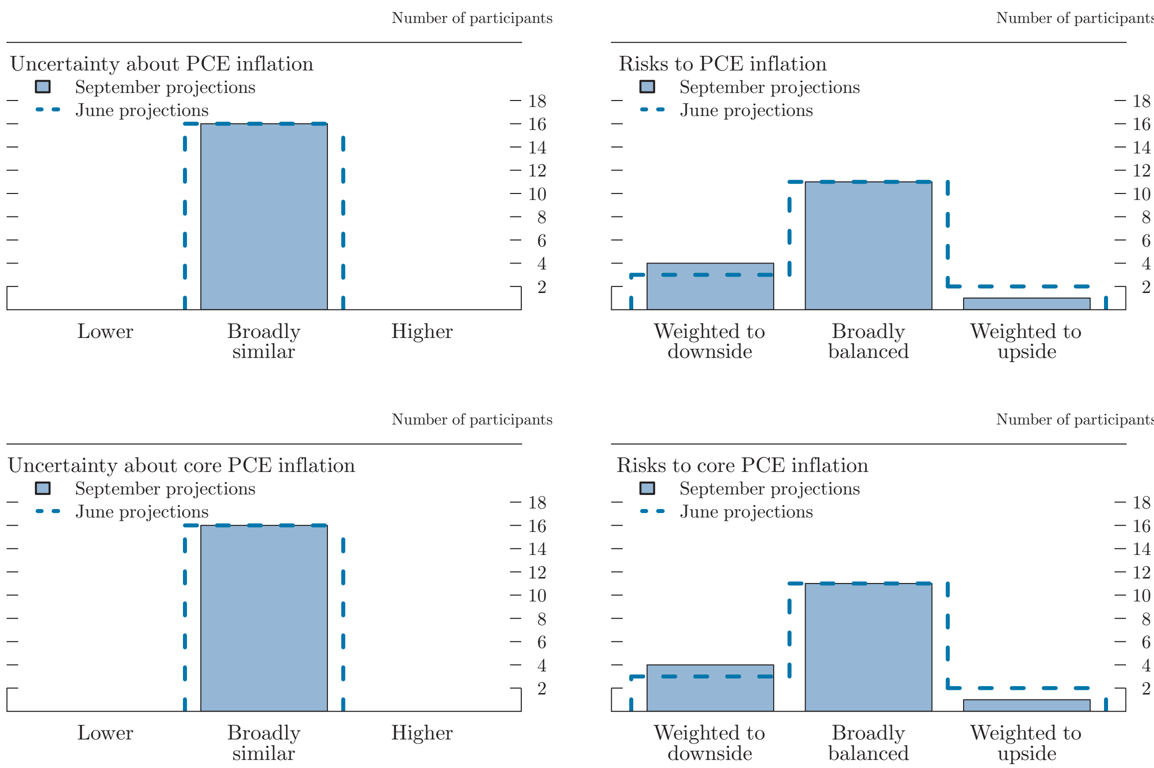
Note: The blue and red lines in the top panel show actual values and median projected values, respectively, of the average civilian unemployment rate in the fourth quarter of the year indicated. The confidence interval around the median projected values is assumed to be symmetric and is based on root 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

Median projection and confidence interval based on historical forecast errors



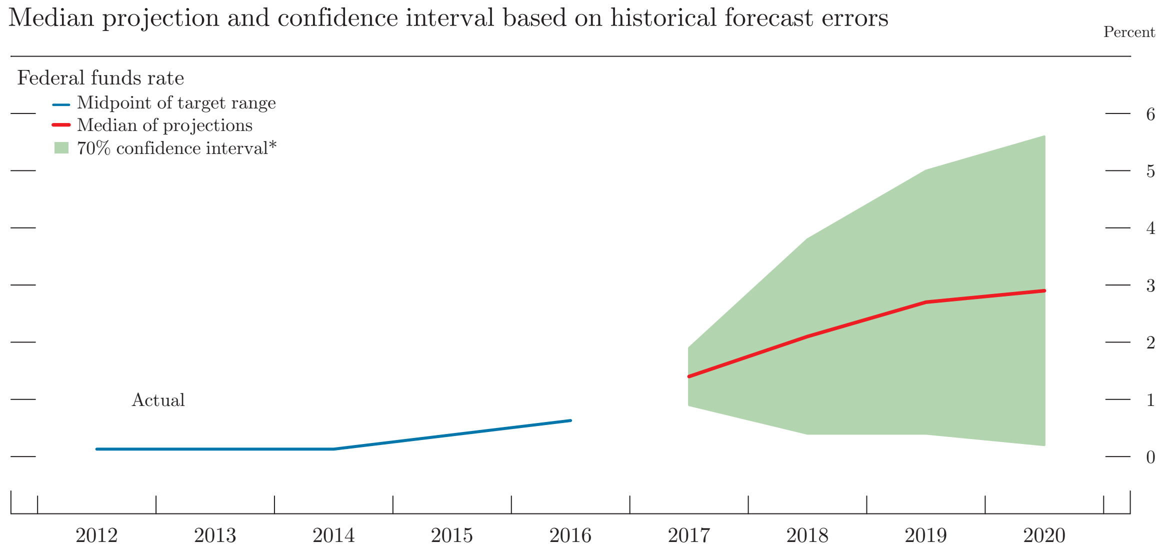
FOMC participants' assessments of uncertainty and risks around their economic projections



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."

in table 2 shows the RMSEs for forecasts of short-term interest rates. These RMSEs are not strictly consistent with the SEP projections for the federal funds rate, in part because the SEP projections are not forecasts of the most likely outcomes but rather reflect each participant's individual assessment of appropriate monetary policy. However, the associated confidence intervals provide a sense of the likely uncertainty around the future path of the federal funds rate generated by the uncertainty about the macroeconomic variables and additional adjustments to monetary policy that may be appropriate to offset the effects of shocks to the economy. To illustrate the uncertainty regarding the appropriate path for monetary policy, figure 5 shows a fan chart plotting the median SEP projections for the federal funds rate surrounded by confidence intervals derived from the results presented in table 2. As with the macroeconomic variables, forecast uncertainty is substantial and increases at longer horizons.

Figure 5. Uncertainty in projections of the federal funds rate



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

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

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

Forecast Uncertainty

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

Table 2 summarizes the average historical accuracy of a range of forecasts, including those reported in past *Monetary Policy Report*s and those prepared by the Federal Reserve Board's staff in advance of meetings of the Federal Open Market Committee (FOMC). The projection error ranges shown in the table illustrate the considerable uncertainty associated with economic forecasts. For example, suppose a participant projects that real gross domestic product (GDP) and total consumer prices will rise steadily at annual rates of, respectively, 3 percent and 2 percent. If the uncertainty attending those projections is similar to that experienced in the past and the risks around the projections are broadly balanced, the numbers reported in table 2 would imply a probability of about 70 percent that actual GDP would expand within a range of 1.8 to 4.2 percent in the current year, 1.1 to 4.9 percent in the second year, 1.0 to 5.0 percent in the third year, and 0.9 to 5.1 percent in the fourth year. The corresponding 70 percent confidence intervals for overall inflation would be 1.2 to 2.8 percent in the current year, 0.9 to 3.1 percent in the second year, 0.8 to 3.2 percent in the third year, and 0.9 to 3.1 percent in the fourth year. Figures 4.A through 4.C illustrate these confidence bounds in "fan charts" that are symmetric and centered on the medians of FOMC participants' projections for GDP growth, the unemployment rate, and inflation. However, in some instances, the risks around the projections may not be symmetric. In particular, the unemployment rate cannot be negative; furthermore, the risks around a particular projection might be tilted to either the upside or the downside, in which case the corresponding fan chart would be asymmetrically positioned around the median projection.

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