Minutes of the Federal Open Market Committee
June 12–13, 2018

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, June 12, 2018, at 1:00 p.m. and continued on Wednesday, June 13, 2018, at 9:00 a.m.[1]

PRESENT:
Jerome H. Powell, Chairman
William C. Dudley, Vice Chairman
Thomas I. Barkin
Raphael W. Bostic
Lael Brainard
Loretta J. Mester
Randal K. Quarles
John C. Williams

James Bullard, Charles L. Evans, Esther L. George, Eric Rosengren, and Michael Strine,[2] Alternate Members of the Federal Open Market Committee

Patrick Harker, Robert S. Kaplan, and Neel Kashkari, Presidents of the Federal Reserve Banks of Philadelphia, Dallas, and Minneapolis, respectively

James A. Clouse, 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

David Altig, Kartik B. Athreya, Thomas A. Connors, David E. Lebow, Trevor A. Reeve, Ellis W. Tallman, William Wascher,[2] and Beth Anne Wilson, 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,[3] 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

Rochelle M. Edge, Deputy Director, Division of Monetary Affairs, Board of Governors; Michael T. Kiley, Deputy Director, Division of Financial Stability, Board of Governors

Antulio N. Bomfim, Special Adviser to the Chairman, Office of Board Members, Board of Governors

Joseph W. Gruber 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

Shaghil Ahmed, Senior Associate Director, Division of International Finance, Board of Governors

Ellen E. Meade, Stephen A. Meyer, and Robert J. Tetlow, Senior Advisers, Division of Monetary Affairs, Board of Governors

John J. Stevens and Stacey Tevlin, Associate Directors, Division of Research and Statistics, Board of Governors

Jeffrey D. Walker,[3] Deputy Associate Director, Division of Reserve Bank Operations and Payment Systems, Board of Governors; Min Wei, Deputy Associate Director, Division of Monetary Affairs, Board of Governors

[1] The Federal Open Market Committee is referenced as the "FOMC" and the "Committee" in these minutes.
[2] Attended Tuesday session only.
[3] Attended through the discussion of developments in financial markets and open market operations.

Burcu Duygan-Bump, Norman J. Morin, John Sabelhaus, and Paul A. Smith, Assistant Directors, Division of Research and Statistics, Board of Governors; Christopher J. Gust, Assistant Director, Division of Monetary Affairs, Board of Governors

Penelope A. Beattie,[2] Assistant to the Secretary, Office of the Secretary, Board of Governors

John Ammer,[2] Senior Economic Project Manager, Division of International Finance, Board of Governors

Dan Li, Section Chief, Division of Monetary Affairs, Board of Governors

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

Martin Bodenstein and Marcel A. Priebsch, Principal Economists, Division of Monetary Affairs, Board of Governors; Logan T. Lewis, Principal Economist, Division of International Finance, Board of Governors; Maria Otoo, Principal Economist, Division of Research and Statistics, Board of Governors

Marcelo Ochoa, Senior Economist, Division of Monetary Affairs, Board of Governors

Achilles Sangster II, Information Management Analyst, Division of Monetary Affairs, Board of Governors

Kenneth C. Montgomery, First Vice President, Federal Reserve Bank of Boston

Jeff Fuhrer, Daniel G. Sullivan, and Christopher J. Waller, Executive Vice Presidents, Federal Reserve Banks of Boston, Chicago, and St. Louis, respectively

Marc Giannoni, Paolo A. Pesenti, and Mark L.J. Wright, Senior Vice Presidents, Federal Reserve Banks of Dallas, New York, and Minneapolis, respectively

Roc Armenter, Vice President, Federal Reserve Bank of Philadelphia

Willem Van Zandweghe, Assistant Vice President, Federal Reserve Bank of Kansas City

Nicolas Petrosky-Nadeau, Senior Research Advisor, Federal Reserve Bank of San Francisco

Developments in Financial Markets and Open Market Operations

The manager of the System Open Market Account (SOMA) provided a summary of developments in domestic and global financial markets over the intermeeting period. Developments in emerging market economies (EMEs) and in Europe were the focus of considerable attention by financial market participants over recent weeks. Investor perceptions of increased economic and political vulnerabilities in several EMEs led to a notable depreciation in EME currencies relative to the dollar. Market participants reported that an unwinding of investor positions had been a factor amplifying these currency moves. In Europe, concerns about the political situation in Italy and its potential economic implications prompted a significant widening in risk spreads on Italian sovereign securities. The share prices of Italian banks and other banks that could be exposed to Italy declined sharply. In domestic financial markets, expectations for the path of the federal funds rate were little changed over the intermeeting period. The manager noted that the release of the minutes of the May FOMC meeting, and particularly the reference to a possible technical adjustment in the interest on excess reserves (IOER) rate relative to the top of the FOMC's target range for the federal funds rate, prompted a small reduction in federal funds futures rates.

The deputy manager followed with a discussion of money markets and open market operations. Rates on Treasury repurchase agreements (repo) had remained elevated in recent weeks, apparently responding, in part, to increased Treasury issuance over recent months. In light of the firmness in repo rates, the volume of operations conducted through the Federal Reserve's overnight reverse repurchase agreement facility remained low. Elevated repo rates may also have contributed to some upward pressure on the effective federal funds rate in recent weeks as lenders in that market shifted some of their investments to earn higher rates available in repo markets. The deputy manager also discussed the current outlook for reinvestment purchases of agency mortgage-backed securities (MBS). Based on current projections, principal payments on the Federal Reserve's holdings of agency MBS would likely be lower than the monthly cap on redemptions that will be in effect beginning in the fall of this year. Consistent with the June 2017 addendum to the Policy Normalization Principles and Plans, reinvestment purchases of agency MBS then are projected to fall to zero from that point onward. However, principal payments on agency MBS are sensitive to changes in various factors, particularly long-term interest rates. As a result, agency MBS principal payments could rise above the monthly redemption cap in some future scenarios and thus require MBS reinvestment purchases. In light of this possibility, the deputy manager described plans for the Desk to conduct small value purchases of agency MBS on a regular basis in order to maintain operational readiness.

By unanimous vote, the Committee ratified the Open Market 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 June 12–13 meeting indicated that labor market conditions continued to strengthen in recent months, and that real gross domestic product (GDP) appeared to be rising at a solid rate in the first half of the year. Consumer price inflation, as measured by the 12-month percentage change in the price index for personal consumption expenditures (PCE), was 2 percent in April. Survey-based measures of longer-run inflation expectations were little changed on balance.

Total nonfarm payroll employment expanded at a strong pace, on average, in April and May. The national unemployment rate edged down in both months and was 3.8 percent in May. The unemployment rates for African Americans, Asians, and Hispanics all declined, on net, from March to May; the rate for African Americans was the lowest on record but still noticeably above the rates for other groups. The overall labor force participation rate edged down in April and May but was still at about the same level as a year earlier. The share of workers employed part time for economic reasons was little changed at a level close to that from just before the previous recession. The rate of private-sector job openings rose in March and stayed at that elevated level in April; the rate of quits edged up, on net, over those two months; and initial claims for unemployment insurance benefits continued to be low through early June. Recent readings showed that increases in labor compensation stepped up over the past year. Compensation per hour in the nonfarm business sector increased 2.7 percent over the four quarters ending in the first quarter of this year (compared with 1.9 percent over the same four quarters a year earlier), and average hourly earnings for all employees increased 2.7 percent over the 12 months ending in May (compared with 2.5 percent over the same 12 months a year earlier).

Total industrial production increased at a solid pace in April, but the available indicators for May, particularly production worker hours in manufacturing, indicated that output declined in that month. Automakers' schedules suggested that assemblies of light motor vehicles would increase in the coming months, and broader indicators of manufacturing production, such as the new orders indexes from national and regional manufacturing surveys, continued to point to solid gains in factory output in the near term.

Consumer spending appeared to be increasing briskly in the second quarter after rising at only a modest pace in the first quarter. Real PCE increased at a robust pace in April after a strong gain in March. Although light motor vehicle sales declined in May, indicators of vehicle demand generally remained upbeat. More broadly, recent readings on key factors that influence consumer spending—including gains in employment, real disposable personal income, and households' net worth—continued to be supportive of solid real PCE growth in the near term. In addition, the lower tax withholding resulting from the tax cuts enacted late last year still appeared likely to provide some additional impetus to spending in coming months. Consumer sentiment, as measured by the University of Michigan Surveys of Consumers, remained elevated in May.

Residential investment appeared to be declining further in the second quarter after decreasing in the first quarter. Starts for new single-family homes were unchanged in April from their first-quarter average, but starts of multifamily units declined noticeably. Sales of both new and existing homes decreased in April.

Real private expenditures for business equipment and intellectual property appeared to be rising at a moderate pace in the second quarter after a somewhat faster increase in the first quarter. Nominal shipments of nondefense capital goods excluding aircraft rose in April, and forward-looking indicators of business equipment spending—such as the backlog of unfilled capital goods orders, along with upbeat readings on business sentiment from national and regional surveys—continued to point to robust gains in equipment spending in the near term. Real business expenditures for nonresidential structures appeared to be expanding at a solid pace again in the second quarter, and the number of crude oil and natural gas rigs in operation—an indicator of business spending for structures in the drilling and mining sector—increased, on net, from mid-April through early June.

Nominal federal government spending data for April and May pointed to an increase in real federal purchases in the second quarter. Real state and local government purchases also appeared to be moving up; although nominal construction expenditures by these governments edged down in April, their payrolls rose at a moderate pace, on net, in April and May.

Net exports made a negligible contribution to real GDP growth in the first quarter, with growth of both real exports and real imports slowing from the brisk pace of the fourth quarter of last year. After narrowing in March, the nominal trade deficit narrowed further in April, as exports continued to increase while imports declined slightly, which suggested that net exports might add modestly to real GDP growth in the second quarter.

Total U.S. consumer prices, as measured by the PCE price index, increased 2.0 percent over the 12 months ending in April. Core PCE price inflation, which excludes changes in consumer food and energy prices, was 1.8 percent over that same period. The consumer price index (CPI) rose 2.8 percent over the 12 months ending in May, while core CPI inflation was 2.2 percent. Recent readings on survey-based measures of longer-run inflation expectations—including those from the Michigan survey, the Survey of Professional Forecasters, and the Desk's Survey of Primary Dealers and Survey of Market Participants—were little changed on balance.

Incoming data suggested that foreign economic activity continued to expand at a solid pace. Real GDP growth picked up in the first quarter in several EMEs—including Mexico, China, and much of emerging Asia—although recent indicators pointed to some moderation in the pace of activity in most EMEs. By contrast, in the advanced foreign economies (AFEs), real GDP growth slowed in the first quarter, owing partly to temporary factors such as labor strikes in some European countries and bad weather in Japan. More recent indicators pointed to a partial rebound in AFE economic growth in the second quarter. Inflation pressures in the foreign economies generally remained subdued, even though higher oil prices put some upward pressure on headline inflation.

Staff Review of the Financial Situation

During the intermeeting period, global financial markets were buffeted by increased concerns about the outlook for foreign growth and political developments in Italy, but these concerns subsequently eased. On net, Treasury yields were little changed despite significant intraperiod moves, and the dollar appreciated notably as a range of AFE and EME currencies and sovereign bonds came under pressure. However, broad domestic stock price indexes increased, on net, as generally strong corporate earnings reports helped support prices. Meanwhile, financing conditions for nonfinancial businesses and households remained supportive of economic activity on balance.

Over the intermeeting period, macroeconomic data releases signaling moderating growth in some foreign economies, along with downside risks stemming from political developments in Italy and several EMEs, weighed on prices of foreign risk assets. These developments, together with a still-solid economic outlook for the United States, supported an increase in the broad trade-weighted index of the foreign exchange value of the dollar.

The dollar appreciated notably against several EME currencies (primarily those of Argentina, Turkey, Mexico, and Brazil), as the increase in U.S. interest rates since late 2017, along with political developments and other issues, intensified concerns about financial vulnerabilities. EME mutual funds saw slight net outflows, and, on balance, EME sovereign spreads widened and equity prices edged lower. In the AFEs, sovereign spreads in some peripheral European countries widened and European bank shares came under pressure, as investors focused on political developments in Italy. Broad equity indexes in the euro area, with the exception of Italy, ended the period little changed, while those in Canada, the United Kingdom, and Japan edged higher. Market-based measures of expected policy rates were little changed, on balance, and flight-to-safety flows reportedly contributed to declines in German longer-term sovereign yields.

FOMC communications over the intermeeting period—including the May FOMC statement and the May FOMC meeting minutes—elicited only minor reactions in asset markets. Quotes on federal funds futures contracts suggested that the probability of an increase in the target range for the federal funds rate occurring at the June FOMC meeting inched up further to near certainty. Levels of the federal funds rate at the end of 2019 and 2020 implied by overnight index swap (OIS) rates were little changed on net.

Longer-term nominal Treasury yields ended the period largely unchanged despite notable movements during the intermeeting period. Measures of inflation compensation derived from Treasury Inflation-Protected Securities were also little changed on net.

Broad U.S. equity price indexes increased about 5 percent, on net, since the May FOMC meeting, boosted in part by the stronger-than-expected May Employment Situation report. Stock prices also appeared to have been buoyed by first-quarter earnings reports that generally beat expectations—particularly for the technology sector, which outperformed the broader market. However, the turbulence abroad and, to a lesser degree, mounting concerns about trade policy weighed on equity prices at times. Option-implied volatility on the S&P 500 at the one-month horizon—the VIX—was down somewhat, on net, remaining just a couple of percentage points above the very low levels that prevailed before early February. Over the intermeeting period, spreads of yields on nonfinancial corporate bonds over those of comparable-maturity Treasury securities widened moderately for both investment- and speculative-grade firms. However, these spreads remained low by historical standards.

Over the intermeeting period, short-term funding markets stayed generally stable despite still-elevated spreads between rates on some private money market instruments and OIS rates of similar maturity. While some of the factors contributing to pressures in short-term funding markets had eased recently, the three-month spread between the London interbank offered rate and the OIS rate remained significantly wider than at the start of the year.

Growth of outstanding commercial and industrial loans held by banks appeared to have moderated in May after a strong reading in April. The issuance of institutional leveraged loans was strong in April and May; meanwhile, corporate bond issuance was weak, likely reflecting seasonal patterns. Gross issuance of municipal bonds in April and May was solid, as issuance continued to recover from the slow pace recorded at the start of the year.

Financing conditions for commercial real estate (CRE) remained accommodative. Even so, the growth of CRE loans held by banks ticked down in April and May. Commercial mortgage-backed securities (CMBS) issuance, in general, continued at a robust pace; although issuance softened somewhat in April, partly reflecting seasonal factors, it recovered in May. Spreads on CMBS were little changed over the intermeeting period, remaining near their post-crisis lows.

Residential mortgage financing conditions remained accommodative for most borrowers. For borrowers with low credit scores, conditions stayed tight but continued to ease. Growth in home-purchase mortgages slowed a bit and refinancing activity continued to be muted in recent months, with both developments partly reflecting the rise in mortgage rates earlier this year.

Financing conditions in consumer credit markets were little changed in the first few months of 2018, on balance, and remained largely supportive of growth in household spending. Growth in consumer credit slowed a bit in the first quarter, as seasonally adjusted credit card balances were about flat after having surged in the fourth quarter of last year. Financing conditions for consumers with subprime credit scores continued to tighten, likely contributing to a decline in auto loan extensions to such borrowers.

Staff Economic Outlook

In the U.S. economic forecast prepared for the June FOMC meeting, the staff continued to project that the economy would expand at an above-trend pace. Real GDP appeared to be rising at a much faster pace in the second quarter than in the first, and it was forecast to increase at a solid rate in the second half of this year. Over the 2018–20 period, output was projected to rise further above the staff's estimate of its potential, and the unemployment rate was projected to decline further below the staff's estimate of its longer-run natural rate. Relative to the forecast prepared for the May meeting, the projection for real GDP growth beyond the first half of 2018 was revised down a little in response to a higher assumed path for the exchange value of the dollar. In addition, the staff continued to anticipate that supply constraints might restrain output growth somewhat. With real GDP rising a little less, on balance, over the forecast period, the projected decline in the unemployment rate over the next few years was a touch smaller than in the previous forecast.

The staff forecast for total PCE price inflation from 2018 to 2020 was not revised materially. Total consumer price inflation over the first half of 2018 appeared to be a little lower than in the previous projection, mainly because of slightly softer incoming data on nonmarket prices, but the forecast for the second half of the year was a little higher, reflecting an upward revision to projected consumer energy prices over the next couple of quarters. The staff continued to project that total PCE inflation would remain near the Committee's 2 percent objective over the medium term and that core PCE price inflation would run slightly higher than total inflation over that period because of a projected decline in consumer energy prices in 2019 and 2020.

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. The staff saw the risks to the forecasts for real GDP growth and the unemployment rate as balanced. On the upside, recent fiscal policy changes could lead to a greater expansion in economic activity over the next few years than the staff projected. On the downside, those fiscal policy changes could yield less impetus to the economy than the staff expected if, for example, the marginal propensities to consume for groups most affected by the tax cuts are lower than the staff had assumed. Risks to the inflation projection also were seen as balanced. The upside risk that inflation could increase more than expected in an economy that was projected to move further above its potential was counterbalanced by the downside risk that longer-term inflation expectations may be lower than was assumed in the staff forecast.

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 GDP growth, the unemployment rate, and inflation for each year from 2018 through 2020 and over the longer run, based on their individual assessments of the appropriate path for the federal funds rate. 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 since the FOMC met in May indicated that the labor market had continued to strengthen and that economic activity had been rising at a solid rate. Job gains had been strong, on average, in recent months, and the unemployment rate had declined. Recent data suggested that growth of household spending had picked up, while business fixed investment had continued to grow strongly. On a 12-month basis, overall inflation and core inflation, which excludes changes in food and energy prices, had both moved close to 2 percent. Indicators of longer-term inflation expectations were little changed, on balance.

Participants viewed recent readings on spending, employment, and inflation as suggesting little change, on balance, in their assessments of the economic outlook. Incoming data suggested that GDP growth strengthened in the second quarter of this year, as growth of consumer spending picked up after slowing earlier in the year. Participants noted a number of favorable economic factors that were supporting above-trend GDP growth; these included a strong labor market, stimulative federal tax and spending policies, accommodative financial conditions, and continued high levels of household and business confidence. They also generally expected that further gradual increases in the target range for the federal funds rate would be consistent with sustained expansion of economic activity, strong labor market conditions, and inflation near the Committee's symmetric 2 percent objective over the medium term. Participants generally viewed the risks to the economic outlook as roughly balanced.

Participants reported that business fixed investment had continued to expand at a strong pace in recent months, supported in part by substantial investment growth in the energy sector. Higher oil prices were expected to continue to support investment in that sector, and District contacts in the industry were generally upbeat, though supply constraints for labor and infrastructure were reportedly limiting expansion plans. By contrast, District reports regarding the construction sector were mixed, although here, too, some contacts reported that supply constraints were acting as a drag on activity. Conditions in both the manufacturing and service sectors in several Districts were reportedly strong and were seen as contributing to solid investment gains. However, many District contacts expressed concern about the possible adverse effects of tariffs and other proposed trade restrictions, both domestically and abroad, on future investment activity; contacts in some Districts indicated that plans for capital spending had been scaled back or postponed as a result of uncertainty over trade policy. Contacts in the steel and aluminum industries expected higher prices as a result of the tariffs on these products but had not planned any new investments to increase capacity. Conditions in the agricultural sector reportedly improved somewhat, but contacts were concerned about the effect of potentially higher tariffs on their exports.

Participants agreed that labor market conditions strengthened further over the intermeeting period. Nonfarm payroll employment posted strong gains in recent months, averaging more than 200,000 per month this year. The unemployment rate fell to 3.8 percent in

May, below the estimate of each participant who submitted a longer-run projection. Participants pointed to other indicators such as a very high rate of job openings and an elevated quits rate as additional signs that labor market conditions were strong. With economic growth anticipated to remain above trend, participants generally expected the unemployment rate to remain below, or decline further below, their estimates of its longer-run normal rate. Several participants, however, suggested that there may be less tightness in the labor market than implied by the unemployment rate alone, because there was further scope for a strong labor market to continue to draw individuals into the workforce.

Contacts in several Districts reported difficulties finding qualified workers, and, in some cases, firms were coping with labor shortages by increasing salaries and benefits in order to attract or retain workers. Other business contacts facing labor shortages were responding by increasing training for less-qualified workers or by investing in automation. On balance, for the economy overall, recent data on average hourly earnings indicated that wage increases remained moderate. A number of participants noted that, with the unemployment rate expected to remain below estimates of its longer-run normal rate, they anticipated wage inflation to pick up further.

Participants noted that the 12-month changes in both overall and core PCE prices had recently moved close to 2 percent. The recent large increases in consumer energy prices had pushed up total PCE price inflation relative to the core measure, and this divergence was expected to continue in the near term, resulting in a temporary increase in overall inflation above the Committee's 2 percent longer-run objective. In general, participants viewed recent price developments as consistent with their expectation that inflation was on a trajectory to achieve the Committee's symmetric 2 percent objective on a sustained basis, although a number of participants noted that it was premature to conclude that the Committee had achieved that objective. The generally favorable outlook for inflation was buttressed by reports from business contacts in several Districts suggesting some firming of inflationary pressures; for example, many business contacts indicated that they were experiencing rising input costs, and, in some cases, firms appeared to be passing these cost increases through to consumer prices. Although core inflation and the 12-month trimmed mean PCE inflation rate calculated by the Federal Reserve Bank of Dallas remained a little below 2 percent, many participants anticipated that high levels of resource utilization and stable inflation expectations would keep overall inflation near 2 percent over the medium term. In light of inflation having run below the Committee's 2 percent objective for the past several years, a few participants cautioned that measures of longer-run inflation expectations derived from financial market data remained somewhat below levels consistent with the Committee's 2 percent objective. Accordingly, in their view, investors appeared to judge the expected path of inflation as running a bit below 2 percent over the medium run. Some participants raised the concern that a prolonged period in which the economy operated beyond potential could give rise to heightened inflationary pressures or to financial imbalances that could lead eventually to a significant economic downturn.

Participants commented on a number of risks and uncertainties associated with their outlook for economic activity, the labor market, and inflation over the medium term. Most participants noted that uncertainty and risks associated with trade policy had intensified and were concerned that such uncertainty and risks eventually could have negative effects on business sentiment and investment spending. Participants generally continued to see recent fiscal policy changes as supportive of economic growth over the next few years, and a few indicated that fiscal policy posed an upside risk. A few participants raised the concern that fiscal policy is not currently on a sustainable path. Many participants saw potential downside risks to economic growth and inflation associated with political and economic developments in Europe and some EMEs.

Meeting participants also discussed the term structure of interest rates and what a flattening of the yield curve might signal about economic activity going forward. Participants pointed to a number of factors, other than the gradual rise of the federal funds rate, that could contribute to a reduction in the spread between long-term and short-term Treasury yields, including a reduction in investors' estimates of the longer-run neutral real interest rate; lower longer-term inflation expectations; or a lower level of term premiums in recent years relative to historical experience reflecting, in part, central bank asset purchases. Some participants noted that such factors might temper the reliability of the slope of the yield curve as an indicator of future economic activity; however, several others expressed doubt about whether such factors were distorting the information content of the yield curve. A number of participants thought it would be important to continue to monitor the slope of the yield curve, given the historical regularity that an inverted yield curve has indicated an increased risk of recession in the United States. Participants also discussed a staff presentation of an indicator of the likelihood of recession based on the spread between the current level of the federal funds rate and the expected federal funds rate several quarters ahead derived from futures market prices. The staff noted that this measure may be less affected by many of the factors that have contributed to the flattening of the yield curve, such as depressed term premiums at longer horizons. Several participants cautioned that yield curve movements should be interpreted within the broader context of financial conditions and the outlook, and would be only one among many considerations in forming an assessment of appropriate policy.

In their consideration of monetary policy at this meeting, participants generally agreed that the economic expansion was progressing roughly as anticipated, with real economic activity expanding at a solid rate, labor market conditions continuing to strengthen, and inflation near the Committee's objective. Based on their current assessments, almost all participants expressed the view that it would be appropriate for the Committee to continue its gradual approach to policy firming by raising the target range for the federal funds rate 25 basis points at this meeting. These participants agreed that, even after such an increase in the target range, the stance of monetary policy would remain accommodative, supporting strong labor market conditions and a sustained return to 2 percent inflation. One participant remarked that, with inflation having run consistently below 2 percent in recent years and market-based measures of inflation compensation still low, postponing an increase in the target range for the federal funds rate would help push inflation expectations up to levels consistent with the Committee's objective.

With regard to the medium-term outlook for monetary policy, participants generally judged that, with the economy already very strong and inflation expected to run at 2 percent on a sustained basis over the medium term, it would likely be appropriate to continue gradually raising the target range for the federal funds rate to a setting that was at or somewhat above their estimates of its longer-run level by 2019 or 2020. Participants reaffirmed that adjustments to the path for the policy rate would depend on their assessments of the evolution of the economic outlook and risks to the outlook relative to the Committee's statutory objectives.

Participants pointed to various reasons for raising short-term interest rates gradually, including the uncertainty surrounding the level of the federal funds rate in the longer run, the lags with which changes in monetary policy affect the economy, and the potential constraints on adjustments in the target range for the federal funds rate in response to adverse shocks when short-term interest rates are low. In addition, a few participants saw survey- or market-based indicators as suggesting that inflation expectations were not yet firmly anchored at a level consistent with the Committee's objective. A few also noted that a temporary period of inflation modestly above 2 percent could be helpful in anchoring longer-run inflation expectations at a level consistent with the Committee's symmetric objective.

Participants offered their views about how much additional policy firming would likely be required to sustainably achieve the Committee's objectives of maximum employment and 2 percent inflation. Many noted that, if gradual increases in the target range for the federal funds rate continued, the federal funds rate could be at or above their estimates of its neutral level sometime next year. In that regard, participants discussed how the Committee's communications might evolve over coming meetings if the economy progressed about as anticipated; in particular, a number of them noted that it might soon be appropriate to modify the language in the postmeeting statement indicating that "the stance of monetary policy remains accommodative."

Participants supported a plan to implement a technical adjustment to the IOER rate that would place it at a level 5 basis points below the top of the FOMC's target range for the federal funds rate. A few participants suggested that, before too long, the Committee might want to further discuss how it can implement monetary policy most effectively and efficiently when the quantity of reserve balances reaches a level appreciably below that seen recently.

Committee Policy Action

In their discussion of monetary policy for the period ahead, members judged that information received since the FOMC met in May indicated that the labor market had continued to strengthen and that economic activity had been rising at a solid rate. Job gains had been strong, on average, in recent months, and the unemployment rate had declined. Recent data suggested that growth of household spending had picked up, while business fixed investment had continued to grow strongly. On a 12-month basis, both overall inflation and inflation for items other than food and energy had moved close to 2 percent. Indicators of longer-term inflation expectations were little changed, on balance.

Members viewed the recent data as consistent with a strong economy that was evolving about as they had expected. They judged that continuing along a path of gradual policy firming would balance the risk of moving too quickly, which could leave inflation short of a sustained return to the Committee's symmetric goal, against the risk of moving too slowly, which could lead to a buildup of inflation pressures or material financial imbalances. Consequently, members expected that further gradual increases in the target range for the federal funds rate would be consistent with sustained expansion of economic activity, strong labor market conditions, and inflation near the Committee's symmetric 2 percent objective over the medium term. Members continued to judge that the risks to the economic outlook remained roughly balanced.

After assessing current conditions and the outlook for economic activity, the labor market, and inflation, members voted to raise the target range for the federal funds rate to 1¾ to 2 percent. They indicated that the stance of monetary policy remained accommodative, thereby supporting strong 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 upon their assessment of realized and expected economic conditions relative to the Committee's maximum employment objective and symmetric 2 percent inflation objective. They reiterated that this assessment would 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.

With regard to the postmeeting statement, members favored the removal of the forward-guidance language stating that "the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run." Members noted that, although this forward-guidance language had been useful for communicating the expected path of the federal funds rate during the early stages of policy normalization, this language was no longer appropriate in light of the strong state of the economy and the current expected path for policy. Moreover, the removal of the forward-guidance language and other changes to the statement should streamline and facilitate the Committee's communications. Importantly, the changes were a reflection of the progress toward achieving the Committee's statutory goals and did not reflect a shift in the approach to policy going forward.

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 June 14, 2018, 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 1¾ to 2 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 1.75 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 the amount of principal payments from the Federal Reserve's holdings of Treasury securities maturing during June that exceeds $18 billion, and to continue reinvesting 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 June that exceeds $12 billion. Effective in July, 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 $24 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 $16 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 May indicates that the labor market has continued to strengthen and that economic activity has been rising at a solid rate. Job gains have been strong, on average, in recent months, and the unemployment rate has declined. Recent data suggest that growth of household spending has picked up, while business fixed investment has continued to grow strongly. On a 12-month basis, both overall inflation and inflation for items other than food and energy have moved close to 2 percent. Indicators 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. The Committee expects that further gradual increases in the target range for the federal funds rate will be consistent with sustained expansion of economic activity, strong labor market conditions, and inflation near the Committee's symmetric 2 percent objective over the medium term. Risks to the economic outlook appear roughly balanced.
>
> In view of realized and expected labor market conditions and inflation, the Committee decided to raise the target range for the federal funds rate to 1¾ to 2 percent. The stance of monetary policy remains accommodative, thereby supporting strong 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 maximum employment objective and its symmetric 2 percent inflation objective. 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."

Voting for this action: Jerome H. Powell, William C. Dudley, Thomas I. Barkin, Raphael W. Bostic, Lael Brainard, Loretta J. Mester, Randal K. Quarles, and John C. Williams.

Voting against this action: None.

To support the Committee's decision to raise the target range for the federal funds rate, the Board of Governors voted unanimously to raise the interest rates on required and excess reserve balances to 1.95 percent, effective June 14, 2018. The Board of Governors also voted unanimously to approve a ¼ percentage point increase in the primary credit rate (discount rate) to 2½ percent, effective June 14, 2018.[4]

Election of Committee Vice Chairman

By unanimous vote, the Committee selected John C. Williams to serve as Vice Chairman, effective on June 18, 2018, until the selection of a successor at the Committee's first regularly scheduled meeting in 2019.

It was agreed that the next meeting of the Committee would be held on Tuesday–Wednesday, July 31–August 1, 2018. The meeting adjourned at 10:00 a.m. on June 13, 2018.

Notation Vote

By notation vote completed on May 22, 2018, the Committee unanimously approved the minutes of the Committee meeting held on May 1-2, 2018.

James A. Clouse
Secretary

[4] In taking this action, the Board approved requests submitted by the boards of directors of the Federal Reserve Banks of Boston, Philadelphia, Cleveland, Richmond, Atlanta, Chicago, St. Louis, Minneapolis, Kansas City, Dallas, and San Francisco. This vote also encompassed approval by the Board of Governors of the establishment of a 2½ percent primary credit rate by the remaining Federal Reserve Bank, effective on the later of June 14, 2018, and the date such Reserve Bank informed the Secretary of the Board of such a request. (Secretary's note: Subsequently, the Federal Reserve Bank of New York was informed by the Secretary of the Board of the Board's approval of their establishment of a primary credit rate of 2½ percent, effective June 14, 2018.) 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 June 12–13, 2018, meeting participants submitted their projections of the most likely outcomes for real gross domestic product (GDP) growth, the unemployment rate, and inflation for each year from 2018 to 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 statutory mandate to promote maximum employment and price stability.

All participants who submitted longer-run projections expected that, in 2018, real GDP would expand at a pace exceeding their individual estimates of the longer-run growth rate of real GDP. Participants generally saw real GDP growth moderating somewhat in each of the following two years but remaining above their estimates of the longer-run rate. All participants who submitted longer-run projections expected that, throughout the projection period, the unemployment rate would run below their estimates of its longer-run level. All participants projected that inflation, as measured by the four-quarter percentage change in the price index for personal consumption expenditures (PCE), would run at or slightly above the Committee's 2 percent objective by the end of 2018 and remain roughly flat through 2020. Compared with the Summary of Economic Projections (SEP) from March, most participants slightly marked up their projections of real GDP growth in 2018 and somewhat lowered their projections for the unemployment rate from 2018 through 2020; participants indicated that these revisions reflected, in large part, strength in incoming data. A large majority of participants made slight upward adjustments to their projections of inflation in 2018. Table 1 and figure 1 provide summary statistics for the projections.

As shown in figure 2, participants generally continued to expect that the evolution of the economy relative to their objectives of maximum employment and 2 percent inflation would likely warrant further gradual increases in the federal funds rate. The central tendencies of participants' projections of the federal funds rate for both 2018 and 2019 were roughly unchanged, but the medians for both years were 25 basis points higher relative to March. Nearly all participants who submitted longer-run projections expected that, during part of the projection period, evolving economic conditions would make it appropriate for the federal funds rate to move somewhat above their estimates of its longer-run level.

In general, participants continued to view the uncertainty attached to their economic projections as broadly similar to the average of the past 20 years. As in March, most participants judged the risks around their projections for real GDP growth, the unemployment rate, and inflation to be broadly balanced.

The Outlook for Economic Activity

The median of participants' projections for the growth rate of real GDP, conditional on their individual assessments of appropriate monetary policy, was 2.8 percent for this year and 2.4 percent for next year. The median was 2.0 percent for 2020, a touch above the median projection of longer-run growth. Most participants continued to cite fiscal policy as a driver of strong economic activity over the next couple of years. Many participants also mentioned accommodative monetary policy and financial conditions, strength in the global outlook, continued momentum in the labor market, or positive readings on business and consumer sentiment as important factors shaping the economic outlook. Compared with the March SEP, the median of participants' projections for the rate of real GDP growth was 0.1 percentage point higher for this year and unchanged for the next two years.

Almost all participants expected the unemployment rate to decline somewhat further over the projection period. The median of participants' projections for the unemployment rate was 3.6 percent for the final quarter of this year and 3.5 percent for the final quarters of 2019

[1] Three members of the Board of Governors were in office at the time of the June 2018 meeting.

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

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

Percent

Variable	Median[1]				Central tendency[2]				Range[3]			
	2018	2019	2020	Longer run	2018	2019	2020	Longer run	2018	2019	2020	Longer run
Change in real GDP	2.8	2.4	2.0	1.8	2.7 – 3.0	2.2 – 2.6	1.8 – 2.0	1.8 – 2.0	2.5 – 3.0	2.1 – 2.7	1.5 – 2.2	1.7 – 2.1
March projection	2.7	2.4	2.0	1.8	2.6 – 3.0	2.2 – 2.6	1.8 – 2.1	1.8 – 2.0	2.5 – 3.0	2.0 – 2.8	1.5 – 2.3	1.7 – 2.2
Unemployment rate	3.6	3.5	3.5	4.5	3.6 – 3.7	3.4 – 3.5	3.4 – 3.7	4.3 – 4.6	3.5 – 3.8	3.3 – 3.8	3.3 – 4.0	4.1 – 4.7
March projection	3.8	3.6	3.6	4.5	3.6 – 3.8	3.4 – 3.7	3.5 – 3.8	4.3 – 4.7	3.6 – 4.0	3.3 – 4.2	3.3 – 4.4	4.2 – 4.8
PCE inflation	2.1	2.1	2.1	2.0	2.0 – 2.1	2.0 – 2.2	2.1 – 2.2	2.0	2.0 – 2.2	1.9 – 2.3	2.0 – 2.3	2.0
March projection	1.9	2.0	2.1	2.0	1.8 – 2.0	2.0 – 2.2	2.1 – 2.2	2.0	1.8 – 2.1	1.9 – 2.3	2.0 – 2.3	2.0
Core PCE inflation[4]	2.0	2.1	2.1		1.9 – 2.0	2.0 – 2.2	2.1 – 2.2		1.9 – 2.1	2.0 – 2.3	2.0 – 2.3	
March projection	1.9	2.1	2.1		1.8 – 2.0	2.0 – 2.2	2.1 – 2.2		1.8 – 2.1	1.9 – 2.3	2.0 – 2.3	
Memo: Projected appropriate policy path												
Federal funds rate	2.4	3.1	3.4	2.9	2.1 – 2.4	2.9 – 3.4	3.1 – 3.6	2.8 – 3.0	1.9 – 2.6	1.9 – 3.6	1.9 – 4.1	2.3 – 3.5
March projection	2.1	2.9	3.4	2.9	2.1 – 2.4	2.8 – 3.4	3.1 – 3.6	2.8 – 3.0	1.6 – 2.6	1.6 – 3.9	1.6 – 4.9	2.3 – 3.5

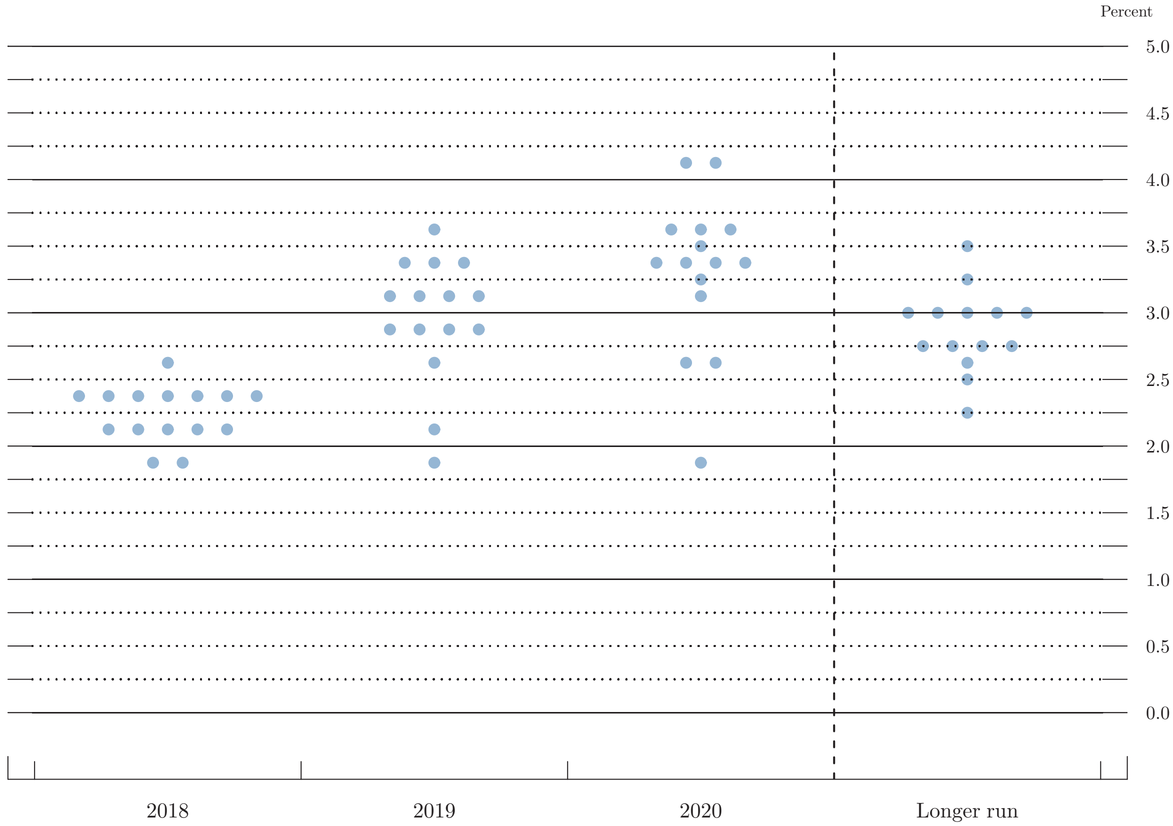
Note: Projections of change in real gross domestic product (GDP) and projections for both measures of inflation are percent changes from the fourth quarter of the previous year to the fourth quarter of the year indicated. PCE inflation and core PCE inflation are the percentage rates of change in, respectively, 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 March projections were made in conjunction with the meeting of the Federal Open Market Committee on March 20–21, 2018. One participant did not submit longer-run projections for the change in real GDP, the unemployment rate, or the federal funds rate in conjunction with the March 20–21, 2018, meeting, and one participant did not submit such projections in conjunction with the June 12–13, 2018, meeting.

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

Figure 1. Medians, central tendencies, and ranges of economic projections, 2018–20 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 2020. The median of participants' estimates of the longer-run unemployment rate was unchanged at 4.5 percent.

Figures 3.A and 3.B show the distributions of participants' projections for real GDP growth and the unemployment rate from 2018 to 2020 and over the longer run. The distribution of individual projections for real GDP growth this year shifted up noticeably from that in the March SEP. By contrast, the distributions of projected real GDP growth in 2019 and 2020 and over the longer run were little changed. The distributions of individual projections for the unemployment rate in 2018 to 2020 shifted down relative to the distributions in March, while the downward shift in the distribution of longer-run projections was very modest.

The Outlook for Inflation

The medians of participants' projections for total and core PCE price inflation in 2018 were 2.1 percent and 2.0 percent, respectively, and the median for each measure was 2.1 percent in 2019 and 2020. Compared with the March SEP, the medians of participants' projections for total PCE price inflation for this year and next were revised up slightly. Some participants pointed to incoming data on energy prices as a reason for their upward revisions. The median of participants' forecasts for core PCE price inflation was up a touch for this year and unchanged for subsequent years.

Figures 3.C and 3.D provide information on the distributions of participants' views about the outlook for inflation. The distributions of both total and core PCE price inflation for 2018 shifted to the right relative to the distributions in March. The distributions of projected inflation in 2019, 2020, and over the longer run were roughly unchanged. Participants generally expected each measure to be at or slightly above 2 percent in 2019 and 2020.

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 2018 to 2020 and over the longer run. The distributions of projected policy rates through 2020 shifted modestly higher, consistent with the revisions to participants' projections of real GDP growth, the unemployment rate, and inflation. As in their March projections, a large majority of participants anticipated that evolving economic conditions would likely warrant the equivalent of a total of either three or four increases of 25 basis points in the target range for the federal funds rate over 2018. There was a slight reduction in the dispersion of participants' views, with no participant regarding the appropriate target at the end of the year to be below 1.88 percent. For each subsequent year, the dispersion of participants' year-end projections was somewhat smaller than that in the March SEP.

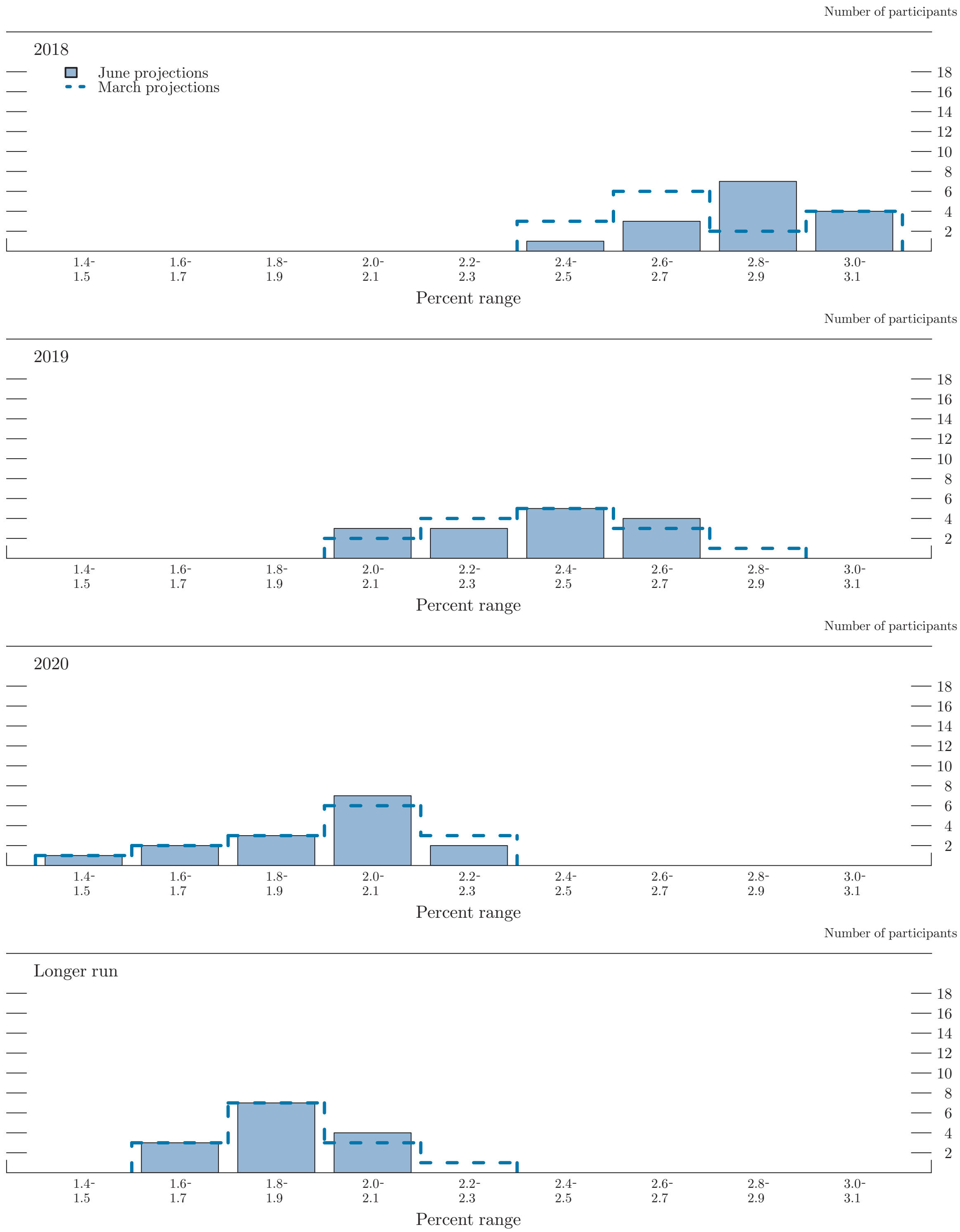
The medians of participants' projections of the federal funds rate rose gradually to 2.4 percent at the end of this year, 3.1 percent at the end of 2019, and 3.4 percent at the end of 2020. The median of participants' longer-run estimates, at 2.9 percent, was unchanged relative to the March SEP.

In discussing their projections, many participants continued to express the view that the appropriate trajectory of the federal funds rate over the next few years would likely involve gradual increases. This view was predicated on several factors, including a judgment that a gradual path of policy firming likely would appropriately balance the risks associated with, among other considerations, the possibilities that U.S. fiscal policy could have larger or more persistent positive effects on real activity and that shifts in trade policy or developments abroad could weigh on the expansion. As always, the appropriate path of the federal funds rate would depend on evolving economic conditions and their implications for participants' economic outlooks and assessments of risks.

Uncertainty and Risks

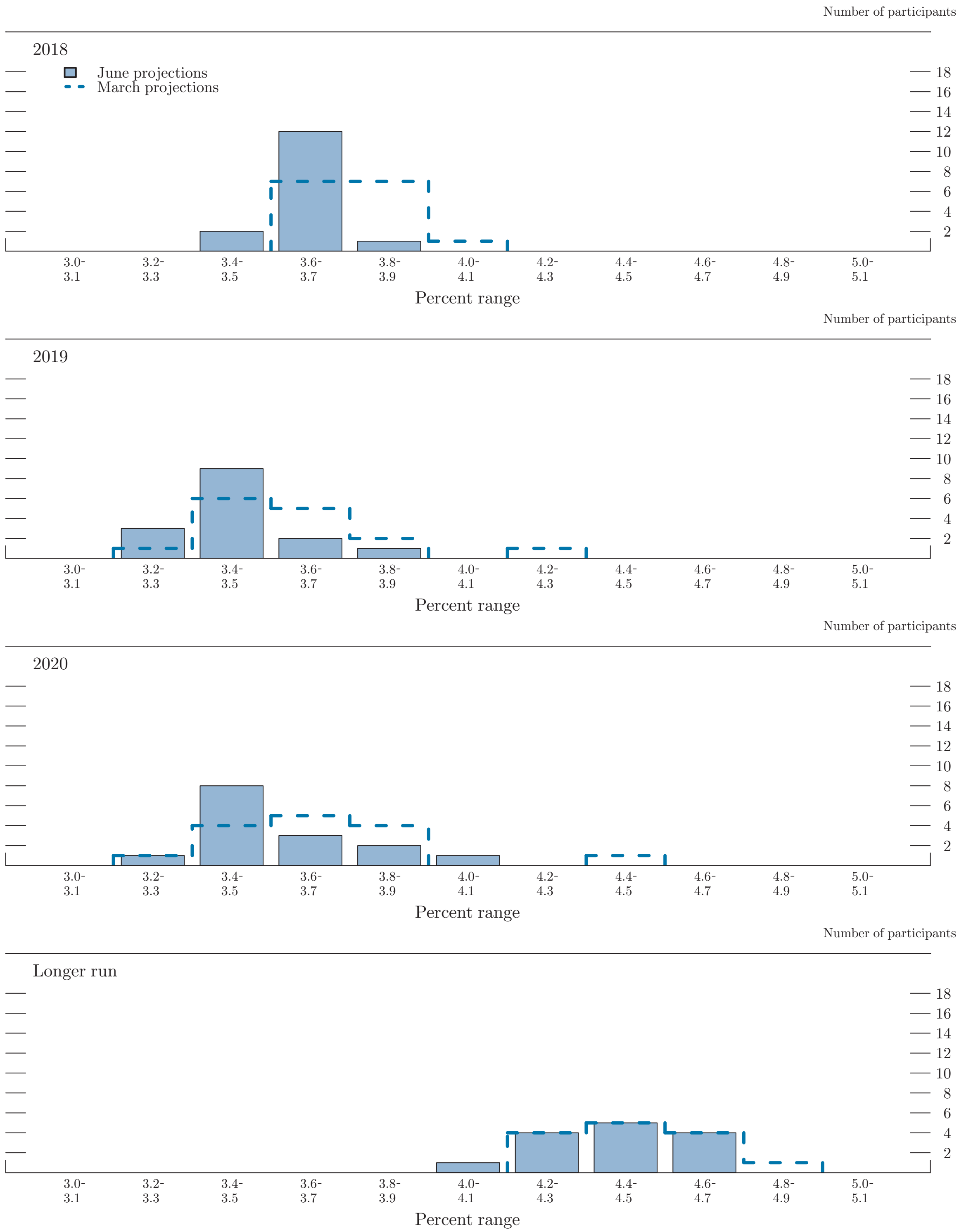
In assessing the path for the federal funds rate that, in their view, is likely to be appropriate, FOMC participants take account of the range of possible economic outcomes, the likelihood of those outcomes, and the potential benefits and costs should they occur. As a reference, table 2 provides measures of forecast uncertainty, based on the forecast errors of various private and government forecasts over the past 20 years, for real GDP growth, the unemployment rate, and total PCE price inflation. Those measures are represented graphically in the "fan charts" shown in the top panels of figures 4.A, 4.B, and 4.C. The fan charts display the median SEP projections for the three variables surrounded by symmetric confidence intervals derived from the forecast errors reported in table 2. If the degree of uncertainty attending these projections is similar to the typical magnitude of past forecast errors and the risks around the projections are broadly balanced, then future outcomes of these variables would have about a 70 percent probability of being within these confidence intervals. For all three variables, this measure of uncertainty is substantial and generally increases as the forecast horizon lengthens.

Figure 3.A. Distribution of participants' projections for the change in real GDP, 2018–20 and over the longer run



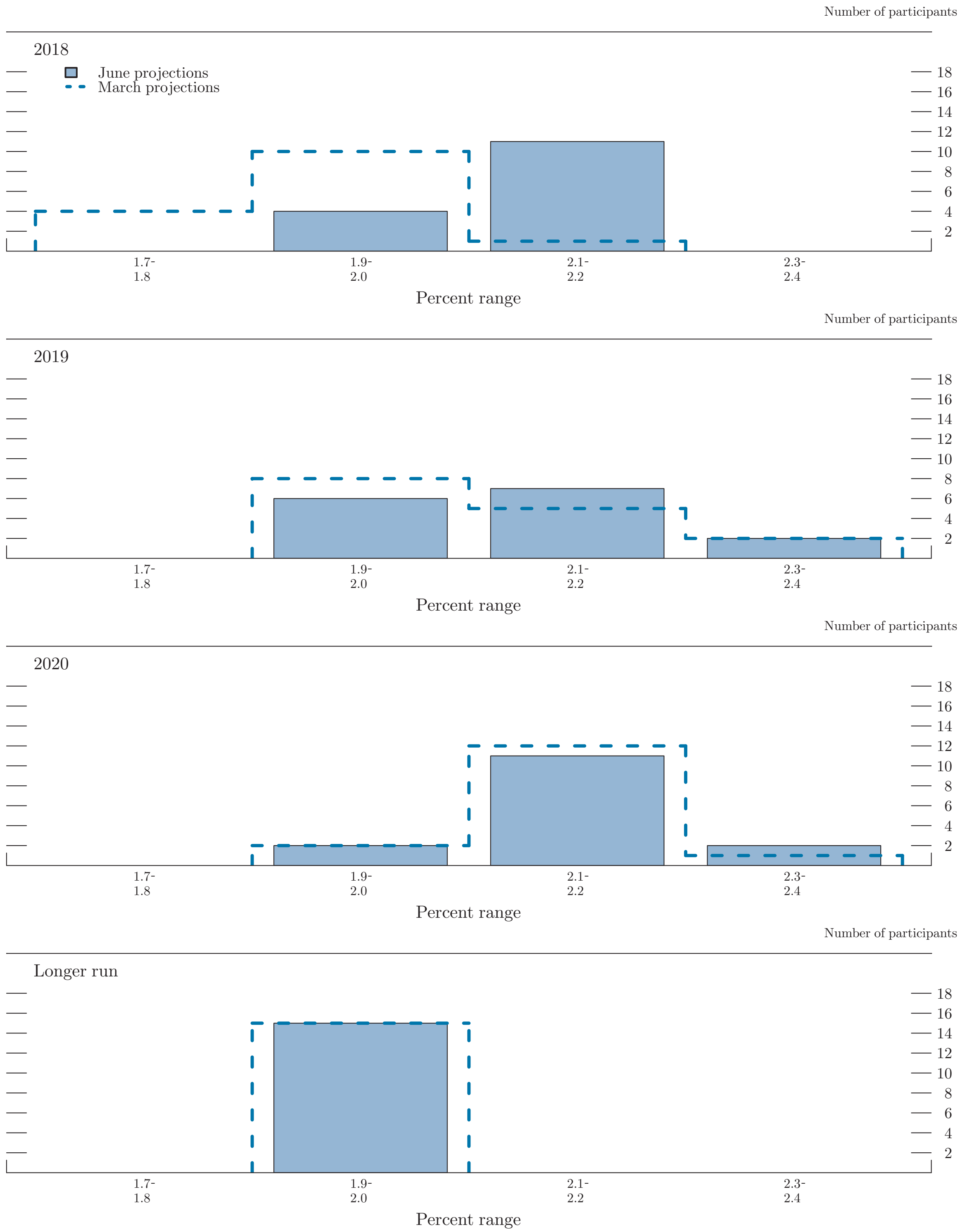
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.B. Distribution of participants' projections for the unemployment rate, 2018–20 and over the longer run



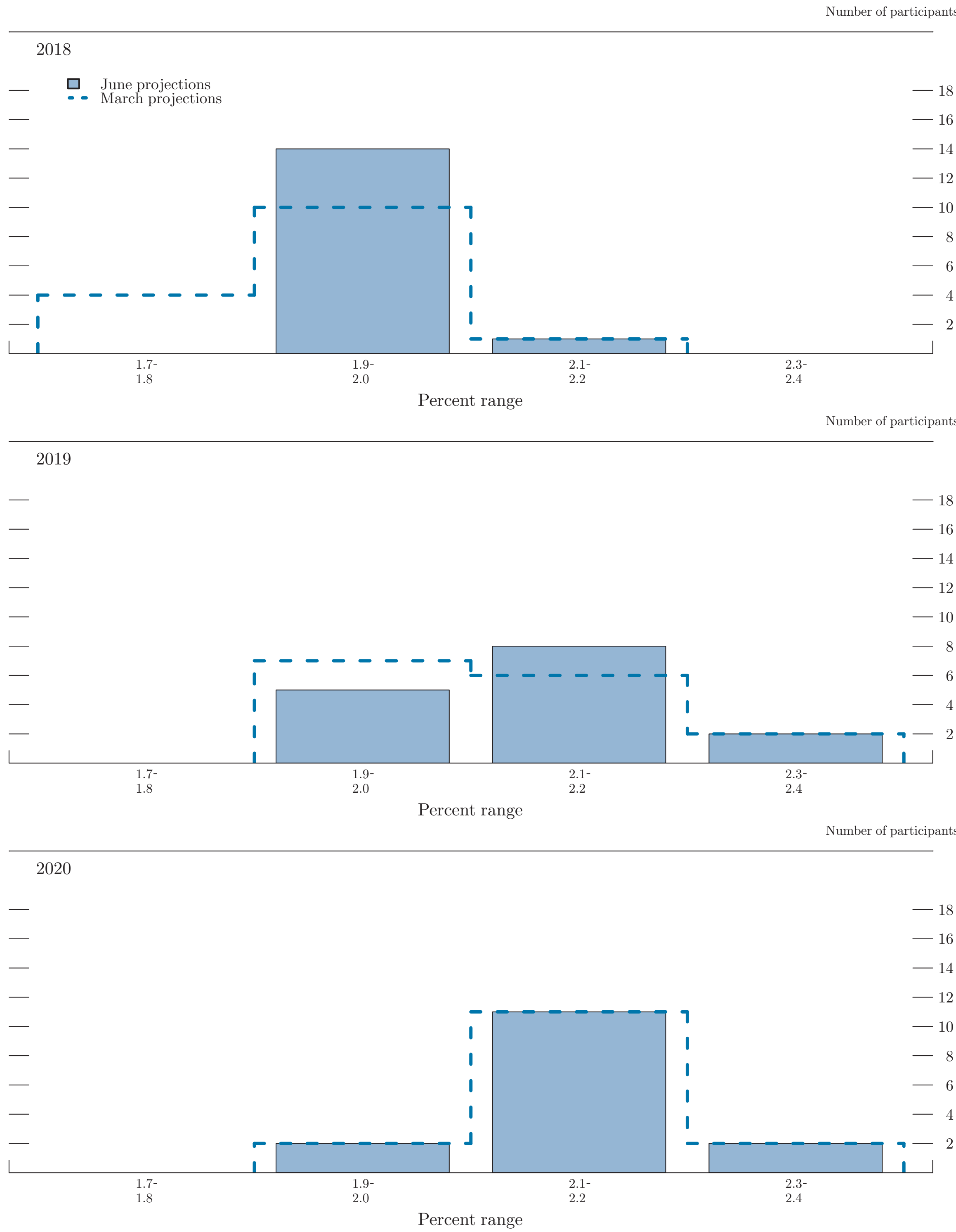
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.C. Distribution of participants' projections for PCE inflation, 2018–20 and over the longer run



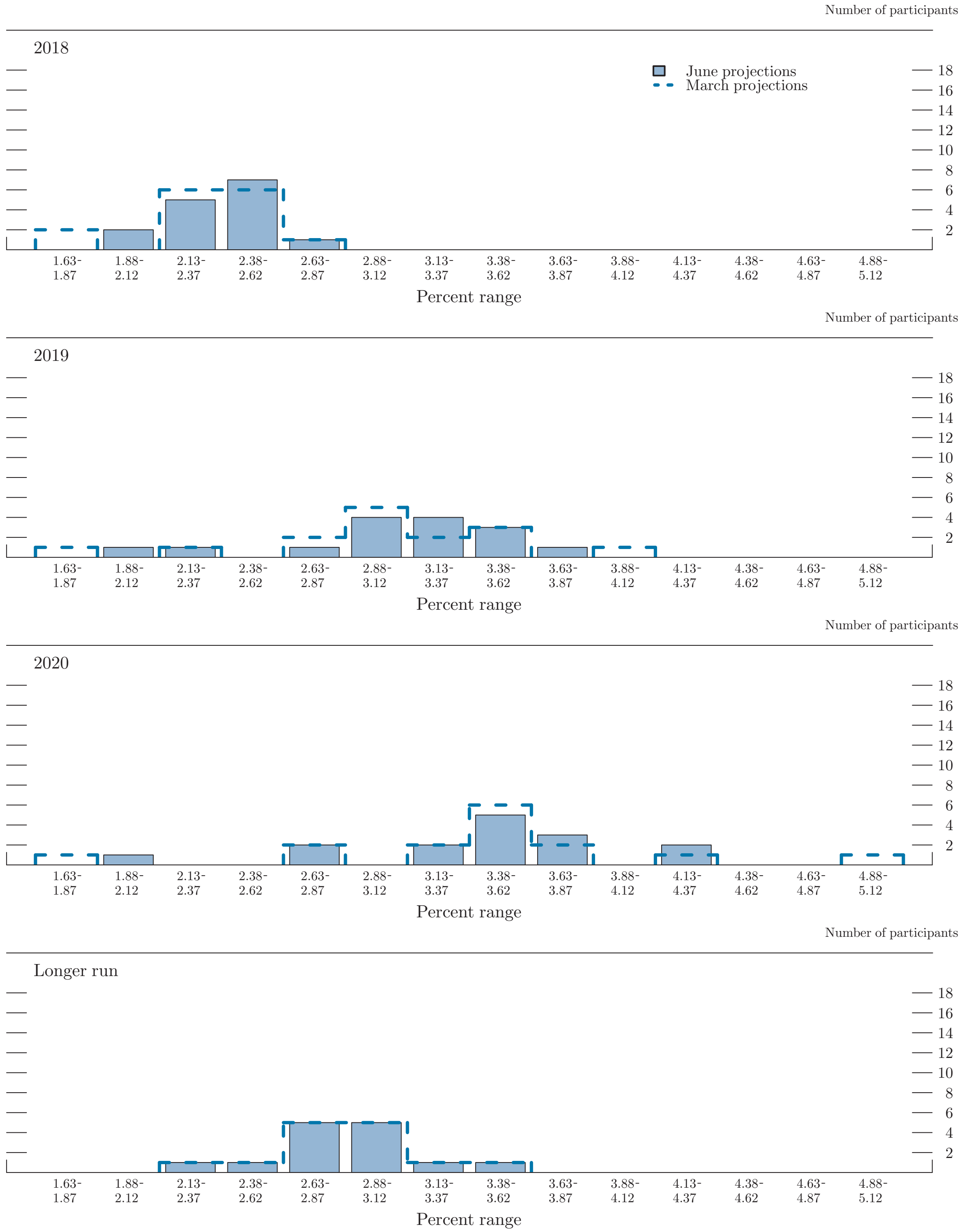
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.D. Distribution of participants' projections for core PCE inflation, 2018–20



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, 2018–20 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	2018	2019	2020
Change in real GDP[1]	±1.3	±2.0	±2.1
Unemployment rate[1]	±0.4	±1.2	±1.8
Total consumer prices[2]	±0.7	±1.0	±1.0
Short-term interest rates[3]	±0.7	±2.0	±2.2

NOTE: Error ranges shown are measured as plus or minus the root mean squared error of projections for 1998 through 2017 that were released in the summer by various private and government forecasters. As described in the box "Forecast Uncertainty," under certain assumptions, there is about a 70 percent probability that actual outcomes for real GDP, unemployment, consumer prices, and the federal funds rate will be in ranges implied by the average size of projection errors made in the past. For more information, see David Reifschneider and Peter Tulip (2017), "Gauging the Uncertainty of the Economic Outlook Using Historical Forecasting Errors: The Federal Reserve's Approach," Finance and Economics Discussion Series 2017-020 (Washington: Board of Governors of the Federal Reserve System, February), 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.

Participants' assessments of the level of uncertainty surrounding their individual economic projections are shown in the bottom-left panels of figures 4.A, 4.B, and 4.C. Nearly all participants viewed the degree of uncertainty attached to their economic projections for real GDP growth, the unemployment rate, and inflation as broadly similar to the average of the past 20 years, a view that was essentially unchanged from March.[3]

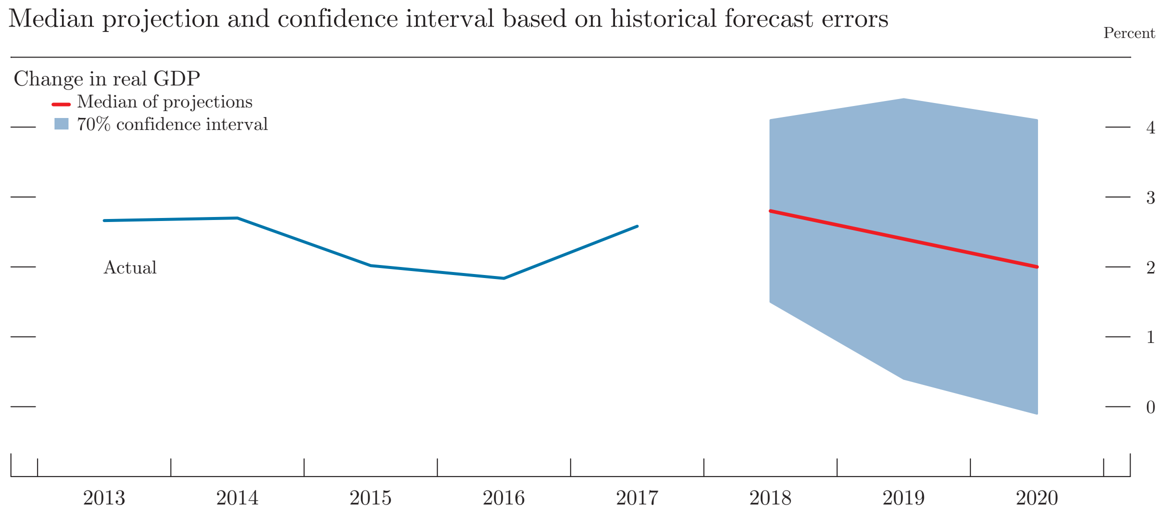
Because the fan charts are constructed to be symmetric around the median projections, they do not reflect any asymmetries in the balance of risks that participants may see in their economic projections. Participants' assessments of the balance of risks to their economic projections are shown in the bottom-right panels of figures 4.A, 4.B, and 4.C. Most participants judged the risks to their projections of real GDP growth, the unemployment rate, total inflation, and core inflation as broadly balanced—in other words, as broadly consistent with a symmetric fan chart. Compared with March, even more participants saw the risks to their projections as broadly balanced. Specifically, for GDP growth, only one participant viewed the risks as tilted to the downside, and the number of participants who viewed the risks as tilted to the upside dropped from four to two. For the unemployment rate, the number of participants who saw the risks as tilted toward low readings dropped from four to two. For inflation, all but one participant judged the risks to either total or core PCE price inflation as broadly balanced.

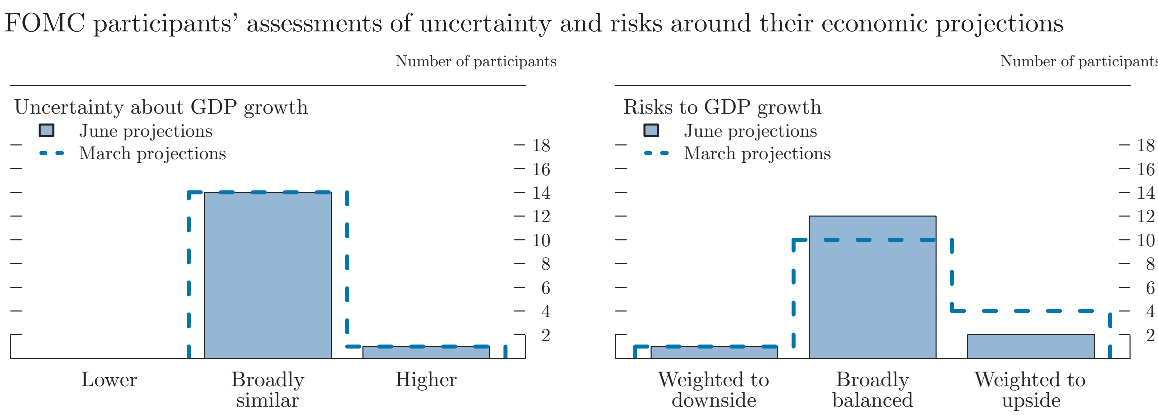
In discussing the uncertainty and risks surrounding their projections, several participants continued to point to fiscal developments as a source of upside risk, many participants cited developments related to trade policy as posing downside risks to their growth forecasts, and a few participants also pointed to political developments in Europe or the global outlook more generally as downside-risk factors. A few participants noted that the appreciation of the dollar posed downside risks to the inflation outlook. A few participants also noted the risk of inflation moving higher than anticipated as the unemployment rate falls.

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

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

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

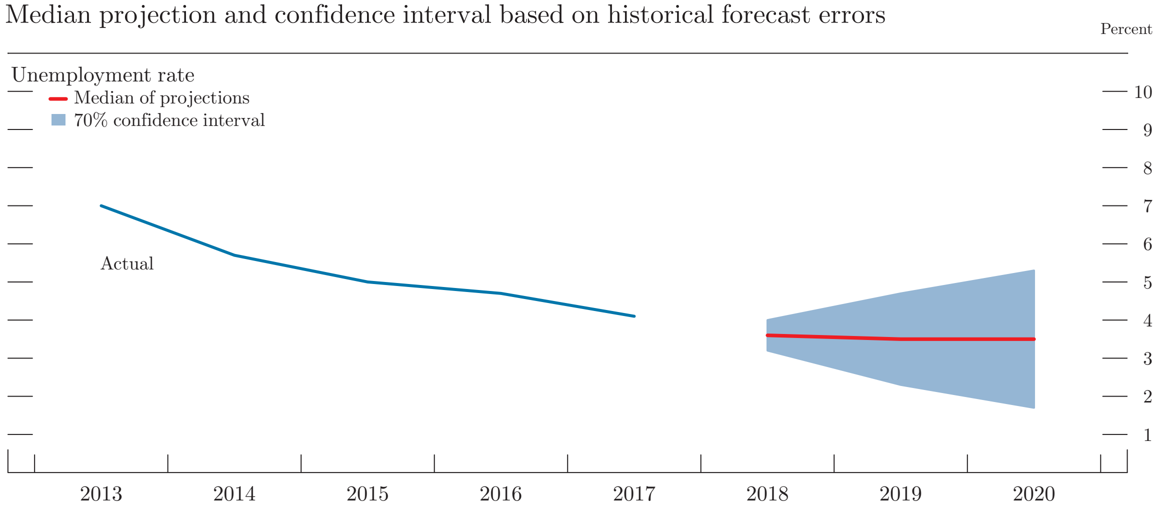




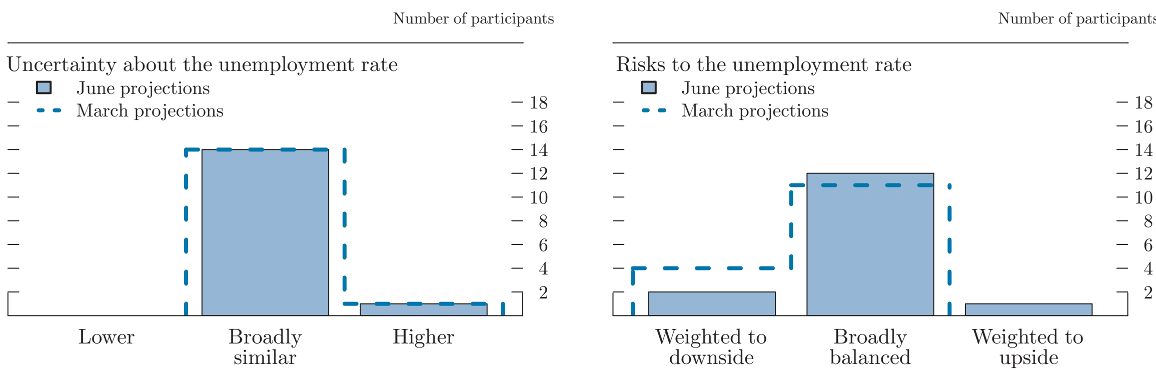
Note: The blue and red lines in the top panel show actual values and median projected values, respectively, of the percent change in real gross domestic product (GDP) from the fourth quarter of the previous year to the fourth quarter of the year indicated. The confidence interval around the median projected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

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

Median projection and confidence interval based on historical forecast errors

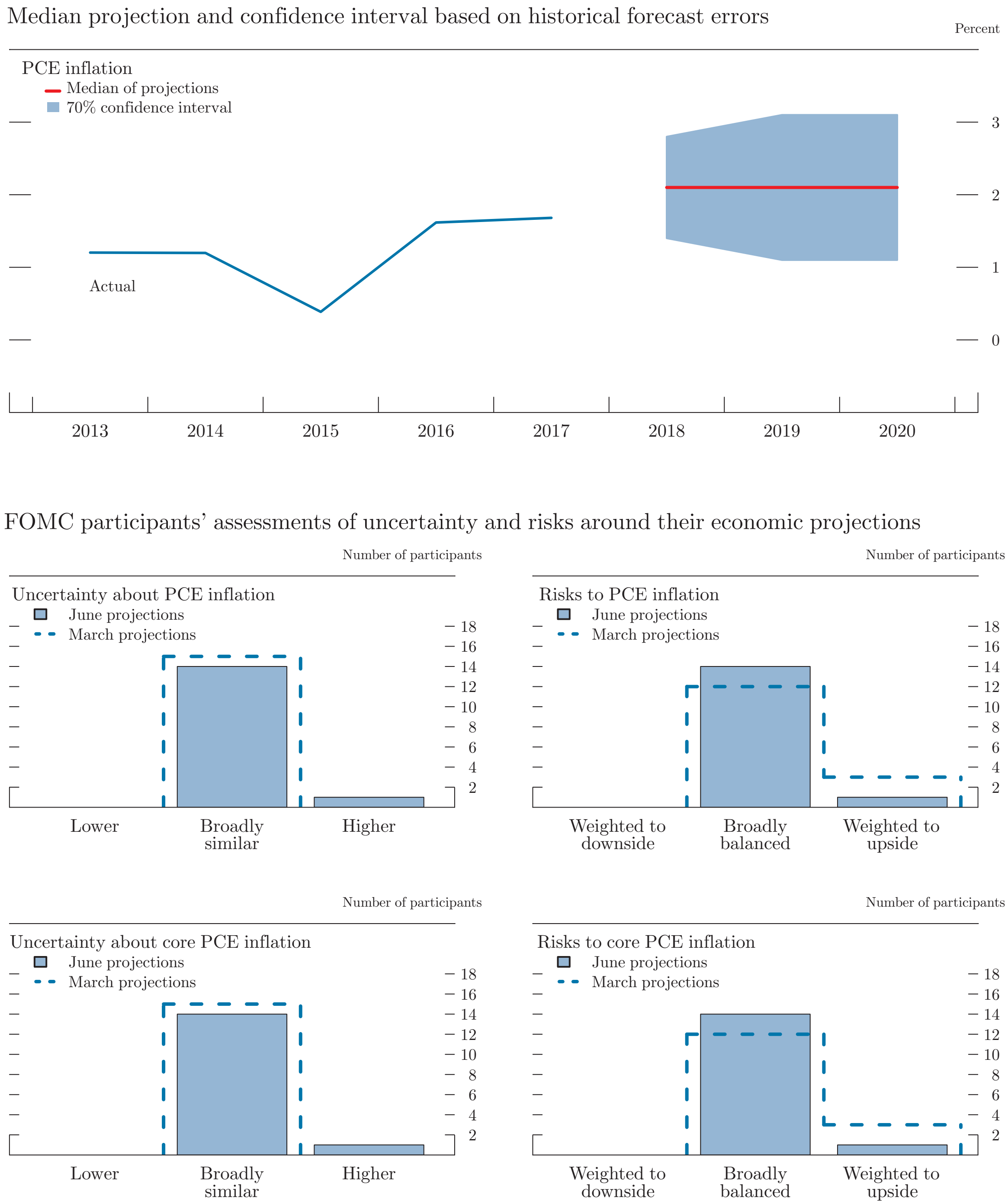


FOMC participants' assessments of uncertainty and risks around their economic projections



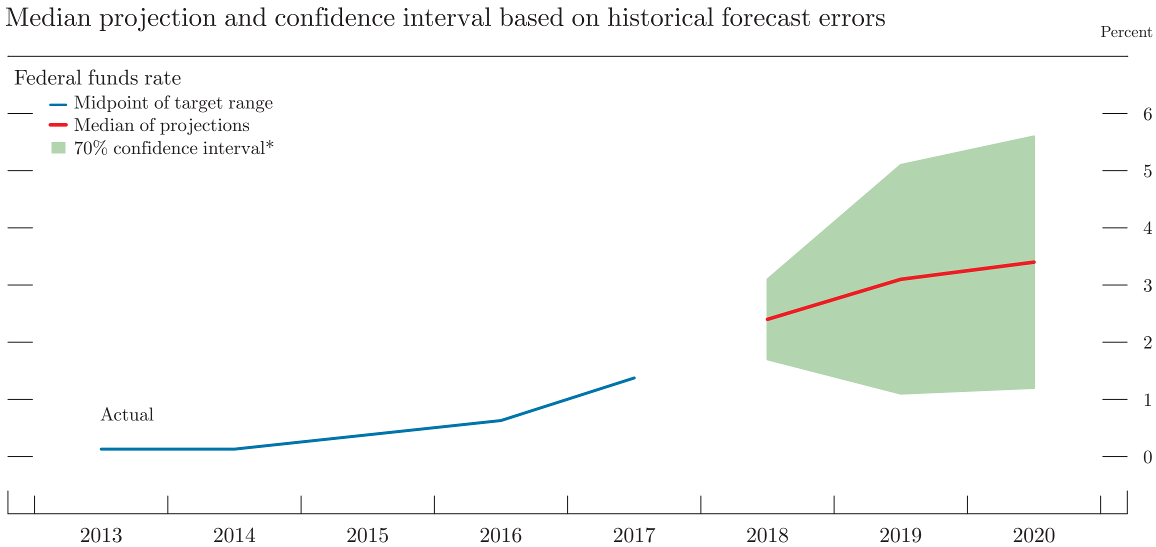
NOTE: The blue and red lines in the top panel show actual values and median projected values, respectively, of the average civilian unemployment rate in the fourth quarter of the year indicated. The confidence interval around the median projected values is assumed to be symmetric and is based on root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



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

Figure 5. Uncertainty in projections of the federal funds rate



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 1.7 to 4.3 percent in the current year, 1.0 to 5.0 percent in the second year, and 0.9 to 5.1 percent in the third year. The corresponding 70 percent confidence intervals for overall inflation would be 1.3 to 2.7 percent in the current year and 1.0 to 3.0 percent in the second and third years. Figures 4.A through 4.C illustrate these confidence bounds in "fan charts" that are symmetric and centered on the medians of FOMC participants' projections for GDP growth, the unemployment rate, and inflation. However, in some instances, the risks around the projections may not be symmetric. In particular, the unemployment rate cannot be negative; furthermore, the risks around a particular projection might be tilted to either the upside or the downside, in which case the corresponding fan chart would be asymmetrically positioned around the median projection.

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