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Monetary Policy Report

July 15, 2015

Board of Governors of the Federal Reserve System

Letter of Transmittal

Board of Governors of the
Federal Reserve System

Washington, D.C., July 15, 2015

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

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

Sincerely,

Janet L. Yellen

Janet L. Yellen, Chair

Statement on Longer-Run Goals and Monetary Policy Strategy

Adopted effective January 24, 2012; as amended effective January 27, 2015

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

Inflation, employment, and long-term interest rates fluctuate over time in response to economic and financial disturbances. Moreover, monetary policy actions tend to influence economic activity and prices with a lag. Therefore, the Committee's policy decisions reflect its longer-run goals, its medium-term outlook, and its assessments of the balance of risks, including risks to the financial system that could impede the attainment of the Committee's goals.

The inflation rate over the longer run is primarily determined by monetary policy, and hence the Committee has the ability to specify a longer-run goal for inflation. The Committee reaffirms its judgment that inflation at the rate of 2 percent, as measured by the annual change in the price index for personal consumption expenditures, is most consistent over the longer run with the Federal Reserve's statutory mandate. Communicating this inflation goal clearly to the public helps keep longer-term inflation expectations firmly anchored, thereby fostering price stability and moderate long-term interest rates and enhancing the Committee's ability to promote maximum employment in the face of significant economic disturbances. The maximum level of employment is largely determined by nonmonetary factors that affect the structure and dynamics of the labor market. These factors may change over time and may not be directly measurable. Consequently, it would not be appropriate to specify a fixed goal for employment; rather, the Committee's policy decisions must be informed by assessments of the maximum level of employment, recognizing that such assessments are necessarily uncertain and subject to revision. The Committee considers a wide range of indicators in making these assessments. Information about Committee participants' estimates of the longer-run normal rates of output growth and unemployment is published four times per year in the FOMC's Summary of Economic Projections. For example, in the most recent projections, FOMC participants' estimates of the longer-run normal rate of unemployment had a central tendency of 5.2 percent to 5.5 percent.

In setting monetary policy, the Committee seeks to mitigate deviations of inflation from its longer-run goal and deviations of employment from the Committee's assessments of its maximum level. These objectives are generally complementary. However, under circumstances in which the Committee judges that the objectives are not complementary, it follows a balanced approach in promoting them, taking into account the magnitude of the deviations and the potentially different time horizons over which employment and inflation are projected to return to levels judged consistent with its mandate.

The Committee intends to reaffirm these principles and to make adjustments as appropriate at its annual organizational meeting each January.

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Note: Unless otherwise stated, the time series in the figures extend through, for daily data, July 9, 2015; for monthly data, June 2015; and, for quarterly data, 2015:Q1. In bar charts, except as noted, the change for a given period is measured to its final quarter from the final quarter of the preceding period.

Summary

The overall condition of the labor market continued to strengthen over the first half of 2015, albeit at a more moderate pace than in 2014. So far this year, payroll employment has increased by about 210,000 on average per month compared with the robust 260,000 average in 2014, and the unemployment rate has declined about ¼ percentage point to 5.3 percent in June, close to most Federal Open Market Committee (FOMC) participants' estimates of its longer-run normal level. Other measures of labor market activity also point to ongoing improvement in labor market conditions even as they continue to suggest that further improvement is needed to achieve the Committee's maximum employment mandate. In particular, the labor force participation rate has generally been holding steady but nevertheless remains below most assessments of its trend, and the number of people working part time when they would prefer full-time employment has declined further but remains elevated. And, while some measures of labor compensation are starting to rise more rapidly, they nevertheless remain consistent with the view that labor resources likely are still not being fully utilized.

Consumer price inflation remains below the FOMC's longer-run goal of 2 percent. The price index for personal consumption expenditures (PCE) edged up only ¼ percent over the 12 months ending in May, held down by the pass-through of a sizable decline in crude oil prices over the second half of last year. However, consumer energy prices appear to have stabilized in recent months. Changes in the PCE price index excluding food and energy items, which are often a better indicator of where overall inflation will be in the future, also remained relatively low; this index rose 1¼ percent over the 12 months ending in May, partly restrained by declines in the prices of non-energy imported goods. Meanwhile, survey-based measures of longer-run inflation expectations have remained relatively stable; market-based measures of inflation compensation have moved up somewhat from their lows earlier this year but remain below levels that prevailed until last summer.

Real gross domestic product is reported to have been little changed in the first quarter of this year. Some of this weakness likely reflected temporary factors that will reverse over the coming quarters. Indeed, a number of recent spending indicators suggest that economic activity increased at a moderate pace in the second quarter. The economic expansion continues to be supported by rising incomes resulting from ongoing job gains, accommodative monetary policy, and generally favorable financial conditions. Furthermore, the sizable drop in oil prices since last summer has been a substantial benefit to households, although the negative side of that decline has been quite evident in cutbacks in the energy sector of our economy. In addition, the sluggish pace of economic activity abroad, together with the appreciation of the dollar, has weighed on net exports.

The Committee expects that, with appropriate policy accommodation, economic activity will expand at a moderate pace and labor market conditions will continue to move toward levels the Committee judges to be consistent with its dual mandate of maximum employment and price stability. In addition, the Committee anticipates that, with stable inflation expectations and strengthening economic activity, inflation will rise gradually over the medium term toward the Committee's 2 percent objective. Those expectations are reflected in the June Summary of Economic Projections (SEP), which provides projections of the individual FOMC participants and is included as Part 3 of this report.

Domestic financial conditions have generally remained supportive of economic growth. After having declined notably in 2014, longer-

term interest rates have increased somewhat, on net, over the first half of the year, but they remain at historically low levels. Broad measures of U.S. equity prices have been little changed, on balance, this year after having risen considerably in recent years. Credit flows to large nonfinancial businesses have remained solid, and financing generally appears to have become available to small businesses as well. Credit conditions for households have been mixed: While the availability of mortgage loans continues to expand gradually, mortgages remain relatively difficult to obtain for some individuals, and credit card lending standards and terms are tight for borrowers with below-prime scores. Meanwhile, auto and student loans continued to be widely available, and outstanding balances of such loans have continued to rise significantly.

Financial vulnerabilities in the United States overall have remained moderate since the previous *Monetary Policy Report.* Capital and liquidity positions at the largest banking firms have remained strong, maturity transformation outside the banking system has continued to trend lower, and debt growth by the household sector has been modest. Valuation pressures in many fixed-income markets, while having eased, have remained notable; prices and valuation measures for commercial real estate have increased further; and borrowing by lower-rated businesses has continued at a rapid rate. Although market participants have expressed concerns about the resilience of liquidity during stress events, a variety of metrics do not suggest a significant deterioration in market liquidity; the Federal Reserve is watching developments closely. Foreign developments, such as the situation in Greece and financial conditions in China, could pose some risks to the United States if they lead to broader strains in those regions.

The FOMC has continued to judge that a high degree of policy accommodation remains appropriate to support continued progress toward maximum employment and price stability. As a result, it has maintained the exceptionally low target range of 0 to ¼ percent for the federal funds rate and has kept the Federal Reserve's holdings of longer-term securities at their current elevated levels to help maintain accommodative financial conditions. The Committee has reiterated that in deciding how long to maintain the current target range for the federal funds rate, it will consider a broad set of indicators to assess realized and expected progress toward its objectives. Since its April meeting, the Committee has stated it anticipates that raising the target range for the federal funds rate will be appropriate when it has seen further improvement in the labor market and is reasonably confident that inflation will move back to its 2 percent objective over the medium term. In the June SEP, most policymakers anticipated that these conditions would be met sometime this year. The Committee continues to expect that, even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run.

The Federal Reserve has continued to plan for the eventual normalization of the stance and conduct of monetary policy, including by testing the operational readiness of the policy tools to be used. The FOMC remains confident that it has the tools it needs to raise short-term interest rates when doing so becomes appropriate.

Part 1
Recent Economic and Financial Developments

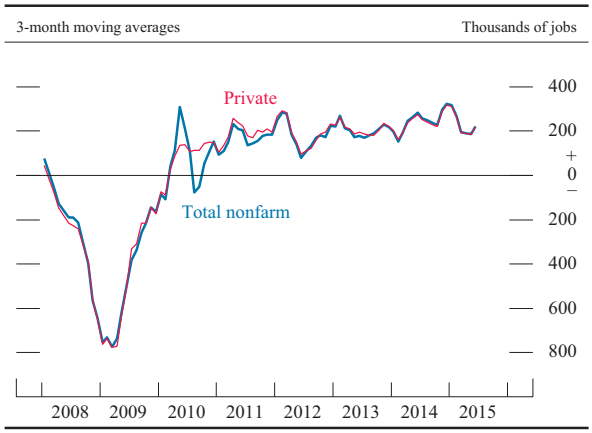
Labor market conditions continued to improve over the first half of 2015, although at a more moderate pace than last year. Gains in payroll employment since the start of the year have averaged close to 210,000 per month, somewhat below last year's average pace, while the unemployment rate edged down slightly to 5.3 percent in June, close to most Federal Open Market Committee (FOMC) participants' estimates of its longer-run normal level. Since last summer, a steep drop in crude oil prices has exerted downward pressure on overall inflation, and price increases for other goods and services have been subdued, partly reflecting declines in prices for imported non-energy goods. The price index for personal consumption expenditures (PCE) increased only ¼ percent during the 12 months ending in May, a rate that is well below the FOMC's longer-run objective of 2 percent; the index excluding food and energy prices was up 1¼ percent over this period. Survey-based measures of longer-run inflation expectations have been fairly stable, whereas measures of inflation compensation derived from financial market quotes, while up from their lows earlier this year, remain below the levels that prevailed prior to last summer. Meanwhile, real gross domestic product (GDP) was reported to have been little changed in the first quarter of this year. Some of this weakness likely was the result of temporary factors, and recent indicators suggest that economic activity picked up in the second quarter; even so, the pace of output growth appears to have slowed so far this year, on average, relative to its pace last year. The economic expansion continues to be supported by rising real incomes driven by gains in employment and, recently, lower oil prices; by improving consumer and business confidence; and by accommodative monetary policy and generally favorable financial conditions. However, the low level of oil prices also pushed down investment spending in the energy sector early this year, and sluggish growth abroad and the higher foreign exchange value of the dollar have weighed on U.S. exports.

Domestic Developments

The labor market has continued to improve but at a more gradual pace . . .

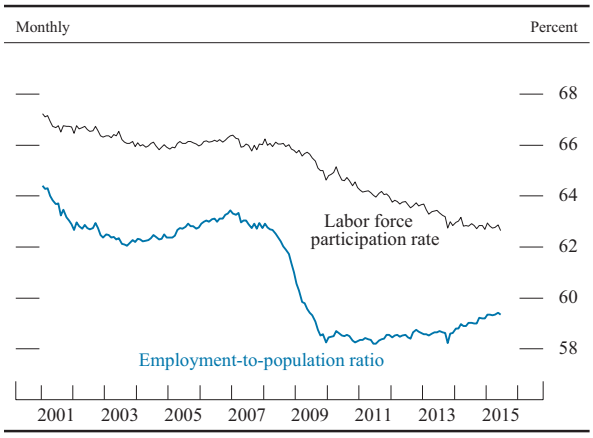
Labor market conditions strengthened further over the first half of 2015 but at a more moderate pace than last year. Payroll employment gains have averaged about 210,000 per month so far this year, a solid pace but down from an average of 260,000 jobs per month in 2014 (figure 1). The unemployment rate has continued to edge lower and reached 5.3 percent in June, ¼ percentage point lower than in December; in 2014, the unemployment rate declined more rapidly. In addition, the share of unemployed who have been out of work for more than six months has declined noticeably this year. After falling steeply during the recession and the early part of the recovery, the labor force participation rate has remained roughly flat since late 2013,

1. Net change in payroll employment



Source: Department of Labor, Bureau of Labor Statistics.

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



NOTE: Both series are a percent of the population aged 16 and over.
SOURCE: Department of Labor, Bureau of Labor Statistics.

although it ticked lower in June (figure 2). The continued stability of the participation rate likely represents cyclical improvement relative to its declining trend, which reflects ongoing demographic trends such as the aging of members of the baby-boom generation into their retirement years. With employment rising and the participation rate holding steady, the employment-to-population ratio edged up further over the first half of this year. Furthermore, the job openings rate has continued to move up this year and now stands above its pre-recession level, and the quits rate, which is often considered a measure of workers' confidence in labor market opportunities, has remained at relatively high levels. Unemployment insurance claims are now very low.

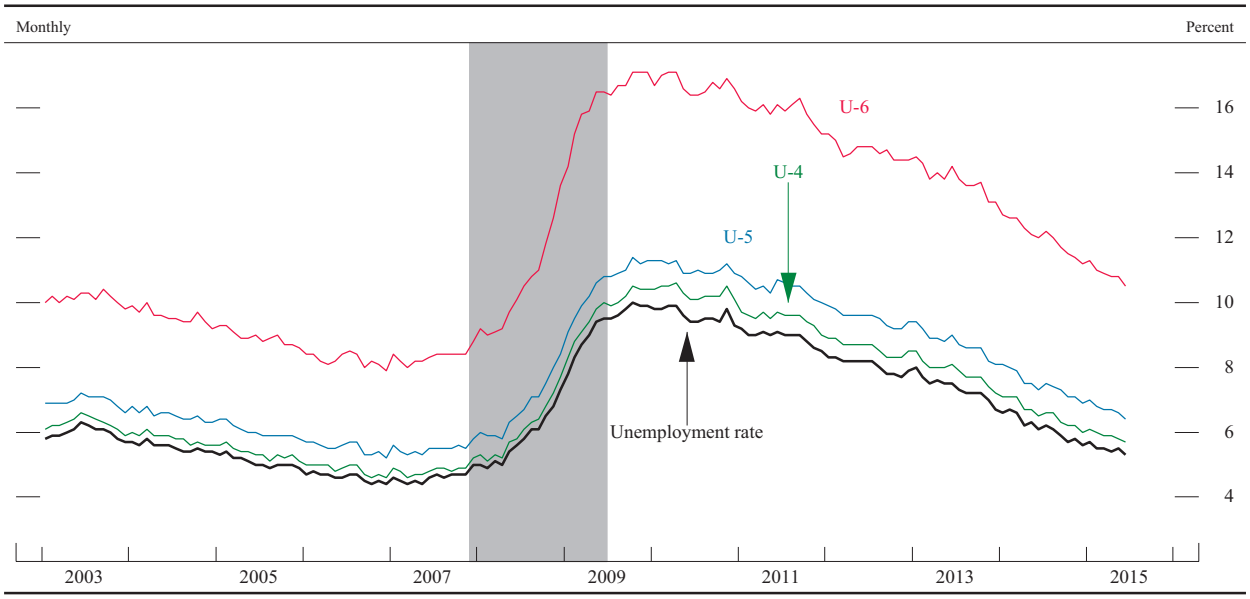
. . . and some labor market slack remains . . .

With these improvements, the labor market has shown further progress toward the Committee's maximum employment mandate. Nevertheless, as described in the box "Slack in the Labor Market," other labor market indicators are consistent with more slack in resource utilization than is indicated by the unemployment rate alone. In particular, although these measures have improved, the participation rate remains below most assessments of its trend, and the share of workers who are employed part time but would like to work full time is still high; in large part for this reason, the more comprehensive U-6 measure of labor underutilization remains elevated relative to the unemployment rate (figure 3).

. . . while compensation has shown some signs of accelerating . . .

As the labor market has continued to improve, increases in some measures of hourly labor compensation have begun to pick up but, nonetheless, remain relatively subdued. The employment cost index (ECI) for private-industry workers, which measures both wages

3. Measures of labor underutilization



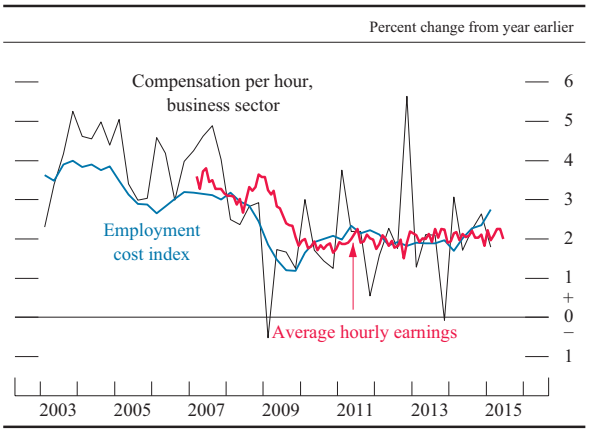
NOTE: U-4 measures total unemployed plus discouraged workers, as a percent of the labor force plus discouraged workers. Discouraged workers are a subset of marginally attached workers who are not currently looking for work because they believe no jobs are available for them. U-5 measures total unemployed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

and the cost of employer-provided benefits, rose 2¾ percent over the 12 months ending in March, up from gains of about 2 percent that had prevailed over the past few years (figure 4). Two other prominent measures of compensation—average hourly earnings and business-sector compensation per hour—have increased a bit more slowly than the ECI over the past year and have shown little sign of acceleration. Since the recession began, the gains in all three of these measures of nominal compensation have fallen well short of their pre-recession averages, and growth of real compensation has fallen short of productivity growth over much of this period. That said, the drop in energy prices boosted real wage growth over the past year.

. . . and productivity growth has been especially weak

Labor productivity in the business sector is reported to have declined in both the fourth

4. Measures of change in hourly compensation



NOTE: The average hourly earnings data series begins in March 2007 and extends through June 2015. The compensation per hour and employment cost index data extend through 2015:Q1. For business-sector compensation, change is over four quarters; for the employment cost index, change is over the 12 months ending in the last month of each quarter; for average hourly earnings, change is from 12 months earlier.
SOURCE: Department of Labor, Bureau of Labor Statistics.

Slack in the Labor Market

Gauging how far the economy is from the Federal Reserve's congressionally mandated objective of maximum employment—that is, estimating the amount of slack (or underutilized resources) in the labor market—is of central importance for monetary policy decisions. The most common and straightforward measure of labor market slack is the unemployment rate gap—the deviation of the unemployment rate from its longer-run sustainable level, or natural rate. By this measure, labor slack has narrowed significantly, and, according to many estimates of the natural rate, the economy may be near maximum employment. However, other measures of labor utilization—including the labor force participation rate and the share of workers employed part time who would like to work full time—have shown less improvement and may represent additional margins of labor market slack that should be considered when assessing progress toward maximum employment.

The natural rate of unemployment is unobserved and necessarily uncertain. At present, most Federal Open Market Committee (FOMC) participants estimate the longer-run normal level of the unemployment rate to be between 5.0 and 5.2 percent, while the Congressional Budget Office's (CBO) current estimate of the natural rate is 5.4 percent.[1] The natural rate is thought to be influenced by frictions in the labor market that prevent firms and workers from quickly forming employment relationships, and some analysts have suggested that these frictions have increased since the Great Recession because of a greater mismatch between the skills demanded by firms and those provided by job seekers or because long spells of unemployment have made some job seekers less employable.[2] Others have argued that these factors do not necessarily imply a higher natural rate of unemployment.[3] Moreover, the natural rate may have *fallen* in recent years because of a shift in the composition of the labor force toward individuals with lower average unemployment rates.[4]

Even if we could accurately measure the natural rate, the unemployment rate gap may at times be an insufficient measure of slack. The measured unemployment rate includes only persons who do not have a job, are available to work, and are actively looking for a job. It excludes persons who may want a job but are not actively searching; these individuals are counted as being out of the labor force instead. The labor force participation rate (the fraction of the population either employed or counted as unemployed) has fallen steeply since the start of the recession. Much of this decline—at least half, by many estimates—likely reflects demographic changes, and another portion of the decline may be related to developments that have contributed to longer-run secular declines in labor force participation among younger adults and working-age men; the portion of the decline due to these factors likely would have occurred even in the absence of a recession. However, the severity of the Great Recession and, especially, the sluggishness of the recovery may nonetheless have discouraged many more persons from looking for work and thus contributed to the steep decline in the participation rate in recent years.[5]

Figure A plots the actual participation rate against estimates of its trend level from the CBO and from a model developed by Federal Reserve System staff and featured in the fall 2014 edition of the *Brookings*

1. The FOMC participants' estimate is the central tendency of the longer-run unemployment rate as presented in the Summary of Economic Projections that is included as Part 3 of this report. The full range of participants' estimates is from 5.0 to 5.8 percent. Estimates from the CBO are provided in Congressional Budget Office (2015), *The Budget and Economic Outlook: 2015 to 2025* (Washington: CBO, January), www.cbo.gov/publication/49892.

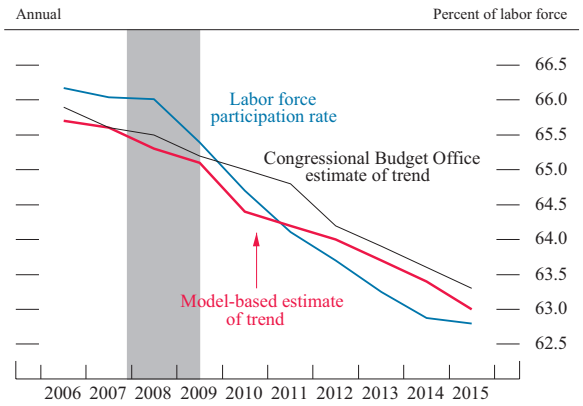
2. One study estimates that the efficiency of job matching deteriorated during the recession and, by 2012, had recovered only incompletely; see Regis Barnichon and Andrew Figura (forthcoming), "Labor Market Heterogeneity and the Aggregate Matching Function," *American Economic Journal: Macroeconomics*. Another study argues that the long-term unemployed will continue to have a low likelihood of finding employment; see Alan B. Krueger, Judd Cramer, and David Cho (2014), "Are the Long-Term Unemployed on the Margins of the Labor Market?" *Brookings Papers on Economic Activity*, vol. 48 (Spring), pp. 229–99, www.brookings.edu/~/media/Projects/BPEA/Spring-2014/2014a_Krueger.pdf?la=en.

3. As evidence of less efficient matching, some analysts point to the elevated level of job vacancies relative to unemployed persons. However, vacancies may also be elevated because it has become more profitable for firms to post vacancies as labor's share of income has declined, as shown in Andrew Figura and David Ratner (2015), "The Labor Share of Income and Equilibrium Unemployment," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, June 8), www.federalreserve.gov/econresdata/notes/feds-notes/2015/labor-share-of-income-and-equilibrium-unemployment-20150608.html. For evidence supporting the view that the long-term unemployed may be no less employable than the short-term unemployed because both the long- and short-term unemployed tend to have the same influence on wages, see Christopher Smith (2014), "The Effect of Labor Slack on Wages: Evidence from State-Level Relationships," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, June 2), www.federalreserve.gov/econresdata/notes/feds-notes/2014/effect-of-labor-slack-on-wages-evidence-from-state-level-relationships-20140602.html.

4. Demographic changes, all else being equal, would push down the natural rate relative to its pre-recession level, as shown in Daniel Aaronson, Luojia Hu, Arian Seifoddini, and Daniel G. Sullivan (2014), "Declining Labor Force Participation and Its Implications for Unemployment and Employment Growth," Federal Reserve Bank of Chicago, *Economic Perspectives*, vol. 38 (Fourth Quarter), pp. 100–38, https://www.chicagofed.org/publications/economic-perspectives/2014/4q-aaronson-etal.

5. For a discussion of secular trends in labor force participation that predated the recession, see Stephanie Aaronson, Tomaz Cajner, Bruce Fallick, Felix Galbis-Reig, Christopher L. Smith, and William Wascher (2014), "Labor

A. Labor force participation rate



NOTE: All series are annual averages. For the annual participation rate in 2015, the average through June is plotted. The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.

SOURCE: Labor force participation rate from published data, Bureau of Labor Statistics; Congressional Budget Office estimate of trend derived from "Key Inputs in CBO's Projection of Potential GDP" and population projections from the January 2015 Budget, as well as Census estimates of population for 2013 and earlier years; model-based estimate from Aaronson and others (2014), "Labor Force Participation: Recent Developments and Future Prospects," Brookings Papers on Economic Activity (Fall), pp. 197-275.

Papers on Economic Activity.[6] Both estimates of the trend capture the influences of demographics and long-running secular changes on the participation rate. Using either estimate, the actual participation rate is at present further below its trend than would be expected given the unemployment rate gap. As a result, at present the unemployment rate gap may understate how much slack remains in the labor market. As job prospects improve further, the participation rate should continue to converge toward its trend, and this excess slack should also diminish.

Additionally, the fraction of workers who report working part time but who want a full-time job (the share of people working part time for economic reasons, or the PTER rate) remains higher than would be expected given other measures of labor market utilization. For example, figure B plots the PTER rate with a prediction of what the PTER rate would be if it moved with the unemployment rate in its historically typical fashion. Although the PTER rate has declined somewhat as the unemployment rate has fallen, it remains higher than would be expected given the current level of the unemployment rate. As with the participation rate, some of the movement in the PTER rate may reflect a longer-term trend—such as a shift in employment toward service-producing industries, which tend to employ more part-time workers as a share of their workforce.[7] However, the share of involuntary part-time workers remains elevated in most industries and for most demographic groups, suggesting that at least some of the still-elevated PTER rate is due to weak labor demand. If so, then involuntary part-time workers represent another margin of labor market slack not captured by the unemployment rate.

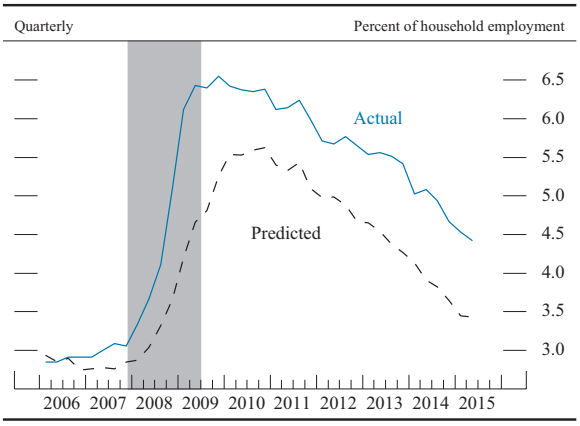
To be sure, there is considerable uncertainty about the magnitude of any additional labor market slack represented by each of these elements. However, it seems likely that they do reflect additional slack not measured by the unemployment rate, which should also be considered when judging how far employment is from its maximum sustainable level.

Force Participation: Recent Developments and Future Prospects," *Brookings Papers on Economic Activity* (Fall), pp. 197–275, www.brookings.edu/~/media/Projects/BPEA/Fall-2014/Fall2014BPEA_Aaronson_et_al.pdf?la=en. For evidence suggesting that the decline predominantly reflects weak labor demand, see Christopher J. Erceg and Andrew T. Levin (2014), "Labor Force Participation and Monetary Policy in the Wake of the Great Recession," *Journal of Money, Credit and Banking*, vol. 46 (October), pp. 3–49.

6. Model estimates refer to published estimates from Aaronson and others, "Labor Force Participation: Recent Developments," in note 5; estimates from the CBO are derived from supplementary economic data and projections in Congressional Budget Office, *Budget and Economic Outlook*, in note 1.

7. See Rob Valletta and Catherine van der List (2015), "Involuntary Part-Time Work: Here to Stay?" FRBSF Economic Letter 2015-19 (San Francisco: Federal Reserve Bank of San Francisco, June 8), www.frbsf.org/economic-research/publications/economic-letter/2015/june/involuntary-part-time-work-labor-market-slack-post-recession-unemployment; and Tomaz Cajner, Dennis Mawhirter, Christopher Nekarda, and David Ratner (2014), "Why Is Involuntary Part-Time Work Elevated?" FEDS Notes (Washington: Board of Governors of the Federal Reserve System, April 14), www.federalreserve.gov/econresdata/notes/feds-notes/2014/why-is-involuntary-part-time-work-elevated-20140414.html.

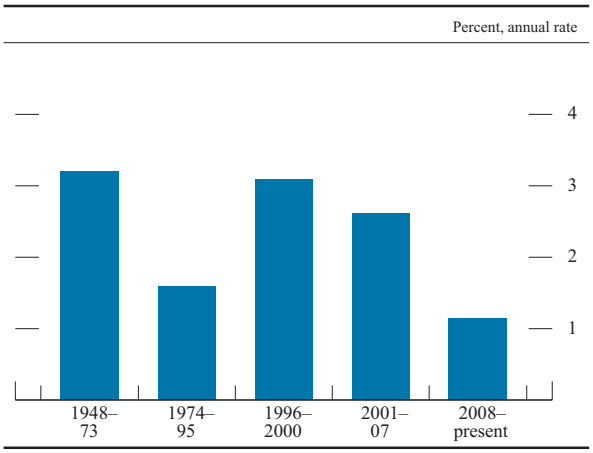
B. Part time for economic reasons



NOTE: The dashed line depicts fitted and simulated values from regression of the part-time for economic reasons rate on the unemployment rate and three lags of the unemployment rate over the period from 1994 to 2007. The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.

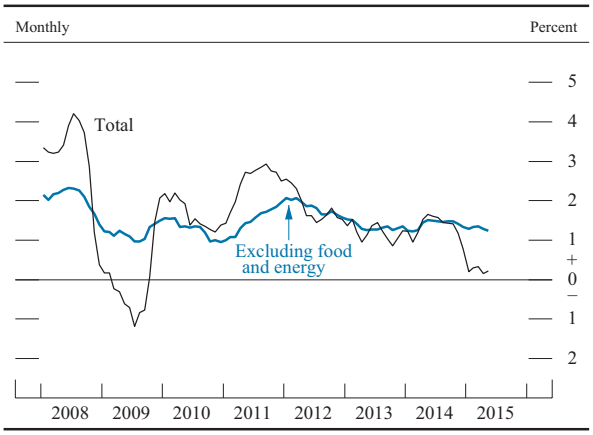
SOURCE: Department of Labor, Bureau of Labor Statistics.

5. Change in business sector output per hour



NOTE: Changes are measured from Q4 of the year immediately preceding the period through Q4 of the final year of the period. The final period is measured from 2007:Q4 through 2015:Q1.
SOURCE: Department of Labor, Bureau of Labor Statistics.

6. Change in the chain-type price index for personal consumption expenditures



NOTE: The data extend through May 2015; changes are from one year earlier.
SOURCE: Department of Commerce, Bureau of Economic Analysis.

quarter of 2014 and the first quarter of 2015, as the recovery in hours worked progressed even as output growth slowed. Over such short periods, however, productivity growth is often quite volatile, both because of difficulties in measuring output and hours and because other transitory factors may affect productivity growth from quarter to quarter. Taking a longer view, output per hour in the business sector has risen at an average annual rate of 1¼ percent since the recession began in late 2007, a gain that is modest by historical standards (figure 5). The relatively slow pace of productivity growth since 2007 reflects, in part, the sustained weakness in capital investment over the recession and recovery period; consequently, productivity gains may improve in the future as investment in productivity-enhancing capital equipment and research and development strengthens.

A plunge in crude oil prices has held down consumer prices . . .

Overall consumer price inflation has slowed to near zero over the past year, well below the FOMC's longer-run objective of 2 percent. In May, the 12-month change in the overall PCE price index was only ¼ percent, down from 1¾ percent in May 2014 (figure 6). This deceleration importantly reflects the sharp drop in oil and farm commodity prices over this period as well as declines in non-energy import prices. However, energy prices have stabilized in recent months, with the result that one-month changes in overall PCE prices have firmed somewhat.

After plunging in the second half of 2014, the spot price of crude oil moved up somewhat in the first half of 2015, reflecting in part a sharp decline in investment in the U.S. energy sector. Over the past few weeks, prices have moved lower as both U.S. and foreign oil production have been stronger than expected and as concerns about global growth persist. As of early July, at below $60 per barrel, the spot price of Brent crude oil remains at about half

of its mid-2014 peak (figure 7). Moreover, oil futures prices suggest that market participants expect only a moderate increase in oil prices over the next couple of years as global demand firms and North American supply growth slows. The large cumulative drop in crude oil prices was fully passed through to lower retail prices for gasoline and other energy products early this year. More recently, gasoline prices have increased somewhat, although prices at the pump remain at levels substantially below those of last summer.

Food commodity prices have fallen considerably from their levels of a year ago, and the gradual pass-through of these costs to the retail level has led to declines in consumer food prices over the first five months of this year. Meanwhile, non-oil import prices have been declining sharply so far this year, reflecting lower commodity prices as well as the rise since last summer in the exchange value of the dollar (figure 8).

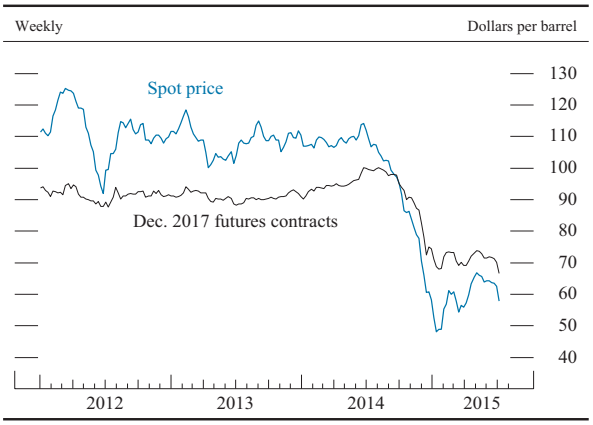
. . . and outside of the energy and food categories, inflation has remained subdued

Inflation for items other than food and energy (so-called core inflation) has remained relatively low. Core PCE prices rose about 1¼ percent over the 12 months ending in May, down slightly from its year-earlier pace. Falling import prices likely held down core inflation over the past year, and lower oil prices and easing prices for commodities more generally may have played a role in holding down firms' costs and prices. In addition, ongoing slack in labor and product markets has likely placed downward pressure on inflation, although with the improving labor market, the effect of this factor likely is waning.

Survey-based measures of longer-term inflation expectations have remained stable . . .

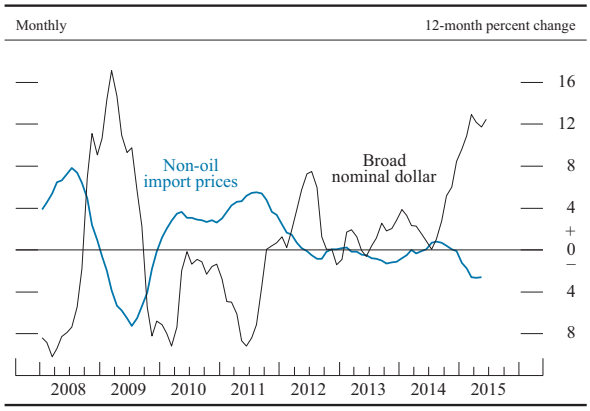
Because inflation expectations likely factor into wage- and price-setting decisions, the

7. Brent spot and futures prices



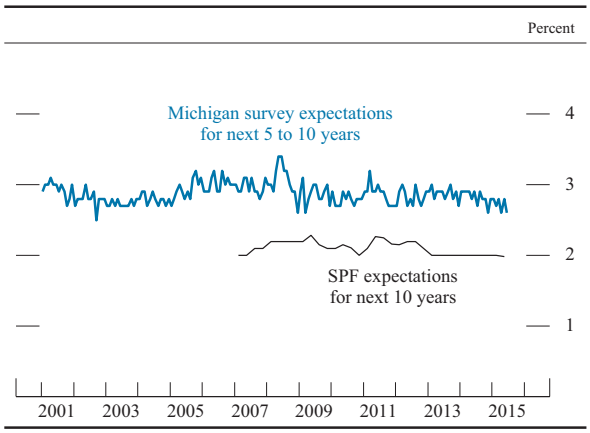
NOTE: The data extend through July 9, 2015.
SOURCE: NYMEX.

8. Non-oil import prices and U.S. dollar exchange rate



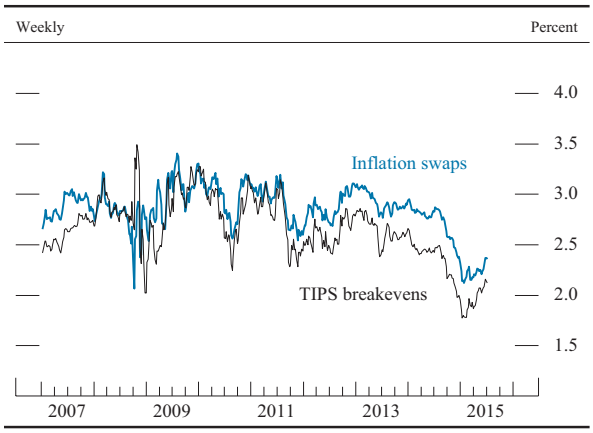
SOURCE: Department of Labor, Bureau of Labor Statistics; Federal Reserve Bank of New York, Statistical Release H.10, "Foreign Exchange Rates."

9. Median inflation expectations



NOTE: The Michigan survey data are monthly. The SPF data for inflation expectations for personal consumption expenditures are quarterly and extend from 2007:Q1 through 2015:Q2.
SOURCE: University of Michigan Surveys of Consumers; Federal Reserve Bank of Philadelphia, Survey of Professional Forecasters (SPF).

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



NOTE: The data are weekly averages of daily data and extend through July 9, 2015. TIPS is Treasury Inflation-Protected Securities.
SOURCE: Federal Reserve Bank of New York; Barclays; Federal Reserve Board staff estimates.

Federal Reserve tracks a variety of indicators of these expectations. Survey-based measures of longer-term inflation expectations have been quite stable over the past 15 years. Readings on inflation expectations over the next 5 to 10 years, as reported in the University of Michigan Surveys of Consumers, have continued to move within a narrow range, and, in the Survey of Professional Forecasters, conducted by the Federal Reserve Bank of Philadelphia, the median expectation for the annual rate of increase in the PCE price index over the next 10 years has been unchanged at 2 percent (figure 9). Furthermore, in the Survey of Primary Dealers, conducted by the Federal Reserve Bank of New York, distributions of inflation expectations 5 to 10 years ahead have also remained stable.

. . . while market-based measures of inflation compensation have declined since last summer

In contrast, market-based measures of longer-term inflation compensation—derived from inflation swaps or from differences between yields on nominal Treasury securities and Treasury Inflation-Protected Securities (TIPS)—declined noticeably between the middle of 2014 and early this year, and, while they have retraced part of that decline in recent months, they remain below the levels that prevailed prior to last summer (figure 10). Deducing the sources of changes in inflation compensation is difficult because such movements reflect not only expected inflation, but also an inflation risk premium—the compensation that holders of nominal securities demand for bearing inflation risk—as well as other factors. Nevertheless, one cannot rule out a decline in inflation expectations among market participants since last summer.

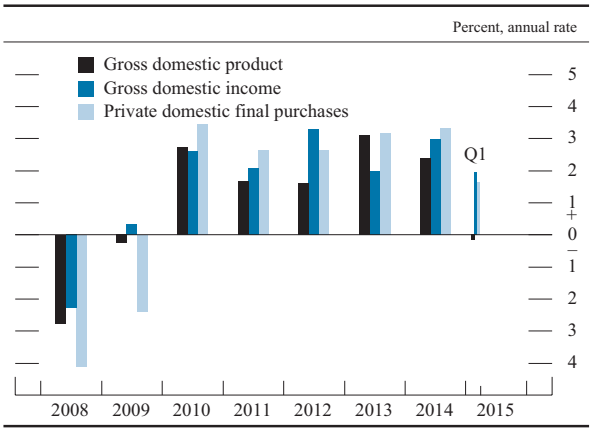
Economic activity slowed earlier this year

Real GDP is reported to have been little changed in the first quarter of this year after

increasing 2½ percent in 2014 (figure 11). Some of this weakness likely reflected temporary disruptions due to unusually severe winter weather and a labor dispute at West Coast ports; in addition, residual seasonality in some components of GDP may have held down measured first-quarter growth.[1] Both of these factors would tend to boost measured GDP growth over the remainder of the year. Indeed, a number of recent spending indicators suggest that economic activity rose moderately in the second quarter.

However, some of the slowdown in GDP growth relative to its pace last year likely reflects somewhat more persistent factors. In particular, expectations that the relative strength of the U.S. economy will lead to an earlier normalization of monetary policy than in our trading partners have contributed to a substantial appreciation of the dollar over the past year. The appreciation, combined with sluggish foreign growth, is weighing on the demand for U.S. exports. And the sizable drop in oil prices since last summer has led to marked cutbacks in investment in the energy sector of our economy even though those

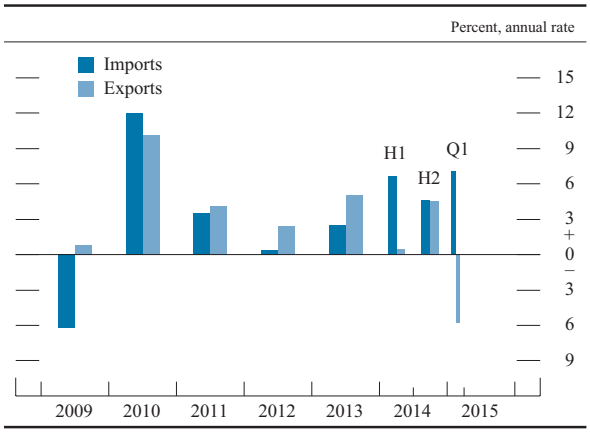
11. Change in real gross domestic product, gross domestic income, and private domestic final purchases



SOURCE: Department of Commerce, Bureau of Economic Analysis.

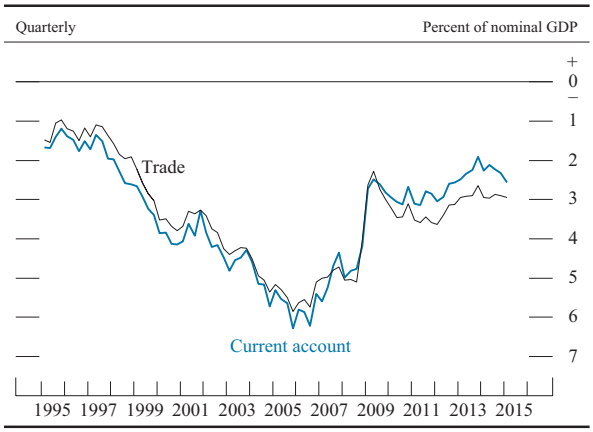
1. *Residual seasonality* is the presence of a predictable seasonal pattern in data that have already been seasonally adjusted. For recent discussions of this issue, see Jason Furman (2015), "Second Estimate of GDP for the First Quarter of 2015," *Council of Economic Advisers Blog*, May 29, https://www.whitehouse.gov/blog/2015/05/29/second-estimate-gdp-first-quarter-2015; and Charles E. Gilbert, Norman J. Morin, Andrew D. Paciorek, and Claudia R. Sahm (2015), "Residual Seasonality in GDP," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, May 14), www.federalreserve.gov/econresdata/notes/feds-notes/2015/residual-seasonality-in-gdp-20150514.html. The Bureau of Economic Analysis discusses its plans to revise seasonal adjustment procedures for GDP in its upcoming annual revision in Stephanie H. McCulla and Shelly Smith (2015), "Preview of the 2015 Annual Revision of the National Income and Product Accounts," Bureau of Economic Analysis, *Survey of Current Business* (June), www.bea.gov/scb/pdf/2015/06%20June/0615_preview_of_2015_annual_revision_of_national_income_and_product_accounts.pdf.

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



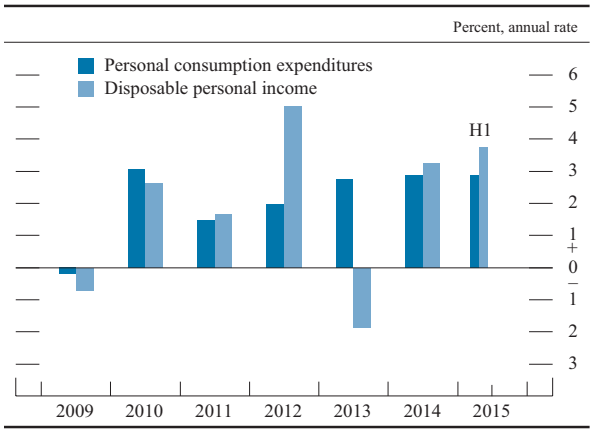
SOURCE: Department of Commerce, Bureau of Economic Analysis.

13. U.S. trade and current account balances



NOTE: GDP is gross domestic product.
SOURCE: Department of Commerce, Bureau of Economic Analysis.

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



NOTE: The reading for 2015:H1 is the annualized May/Q4 change.
SOURCE: Department of Commerce, Bureau of Economic Analysis.

price declines have been a substantial benefit to households. These factors also contributed to the 2¾ percent annual rate of decline in industrial production in the first five months of this year. Despite the drag on production from these headwinds, the economic expansion continues to be supported by accommodative financial conditions—including the low cost of borrowing for many households and businesses—and by increases in households' real incomes spurred by continuing job gains and the earlier decline in oil prices.

Net exports were a substantial drag on real GDP growth in the first quarter

Exports fell markedly in the first quarter, held back by lackluster growth abroad, the appreciation of the dollar, and transitory factors, including the West Coast port labor dispute (figure 12). In contrast, imports grew briskly in the first quarter, supported in part by the stronger dollar. As a result, net exports were an unusually large drag on real GDP growth. Trade data through May suggest that exports recovered from their first-quarter drop and import growth slowed, pointing to a small negative contribution from net exports in the second quarter. The current account deficit widened a bit to 2.6 percent of nominal GDP in the first quarter of this year but remains near its narrowest readings since the late 1990s (figure 13).

Gains in income and wealth are supporting consumer spending . . .

The rate of growth in consumer spending slowed during this year's harsh winter but has picked up in recent months. Smoothing through these monthly fluctuations, real consumer spending increased at an average annual rate of 2¾ percent over the first five months of this year, about the same as its average pace over 2014 (figure 14). The ongoing improvement in the labor market has supported income growth, and low gasoline prices have boosted households' purchasing power. As a result, real disposable personal income—that is, income after taxes and adjusted for price changes—increased at an

annual rate of nearly 4 percent over the first five months of this year, a slightly faster pace than in 2014.

Coupled with low interest rates, the rise in incomes has reduced debt payment burdens for many households. The household debt service ratio—that is, the ratio of required principal and interest payments on outstanding household debt to disposable personal income—has remained at a very low level by historical standards.

Consumer spending growth also continues to be supported by increases in household net worth. Over the first half of this year, broad measures of U.S. equity prices were little changed, on balance, after having risen considerably in recent years, and house prices moved up further (figure 15). Buoyed by cumulative increases in home and equity prices, aggregate household net worth has risen appreciably from its levels during the recession and its aftermath to more than six times the value of disposable personal income (figure 16).

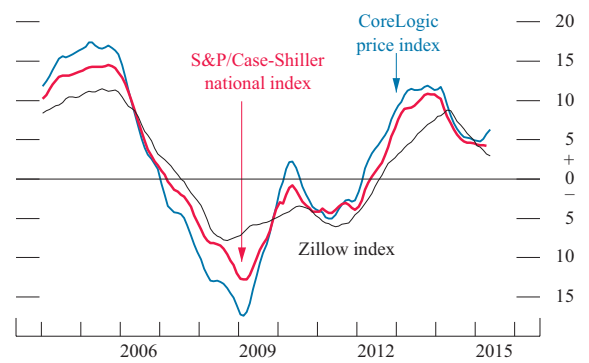
. . . as is credit availability for consumers that remains generally favorable

Consumer credit has continued to expand this year (figure 17). Auto and student loans remain widely available even to borrowers with lower credit scores, and outstanding balances of such loans expanded significantly through May. Credit card borrowing slowed early this year, likely reflecting weak retail activity, but has rebounded in recent months. However, credit card availability remains unusually tight for borrowers with below-prime credit scores.

Consumer confidence remains high

Indicators of consumer sentiment suggest that confidence among households remains high. The Michigan survey's index of consumer sentiment—which incorporates households' views about their own financial situations as well as broader economic conditions—moved up noticeably over the second half of 2014 as

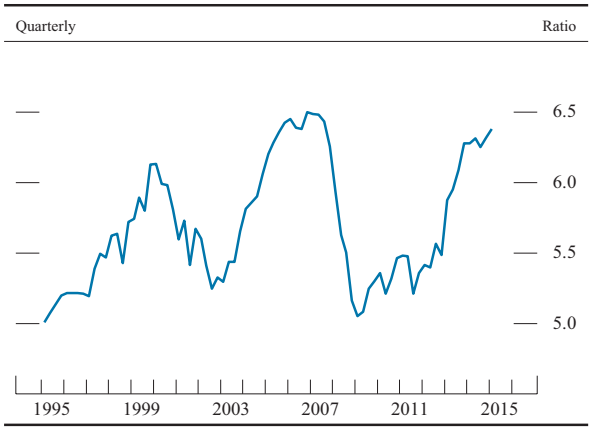
15. Prices of existing single-family houses



NOTE: The data for the S&P/Case-Shiller index extend through April 2015. The data for the Zillow and CoreLogic indexes extend through May 2015.

SOURCE: CoreLogic Price Index; Zillow; and the S&P/Case-Shiller U.S. National Home Price Index ("Index"). Note that the S&P/Case-Shiller Index is a product of S&P Dow Jones Indices LLC and/or its affiliates and has been licensed for use by the Board. Copyright © 2015 S&P Dow Jones Indices LLC, a subsidiary of the McGraw Hill Financial Inc., and/or its affiliates. All rights reserved. Redistribution, reproduction and/or photocopying in whole or in part are prohibited without written permission of S&P Dow Jones Indices LLC. For more information on any of S&P Dow Jones Indices LLC's indices please visit www.spdji.com. S&P® is a registered trademark of Standard & Poor's Financial Services LLC and Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC. Neither S&P Dow Jones Indices LLC, Dow Jones Trademark Holdings LLC, their affiliates nor their third party licensors make any representation or warranty, express or implied, as to the ability of any index to accurately represent the asset class or market sector that it purports to represent and neither S&P Dow Jones Indices LLC, Dow Jones Trademark Holdings LLC, their affiliates nor their third party licensors shall have any liability for any errors, omissions, or interruptions of any index or the data included therein.

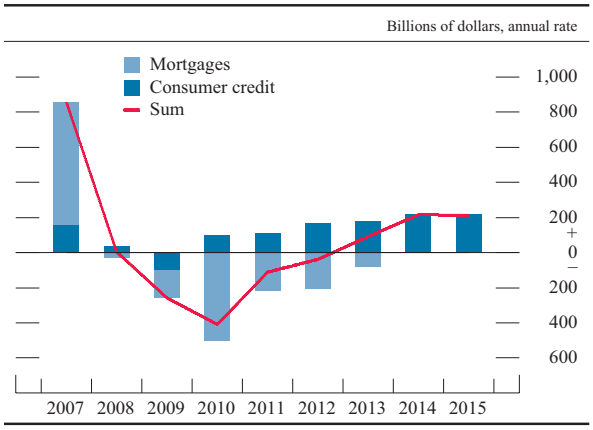
16. Wealth-to-income ratio



NOTE: The series is the ratio of household net worth to disposable personal income.

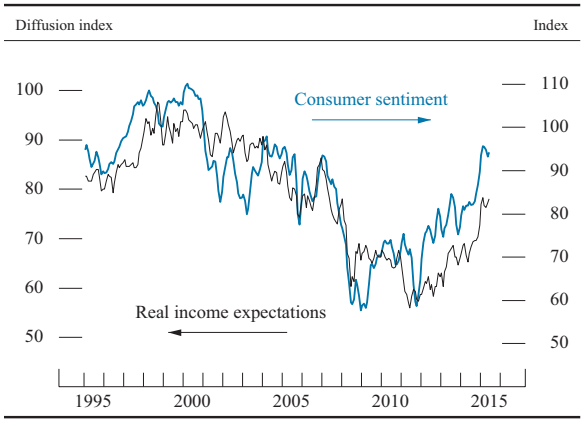
SOURCE: For net worth, Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States"; for income, Department of Commerce, Bureau of Economic Analysis.

17. Changes in household debt



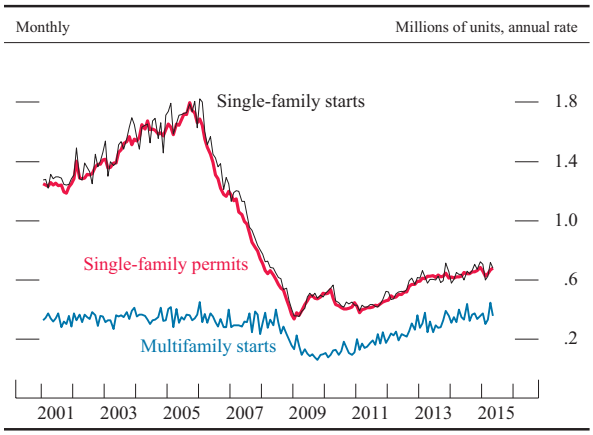
NOTE: Changes are calculated from year-end to year-end, except 2015 changes, which are calculated from Q1 to Q1.
SOURCE: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

18. Indexes of consumer sentiment and income expectations



NOTE: The data are three-month moving averages and extend through June 2015. Consumer sentiment is indexed to 100 in 1966. Real income expectations are calculated as the net percent of survey respondents expecting family income to go up more than prices during the next year or two.
SOURCE: University of Michigan Surveys of Consumers.

19. Private housing starts and permits



NOTE: The data extend through May 2015.
SOURCE: Department of Commerce, Bureau of the Census.

oil prices plunged and labor market conditions improved and has remained upbeat so far this year (figure 18). Responses to the Michigan survey's question about households' expectations of real income changes over the next year or two have also moved up over the past year to their highest levels since before the recession.

The pace of homebuilding has improved only slowly

The recovery in residential investment continued at a gradual pace over the first half of this year. Smoothing through the effects of harsh winter weather, single-family housing starts have edged up since last summer, while sales of new and existing homes have been trending up, on balance, over the past year (figures 19 and 20). In addition, multifamily construction activity has recovered to its pre-recession level, reflecting a shift in demand toward rental units. All told, real residential investment looks set to post a moderate gain over the first half of the year. Nevertheless, overall construction activity remains well below its pre-recession levels, likely due to a rate of household formation that, notwithstanding tentative signs of a recent pickup, has generally run quite low relative to demographic norms since the recession.

The slow advances in single-family construction and home sales have likely been supported, at least to some degree, by low interest rates and a gradual easing in mortgage credit. In the April Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS), banks reported having eased lending standards for a number of categories of residential mortgage loans in the first quarter.[2] Even so, loans remain difficult to obtain for potential borrowers with low credit scores as well as for any potential borrowers that cannot meet a number of other requirements, such as fully documenting their income and meeting debt-to-income ratios. Meanwhile, for

2. The SLOOS is available on the Board's website at www.federalreserve.gov/boarddocs/snloansurvey.

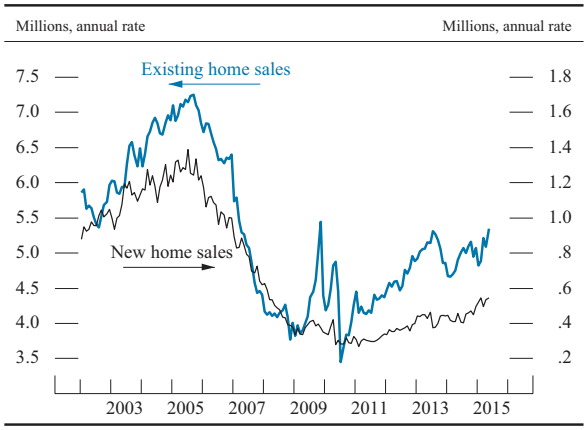
qualified borrowers, interest rates for 30-year fixed mortgages remain near their historical lows despite having moved up somewhat, on net, over the first half of the year (figure 21). Increases in house prices and mortgage rates have been balanced out by rising household incomes, with the result that standard measures of housing affordability have stayed flat at relatively high levels over the first half of this year. With the number of mortgage originations for home purchase still well below pre-crisis levels, aggregate net mortgage debt growth has continued to be quite sluggish.

Overall business investment has turned down as investment in the energy sector has plunged

Business investment (that is, private nonresidential fixed investment) fell at an annual rate of 2 percent in the first quarter, reflecting a sizable decline in investment in the equipment and structures used in the drilling and mining sector (figure 22). The number of drilling rigs in operation has fallen precipitously this year in response to the earlier steep drop in crude oil prices, and a number of oil and gas companies have announced plans to cut capital expenditures this year. As a result, activity has also slowed markedly in sectors that supply oil production companies, including steel and certain types of machinery. The drop in drilling and mining investment subtracted more than ½ percentage point from first-quarter real GDP growth, and, with the contraction in that sector continuing, it likely took a similar amount off of GDP growth in the second quarter.

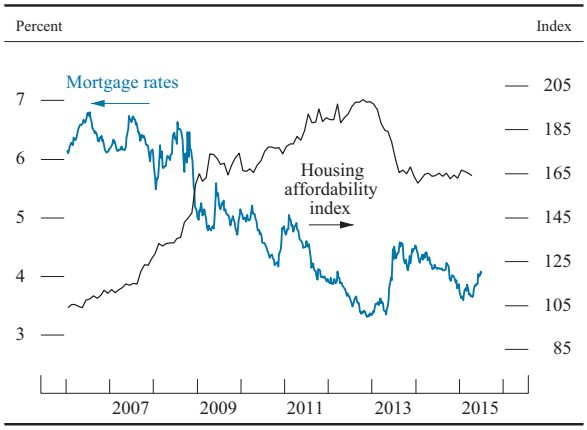
Business outlays for structures outside of the energy sector also declined in the first quarter, while spending on equipment and intellectual property products (E&I) increased at a modest 3½ percent annual rate. Forward-looking indicators, such as orders and shipments of capital goods and surveys of business conditions, point to continued modest gains in E&I investment in the second quarter. Overall business investment has been supported by low interest rates and generally accommodative

20. New and existing home sales



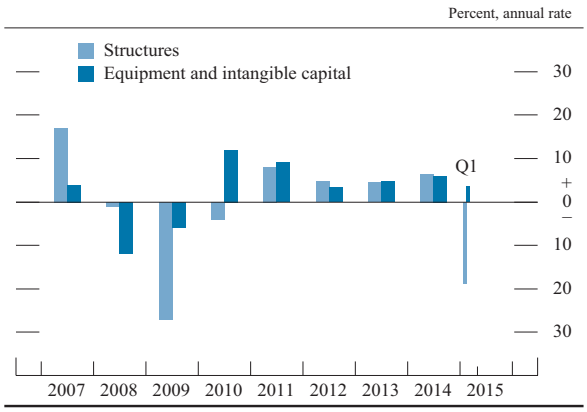
NOTE: The data extend through May 2015. "Existing home sales" includes single-family, condo, townhome, and co-op sales.
SOURCE: For new single-family home sales, Census Bureau; for existing home sales, National Association of Realtors.

21. Mortgage rates and housing affordability



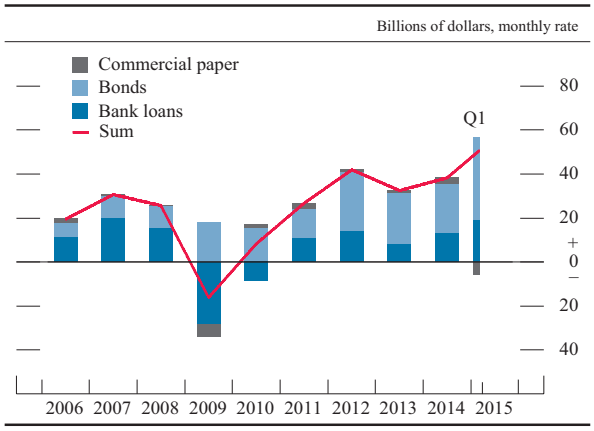
NOTE: The housing affordability index data are monthly through April 2015 and the mortgage rate data are weekly through July 8, 2015. At an index value of 100, a median-income family has exactly enough income to qualify for a median-priced home mortgage. Housing affordability is seasonally adjusted by Board staff.
SOURCE: For housing affordability index, National Association of Realtors; for mortgage rates, Freddie Mac Primary Mortgage Market Survey.

22. Change in real private nonresidential fixed investment



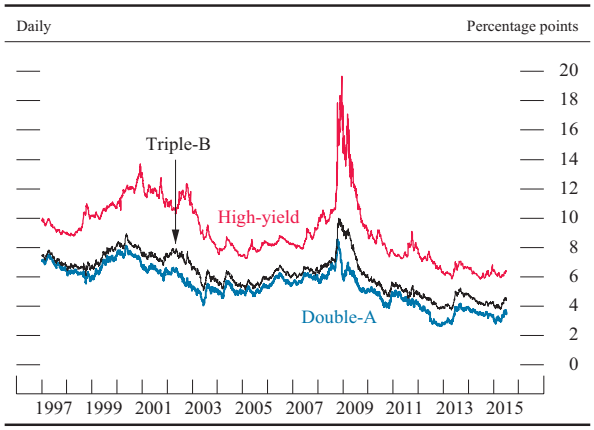
SOURCE: Department of Commerce, Bureau of Economic Analysis.

23. Selected components of net financing for nonfinancial businesses



NOTE: The data for the components except bonds are seasonally adjusted.
SOURCE: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

24. Corporate bond yields, by securities rating



NOTE: The yields shown are yields on 10-year bonds.
SOURCE: BofA Merrill Lynch Global Research, used with permission.

financial conditions but has been held back by slowing business output growth, which reflects, in part, weakening exports by domestic businesses due to the stronger dollar.

Corporate financing conditions were generally favorable

Financing conditions for nonfinancial firms remained solid in the first half of the year. Although corporate profits as reported by the Bureau of Economic Analysis declined in the first quarter, profitability stayed high, and default rates on nonfinancial corporate bonds were generally low. Nonfinancial businesses have raised substantial amounts of funds in bond, equity, and loan markets so far this year, in part to finance a recent pickup in mergers and acquisitions activity (figure 23). Bond issuance by both investment- and speculative-grade firms has remained quite strong, as firms continued to take advantage of historically low interest rates (figure 24). Commercial and industrial loans on banks' books have expanded at a solid pace this year, in part reflecting narrower loan spreads. Meanwhile, financing conditions for small businesses continued to improve, although the growth of small business loans remained subdued, evidently reflecting still-tepid demand for credit from small business owners. In the first quarter, some banks with loans to firms in the oil and gas drilling or extraction sectors indicated they were reducing existing lines of credit to these firms and tightening standards on new loans or lines of credit.

In the commercial real estate (CRE) sector, financing remained broadly available. CRE loans on banks' books increased appreciably this year through May, consistent with stronger loan demand and a further easing of lending standards reported in the April SLOOS. Banks also reported that, over the past 12 months, they had eased spreads, increased maximum loan sizes, and extended the maximum maturity on such loans. Issuance of commercial mortgage-backed securities

(CMBS) continued to be robust, and the spreads of CMBS rates over Treasury rates remained narrow.

The drag from federal fiscal policy has waned . . .

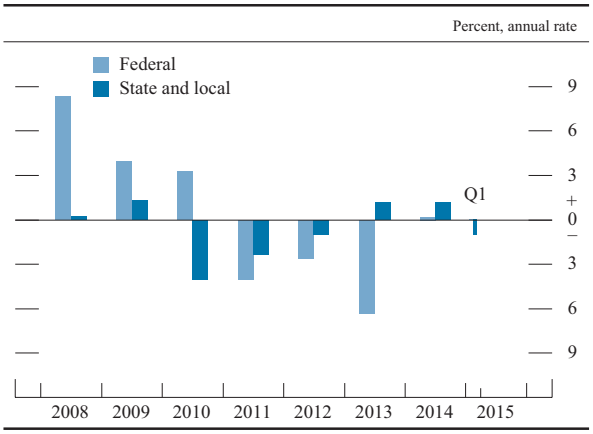
Fiscal policy at the federal level had been a factor restraining GDP growth for several years. However, the contractionary effects of fiscal policy changes eased appreciably last year as the restraining effects of the 2013 tax increases abated, transfers increased from the Affordable Care Act, and federal purchases flattened out after falling sharply from 2011 through 2013 (figure 25).

The federal unified deficit narrowed further this year, reflecting both previous years' spending cuts and an increase in tax receipts resulting from the ongoing economic expansion. Federal receipts have edged up to around 18 percent of GDP, their highest level in more than a decade (figure 26). Meanwhile, nominal federal outlays as a share of GDP have flattened out at about 20 percent, still a little above the levels that prevailed before the start of the recession. As a result, the budget deficit currently stands at about 2½ percent of GDP, down considerably from its peak at nearly 10 percent during the recession. Overall federal debt held by the public stabilized as a share of GDP in 2014 and early 2015, albeit at a relatively high level (figure 27).

. . . and state and local government expenditures are rising anemically

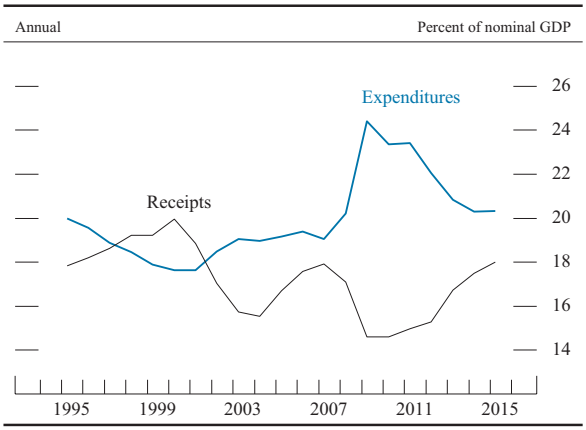
The expansion of economic activity and further gains in house prices—which should help boost property tax revenues over time—continue to support a gradual improvement in the fiscal positions of most state and local governments. Consistent with slowly improving finances, states and localities expanded employment slightly, on average, over 2014 and the first half of this year

25. Change in real government expenditures on consumption and investment



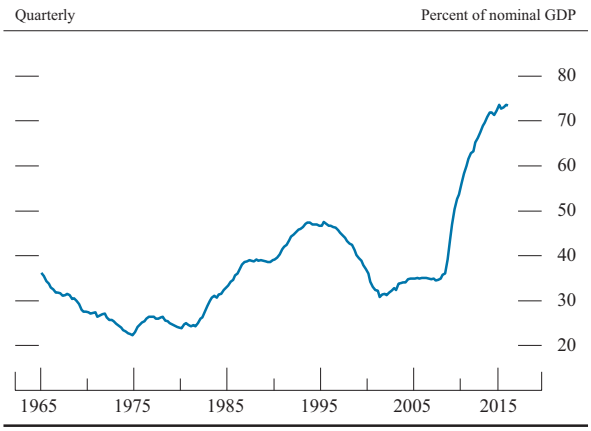
SOURCE: Department of Commerce, Bureau of Economic Analysis.

26. Federal receipts and expenditures



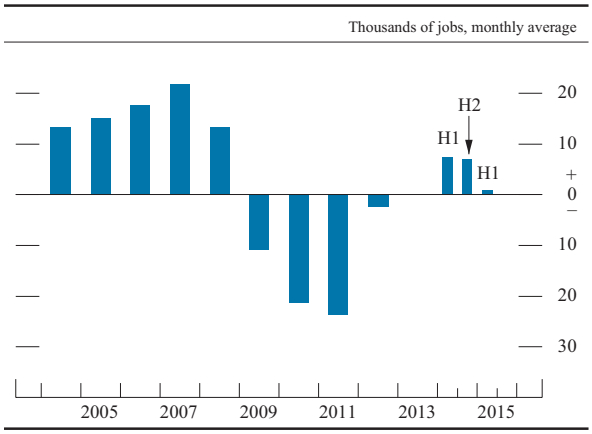
NOTE: Through 2014, receipts and expenditures are for fiscal years (October to September); gross domestic product (GDP) is for the four quarters ending in Q3. For 2015, receipts and expenditures are for the 12 months ending in May, and GDP is the average of 2014:Q4 and 2015:Q1. Receipts and expenditures are on a unified-budget basis.
SOURCE: Office of Management and Budget.

27. Federal government debt held by the public



NOTE: The data for gross domestic product (GDP) are at an annual rate. Debt held by the public is debt held at the end of the period.
SOURCE: For GDP, Department of Commerce, Bureau of Economic Analysis; for federal debt, Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

28. State and local government employment change



SOURCE: Department of Labor, Bureau of Labor Statistics.

following several years of declines (figure 28). In addition, these governments have increased outlays for construction projects somewhat over this period.

Financial Developments

Market expectations for the path of the federal funds rate over the next several years declined . . .

Despite the continued improvement in labor market conditions, market participants' expectations for the path of policy rates over the next several years shifted downward in the first half of 2015. Contributing to this shift were weak data on real economic activity in the first quarter of this year and Federal Reserve communications that were seen as more accommodative than expected—including the downward revisions to FOMC participants' projections for the federal funds rate, real GDP growth, inflation, and the longer-run unemployment rate, particularly in March. On balance, market-based measures of the expected path of the federal funds rate through late 2016 have flattened. The expected timing of the initial increase in the federal funds rate has been pushed out from mid-2015 toward the end of the year, although the expected pace of increases in the federal funds rate after 2016 is now somewhat faster. In the Survey of Primary Dealers and the Survey of Market Participants conducted by the Federal Reserve Bank of New York just prior to the June FOMC meeting, respondents judged that the initial increase in the target federal funds rate was most likely to occur at the FOMC's September 2015 meeting, about one quarter later than they had expected last December.[3] Meanwhile, as the anticipated date of the beginning of normalization has become closer, measures of policy rate uncertainty based on interest rate derivatives have continued to edge higher.

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

. . . and longer-term Treasury yields have remained low

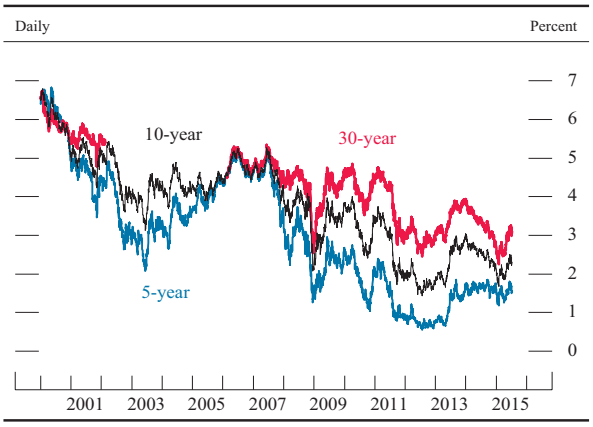
Yields on longer-term Treasury securities have risen notably since early February, reversing the downward trend over the previous 13 months. However, they remain at historically low levels (figure 29). On net, yields on 10- and 30-year nominal Treasury securities are 16 basis points and 43 basis points, respectively, above their levels at the end of 2014. The increases were most pronounced in longer-horizon forward rates. For example, the five-year forward rate five years ahead rose 42 basis points over the first half of 2015 and in early July after falling nearly 2 percentage points in 2014. U.S. Treasury yields continued to be especially sensitive to foreign monetary policy and political developments and movements in core European sovereign yields (for more details, see the section "International Developments"). Uncertainty about long-term interest rates has also risen somewhat amid higher realized volatility of long-term yields, fluctuations in oil prices, and uncertainties surrounding the global outlook.

Consistent with moves in the yields on longer-term Treasury securities, yields on 30-year agency mortgage-backed securities (MBS)—an important determinant of mortgage interest rates—have increased about 20 basis points, on balance, so far in 2015 (figure 30).

Liquidity conditions in the Treasury and agency MBS markets were generally stable . . .

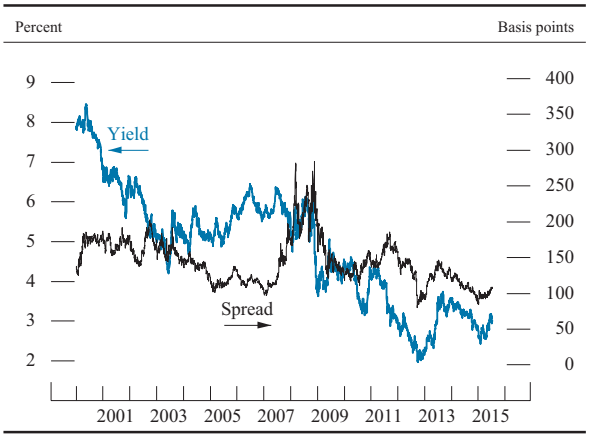
Indicators of Treasury market functioning remained broadly stable over the first half of 2015. While market commentary increasingly pointed to a possible deterioration in liquidity in these markets, a variety of liquidity metrics—including bid-asked spreads and bid sizes—have displayed no notable signs of liquidity pressures over the past half-year. Moreover, Treasury auctions generally continued to be well received by investors. (See the box "Liquidity Conditions in the Bond Market.")

29. Yields on nominal Treasury securities



NOTE: The Treasury ceased publication of the 30-year constant maturity series on February 18, 2002, and resumed that series on February 9, 2006.
SOURCE: Department of the Treasury.

30. Yield and spread on agency mortgage-backed securities



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

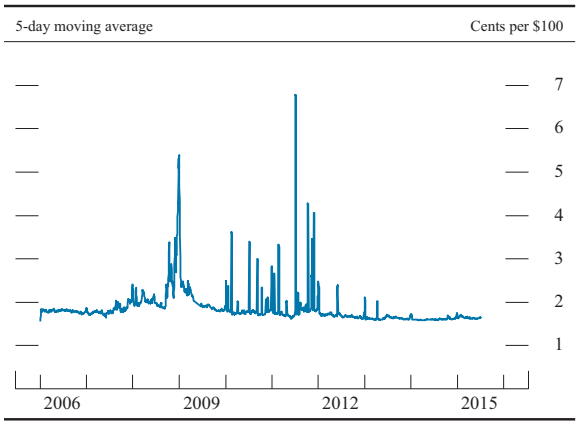
Liquidity Conditions in the Bond Market

A growing number of market commentaries have recently noted that liquidity conditions in fixed-income markets have deteriorated somewhat in recent years. They point to events like the "flash rally" on October 15, 2014, in which the Treasury market experienced elevated intraday volatility, as a worrisome sign of liquidity deterioration in even the most liquid fixed-income market. In response to a set of special questions in the June Senior Credit Officer Opinion Survey on Dealer Financing Terms (SCOOS), over four-fifths and about two-fifths of the dealer respondents characterized current liquidity and market functioning in the secondary markets for nominal Treasury securities and corporate bonds, respectively, as having deteriorated over the past five years.[1] Respondents attributed the deterioration primarily to securities dealers' decreased willingness to provide balance sheet resources for market-making purposes as a result of both regulatory changes and changes in internal risk-management practices. Furthermore, many investors have also noted potential risks to Treasury market functioning posed by high-frequency trading (HFT), which is now employed by most market participants.[2] Coincident with the changes in trading technologies, the composition of market participants has changed over the past decade, with proprietary HFT firms now accounting for the majority of trading volumes in the electronically brokered interdealer Treasury market. As discussed in the recently released interagency staff report on the events of October 15, such changes to market making, automated trading, and participation—many of which predate recent regulatory initiatives—have likely altered the nature of Treasury market liquidity in recent years.[3]

Despite these increased market discussions, a variety of metrics of liquidity in the nominal Treasury market do not indicate notable deteriorations. For example, bid-asked spreads for the on-the-run 10-year Treasury security have remained at levels comparable with or even slightly narrower than those observed before the recent financial crisis (figure A). A measure of market depth has shown notable variation since the data became available in 2010 and is currently around its average level in 2010 and 2011 (figure B). Both measures may have been affected by the increased presence of HFT strategies in the nominal Treasury market, as firms employing such strategies tend to submit orders close to prevailing market prices but with small order sizes, which might partially explain the narrower bid-asked spreads in recent years.

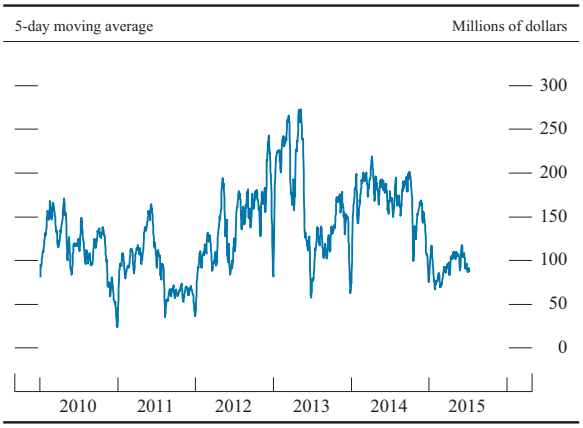
In addition to the two measures discussed earlier, SCOOS respondents also cited market turnover as another metric reflective of the deterioration in liquidity conditions. Indeed, the ratio of primary dealer trading volumes to outstanding Treasury securities has been declining since 2008 (figure C). Nonetheless, part of this decline may reflect institutional changes in the Treasury market, including the Federal Reserve's asset

A. Bid-asked spreads for 10-year on-the-run Treasury notes



SOURCE: Staff calculations using data from EBS BrokerTec.

B. Market depth for 10-year on-the-run Treasury notes



NOTE: Market depth is defined as the average top three bid and asked quote sizes.
SOURCE: Staff calculations using data from EBS BrokerTec.

1. The SCOOS is available on the Board's website at www.federalreserve.gov/econresdata/releases/scoos.htm.

2. High-frequency trading refers to computerized trading using proprietary algorithms that often rely on low-latency technology. For a description of the growth of automated trading—HFT in particular—and the associated benefits and risks, see Treasury Market Practices Group (2015), "Automated Trading in Treasury Markets," white paper (New York: TMPG, June), www.newyorkfed.org/tmpg/TPMG_June%202015_automated%20trading_white%20paper.pdf.

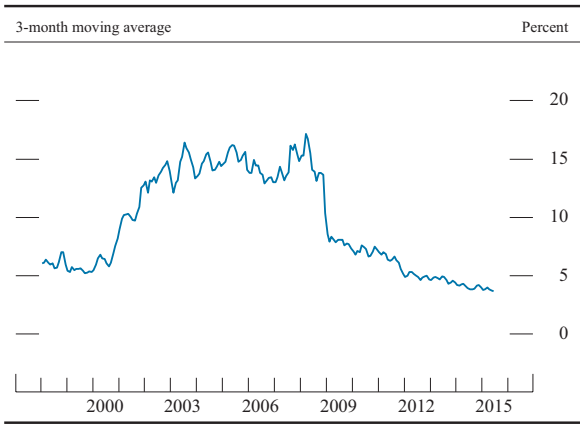
3. U.S. Department of the Treasury, Board of Governors of the Federal Reserve System, Federal Reserve Bank of New York, U.S. Securities and Exchange Commission, and U.S. Commodity Futures Trading Commission (2015), *Joint Staff Report: The U.S. Treasury Market on October 15, 2014* (Washington: Treasury, Board of Governors, FRBNY, SEC, and CFTC, July), www.treasury.gov/press-center/press-releases/Documents/Joint_Staff_Report_Treasury_10-15-2014.pdf.

purchases; the growth of HFT; increased internalization of dealer flows, in which dealers seek to match buyers and sellers across various internal desks before accessing liquidity in interdealer markets; and rising demand from buy-and-hold investors.

Although the bid-asked spread and market depth remained generally stable in recent years, one concern is that these metrics could change sharply during times of market stress. Some investors cautioned that, while proprietary HFT firms can contribute to improved liquidity during normal times by placing orders with narrow bid-asked spreads, they have limited capital to absorb price shocks and could choose to withdraw from the market during periods of turbulence, potentially exacerbating the deterioration in liquidity. All told, while the current level of liquidity in the on-the-run interdealer market seems healthy, some aspects of price movements and liquidity metrics in this market warrant careful monitoring.

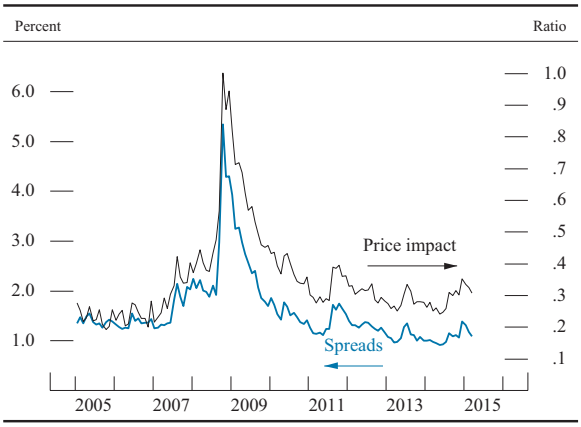
Similar to the Treasury market, a range of conventional liquidity metrics in corporate bond markets also generally do not point to a significant deterioration of market liquidity in recent years. For example, effective bid-asked spreads have remained low, and measures of the price impact, such as Amihud's illiquidity measure, have been fairly stable (figure D). In contrast, the proportion of large-sized trades has remained low since the financial crisis, particularly for speculative-grade bonds, and turnover has declined somewhat as the growth of total bonds outstanding has outpaced the growth of trading volume (figure E). However, as in the case of Treasury securities, it is unclear whether declines in corporate bond trade size and market turnover necessarily indicate a deterioration in liquidity.

C. Nominal Treasury turnover



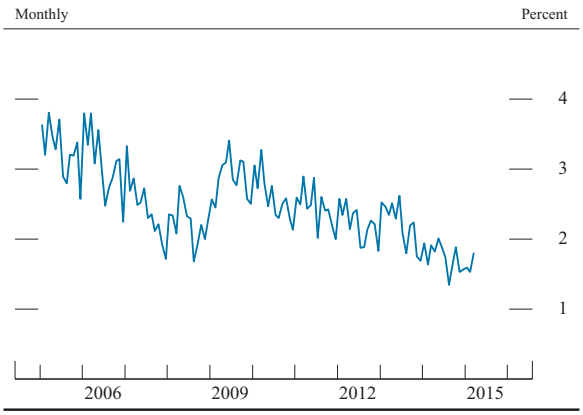
NOTE: Turnover is calculated as three-month moving averages of daily primary dealer trading volumes divided by nominal Treasury securities outstanding.
SOURCE: Federal Reserve Board, FR-2004, Government Securities Dealers Reports.

D. Median bid-asked spreads and market impact for corporate bonds



NOTE: Bid-asked spreads are estimated based on the autocovariance of bond returns. Market impact is the Amihud (2002) measure, which is defined as the monthly average of the ratio of the absolute value of percentage price changes to transaction volume.
SOURCE: FINRA, TRACE, via Wharton Research Data Service (WRDS); Mergent Corporate FISD Daily Feed (FITF).

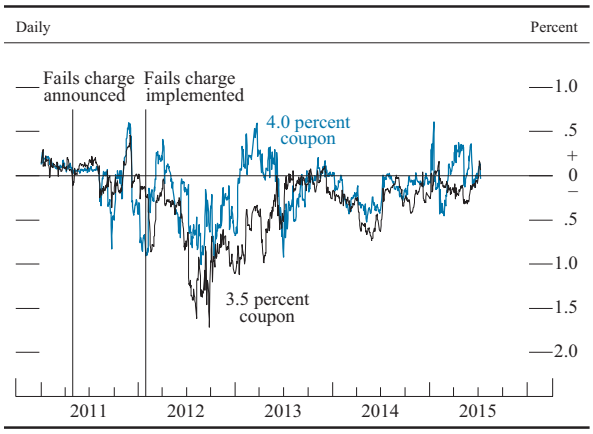
E. Median turnover of corporate bonds



NOTE: Monthly turnover is total trading volume in the month divided by the amount outstanding for the bond.
SOURCE: FINRA, TRACE, via Wharton Research Data Service (WRDS); Mergent Corporate FISD Daily Feed (FITF).

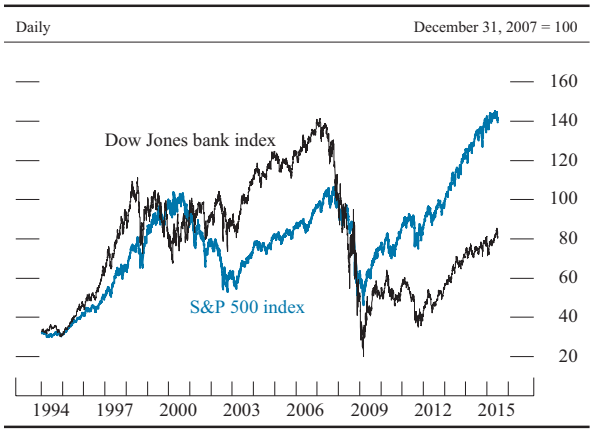
Some analysts raised concerns that the rise of buy-and-hold investors and the decline in dealer inventories relative to the outstanding amount over the past few years may have negatively affected the prospects for liquidity conditions in the corporate bond market, especially during episodes of financial stress. So far, however, corporate bond market liquidity as captured by conventional measures has not experienced substantial deterioration during recent episodes of stress in fixed-income markets, such as the sharp increase in Treasury rates in the summer of 2013 or the flash rally of October 15, 2014.

31. Dollar-roll-implied financing rates (front month), Fannie Mae 30-year current coupon



SOURCE: J.P. Morgan.

32. Equity prices



SOURCE: Bloomberg.

As in the Treasury market, liquidity conditions in the agency MBS market were generally stable. Dollar-roll-implied financing rates for production-coupon MBS—an indicator of the scarcity of agency MBS for settlement—suggested limited settlement pressures in these markets over the first half of 2015 (figure 31).

. . . as were short-term funding markets

Conditions in short-term dollar funding markets also remained broadly stable during the first half of 2015. Both unsecured and secured money market rates have stayed at modestly higher levels since late 2014 but continued to be close to the average rates observed since the federal funds rate reached its effective lower bound. Secured money markets generally functioned smoothly, but rates in these markets experienced some volatility in the first half of 2015, particularly around quarter-ends, consistent with moderate quarter-end funding pressures. Unsecured offshore dollar funding markets generally did not exhibit signs of stress.

Money market participants continued to focus on the ongoing testing of the Federal Reserve's monetary policy tools. The overnight reverse repurchase agreement (ON RRP) operations have continued to provide a soft floor for money market rates, and the combination of term and ON RRP operations supported these rates around quarter-ends.

Broad equity price indexes and stock market volatility were both little changed, on net, and risk spreads on speculative-grade corporate bonds narrowed slightly

Despite higher interest rates and notable declines in Wall Street analysts' projections for corporate earnings, broad measures of U.S. equity prices were little changed, on balance, over the first half of the year (figure 32). Stock prices for firms in the utilities sector, which are more sensitive to interest rates, fell substantially. Implied volatility for the S&P 500 index, as calculated from options

prices, was little changed, on net, and remained below its historical median level.

Corporate bond spreads for investment-grade firms were little changed and stayed close to their historical average levels. Spreads for speculative-grade bonds narrowed modestly—in part because of improvements for energy firms—and are somewhat below their historical norms. (For further related discussion, see the box "Developments Related to Financial Stability.")

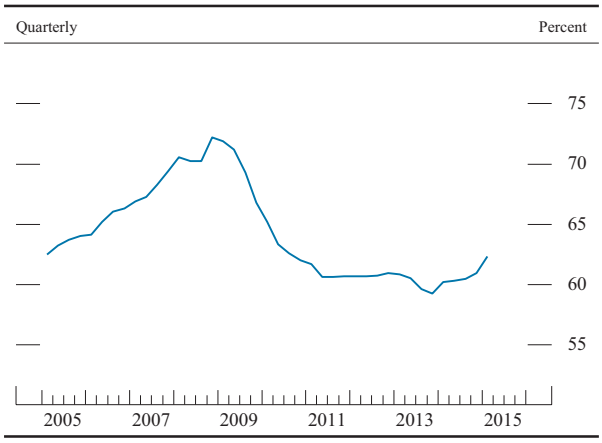
Bank credit expanded and bank profitability improved slightly

Aggregate credit provided by commercial banks increased at a solid pace in the first quarter of 2015 (figure 33). The expansion in bank credit reflected moderate loan growth coupled with continued expansion of banks' holdings of securities. The growth of loans on banks' books was generally consistent with the SLOOS reports of increased loan demand for most loan categories and further easing of lending standards for real estate loans over the first quarter of 2015. Meanwhile, delinquency and charge-off rates continued to improve across most major loan types.

Measures of bank profitability remained below their historical averages but improved slightly in the first quarter of 2015 (figure 34). Several subcomponents of noninterest income increased, although declining net interest margins continued to put downward pressure on the profitability of banks. Equity prices of large domestic bank holding companies (BHCs) have increased modestly, on net, since the end of last year (figure 32). Credit default swap (CDS) spreads for large BHCs were about unchanged on balance.

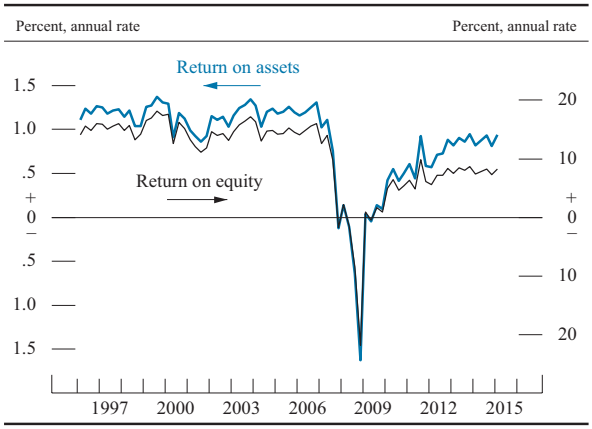
The M2 measure of the money stock has increased at an average annualized rate of about 6 percent since January, somewhat faster than the pace of nominal GDP growth. Demand for liquid deposits and currency has continued to boost M2 growth.

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



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

34. Profitability of bank holding companies



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

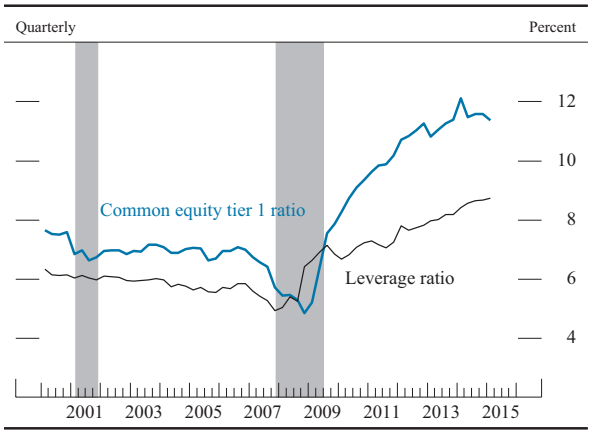
Developments Related to Financial Stability

Financial vulnerabilities in the U.S. financial system overall have continued to be moderate since the February *Monetary Policy Report*. Capital and liquidity positions at the largest banking firms have remained at high levels relative to recent historical standards, and debt growth in the household sector has been modest. However, valuation pressures in many fixed-income markets, while having eased, have stayed notable, prices and valuations for commercial real estate have increased further, and underwriting standards for leveraged loans are still a concern. Moreover, borrowing by lower-rated businesses has continued at a rapid rate. Market participants have expressed a concern that liquidity, especially in fixed-income markets, is now more likely to deteriorate significantly even under moderate stress. However, a variety of metrics do not suggest a deterioration in day-to-day liquidity, with some mixed evidence that may point to less resilient liquidity. The Federal Reserve is watching related developments closely. (See the box "Liquidity Conditions in the Bond Market.")

The financial sector now is likely more resilient to possible adverse events largely because of the increased capital held by the largest banking firms, which reduces the potential spillovers to the macroeconomy from losses in the banking sector (figure A). Regulatory capital ratios of the largest banks are high by recent historical standards, and the stress tests mandated by the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 as well as the accompanying Comprehensive Capital Analysis and Review, both of which were completed in April 2015, show that the 31 participating firms would maintain capital ratios above required minimums through a severe recession during a nine-quarter projection horizon. Higher forward-looking capital positions reflect, in part, a decrease in the average credit risk of loans, although underwriting standards have weakened in certain segments. Large firms' liquidity ratios have also improved with the initial phase-in of new liquidity regulations. Estimates of duration gaps for these firms suggest that they have lower sensitivities to higher interest rates than smaller banking firms. All banks, however, face considerable uncertainty regarding the sensitivity of their deposits to rising interest rates, and supervisors have been working with firms to manage this potential risk.

At insurance companies and broker-dealers, capital positions are also relatively high. In addition, secured borrowing and financing by dealers continue to decline, suggesting less short-term funding both for

A. Regulatory capital ratios at top 25 bank holding companies



NOTE: Prior to 2014:Q1, the numerator of the common equity tier 1 ratio is tier 1 common capital. Beginning in 2014:Q1 for advanced approaches bank holding companies and in 2015:Q1 for all other bank holding companies, the numerator is common equity tier 1 capital. The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.

SOURCE: FR Y-9C (top panels).

financing clients and for financing inventories that can be used to provide liquidity in markets. The stock of private, short-term, money-like instruments, which form funding intermediation chains that may be vulnerable to runs, has generally hovered at relatively high levels in the past couple of years, though well below crisis peaks. A decline in repurchase agreements has coincided with growth in uninsured deposits. Assets in money market funds have held about steady since the Securities and Exchange Commission finalized reforms in July 2014 to mitigate the funds' susceptibility to investor runs. The reforms are required to be fully implemented by late 2016, and it will be important to monitor their effects.

Valuation measures in most asset markets remain notable, but they are less pronounced in some sectors given the low level of long-term real Treasury yields. Credit markets have been reflecting some signs of reach-for-yield behavior, as issuance of speculative-grade bonds continues to be strong, yields are low, and credit spreads are somewhat narrow by historical standards. Issuance of leveraged loans, while robust, declined in the first half of 2015 on a year-over-year basis. Market participants continue to point to the leveraged lending guidance as having affected the market. Indicators of the underwriting quality of leveraged loans in recent months show a modest improvement, but, overall, underwriting standards

remain weak. The share of loans—mostly those for middle-market companies—originated by nonbank lenders reportedly has increased a bit further.

Valuation pressures in commercial real estate are rising as commercial property prices continue to increase rapidly, and underwriting standards at banks and in commercial mortgage-backed securities have been loosening. For residential real estate, prices have risen most rapidly in areas where they fell most in the wake of the financial crisis, and aggregate valuation measures remain close to historical norms. In addition, dealers' responses to the March and June Senior Credit Officer Opinion Survey on Dealer Financing Terms suggest that client demand for secured funding of commercial and residential mortgage-backed securities has been increasing in recent quarters.

Stock prices were little changed, on net, even as earnings forecasts fell and interest rates rose. The equity risk premium—the gap between the expected return and the real 10-year Treasury yield—narrowed further and is now close to historical norms. The possibility that term premiums could revert sharply to more normal levels continues to be a potential risk for asset prices, especially if this reversion were to occur in the absence of positive news about economic growth. Moreover, ongoing concerns that liquidity could deteriorate unexpectedly, in combination with the growth in assets of mutual funds that hold less liquid bonds, suggest that a jump in long-term rates that in turn sparked large bond fund redemptions might amplify volatility. That said, the risk of fire sales is mitigated to some extent by the lower leverage in the financial system.

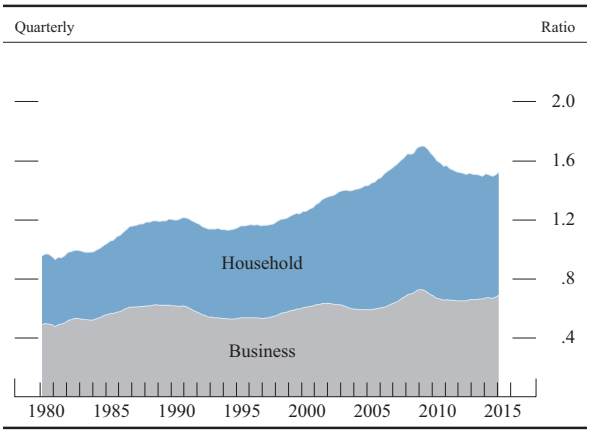
The ratio of private nonfinancial sector credit to gross domestic product (GDP) is significantly below its peak in 2009 and likely remains below a trend-adjusted level (figure B). The household debt-to-GDP ratio has receded to early 2000 levels. Recent modest increases in household debt continue to mostly reflect the sluggish increases in mortgages for prime borrowers. However, auto and student lending, even to financially fragile households, continued apace, though these are smaller components of total household debt. Measures of leverage for the aggregate nonfinancial business sector have been rising, and they are near the high end of their multidecade range for speculative-grade and unrated firms, indicating a buildup of vulnerabilities.

Large banking firms generally have only limited exposure to areas of the financial system with more notable vulnerabilities, such as segments of the bond and equity markets, and their actions are not contributing materially to higher vulnerabilities in those sectors. Large banking firms' direct net exposures to Greece are low, although financial vulnerabilities from the situation could become more concerning if large European counterparties were weakened by a significant deterioration in peripheral European countries.

As part of its efforts to improve the resilience of the financial system, the Federal Reserve Board and other federal banking agencies finalized a rule last year that introduced a liquidity coverage ratio. The rule requires large and internationally active banking organizations to hold a certain minimum amount of high-quality liquid assets—such as central bank reserves and government and corporate debt—that can be converted easily and quickly into cash. Since the February *Monetary Policy Report*, the Federal Reserve Board proposed an amendment to that rule that would allow limited amounts of certain general obligation state and municipal bonds to qualify as high-quality liquid assets if they meet the same liquidity criteria that currently apply to corporate debt securities.[1] The proposed rule would maintain the strong liquidity standards of the liquidity coverage ratio rule while providing banking organizations with the flexibility to hold a wider range of instruments that would qualify as high-quality liquid assets.

1. For the proposed amendment, see Board of Governors of the Federal Reserve System (2015), "Liquidity Coverage Ratio: Treatment of U.S. Municipal Securities as High-Quality Liquid Assets," *Federal Register*, vol. 80 (May 28), pp. 30383–89, www.gpo.gov/fdsys/pkg/FR-2015-05-28/pdf/2015-12850.pdf.

B. Private nonfinancial sector credit-to-GDP ratio



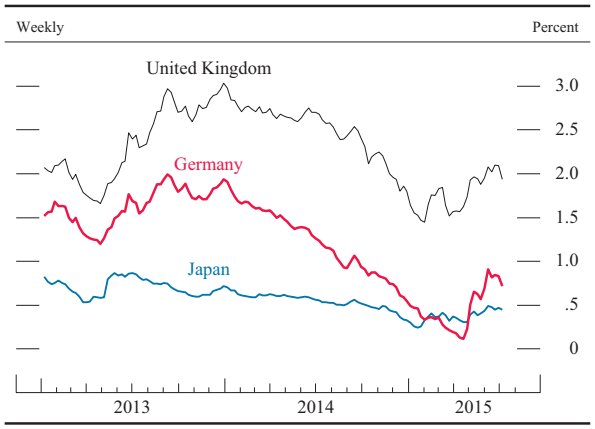
SOURCE: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

Municipal bond markets functioned smoothly, but some issuers remained strained

Credit conditions in municipal bond markets have generally remained stable since the end of last year. Over that period, the MCDX—an index of CDS spreads for a broad portfolio of municipal bonds—increased slightly, while ratios of yields on 20-year general obligation municipal bonds to those on comparable-maturity Treasury securities moved down a bit.

Nevertheless, significant financial strains were still evident for some issuers. In particular, Puerto Rico, which continued to face challenges from subdued economic performance, severe indebtedness, and other fiscal pressures, could reportedly seek to restructure at least part of its debt.

35. 10-year nominal benchmark yields in advanced foreign economies



NOTE: The data extend through July 9, 2015.
SOURCE: Bloomberg.

International Developments

Sovereign bond yields are higher . . .

After declining, on balance, during the first few months of the year, sovereign yields in the advanced foreign economies (AFEs) began to climb rapidly in late April (figure 35). In Germany, long-term yields traded at record lows in mid-April, in part in response to the initiation of the public-sector purchase program of the European Central Bank (ECB). However, the 10-year government bond yield subsequently rose about 60 basis points. Most of this rise appeared to reflect an increase in the term premium, which had likely become very low earlier in the year. However, the timing of this increase has no clear explanation. The rise in German yields also appeared to reflect higher expected short-term rates, which rose, at least in part, in response to euro-area inflation data that came in higher than had been expected. (For more discussion, see the box "Monetary Policy and Interest Rates in Advanced Economies.") More recently, however, German yields have moved back down some in reaction to developments in Greece.

Monetary Policy and Interest Rates in Advanced Economies

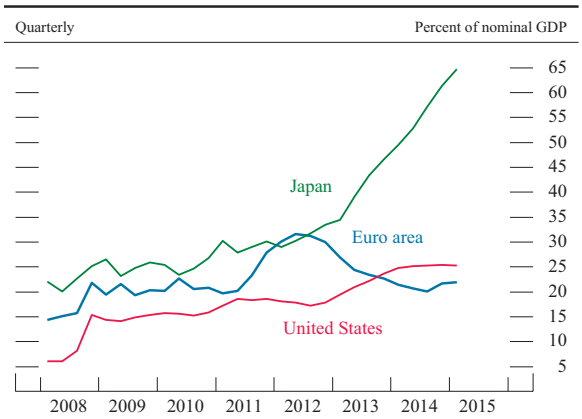
During 2014, economic prospects in the United States improved, while in some major advanced foreign economies (including the euro area and Japan), data on economic activity disappointed and concerns about deflationary pressures increased. As economic outlooks diverged, so did monetary policies. The Federal Reserve wound down and, in October, concluded the asset purchase program that began in September 2012. In contrast, the Bank of Japan (BOJ) and the European Central Bank (ECB) announced further expansions of their asset holdings (figure A). In October, the BOJ increased the pace of its asset purchases (primarily Japanese government bonds, but also some shares of exchange-traded stock funds and real estate investment trusts) and reiterated that its goal was to raise inflation to 2 percent. In September, the ECB reduced its key policy rates, with the deposit rate falling to negative 0.2 percent, and announced plans to purchase two kinds of private-sector securities: covered bonds and asset-backed securities. Then, in January of this year, the ECB announced an expansion of its asset purchases to include public-sector securities, raising its total asset purchases to €60 billion per month. The ECB indicated that it intends to continue that pace of purchases through September 2016 or until its Governing Council believes that euro-area inflation is on track to meet the target of below, but close to, 2 percent.

Policy easing abroad contributed to a decline in market expectations for future policy rates, especially in the euro area, relative to those in the United States (figure B). The divergence of policy expectations was accompanied by a significant increase in the foreign exchange value of the dollar from mid-2014 to March of this year. That dollar appreciation has likely contributed to the drag that U.S. net exports have exerted on U.S. economic growth in recent quarters. In addition, the rise in the dollar's value has lowered U.S. import prices and thus put downward pressure on U.S. consumer price inflation.

Long-term interest rates abroad declined during 2014 and early 2015 (figure 35). Those declines reflected not only shifting expectations of the path of policy interest rates, but also reductions in the term premiums required by investors to hold longer-term assets. Central bank asset purchases—both expectations of those purchases and their later commencement—appear to explain some, but not all, of the decline in term premiums. Term premiums on German bonds continued to decline following the start of ECB asset purchases in March, and German 10-year bond yields fell to near zero by early April. Since then, however, term premiums and yields on German 10-year bonds have risen sharply, on net, as market participants reassessed the sustainability of the previous substantial declines. These movements in foreign yields and term premiums appear to have spilled over to U.S. yields and term premiums.

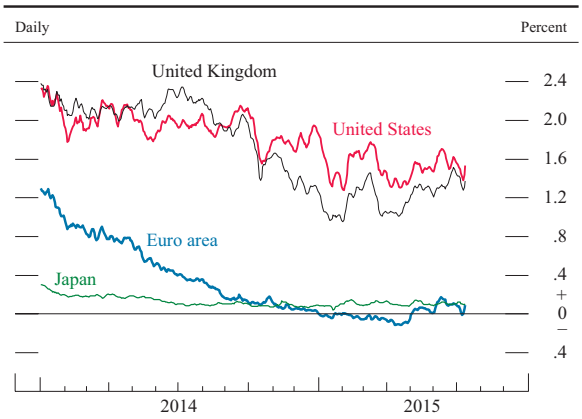
Some of the pickup in long-term interest rates abroad since mid-April also likely reflected a modest rebound in market expectations of future policy rates in those countries. Data showed continued economic recovery in the euro area and solid growth in Japan, and the stabilization in oil prices after previous sharp declines reduced concerns over deflation in the advanced foreign economies. Still, market expectations, as implied by quotes from overnight index swaps, suggest that policy rates will remain near zero for quite some time in the euro area and Japan, even as monetary policy begins to normalize in the United States and the United Kingdom (as shown in figure B).

A. Central bank assets in selected advanced economies



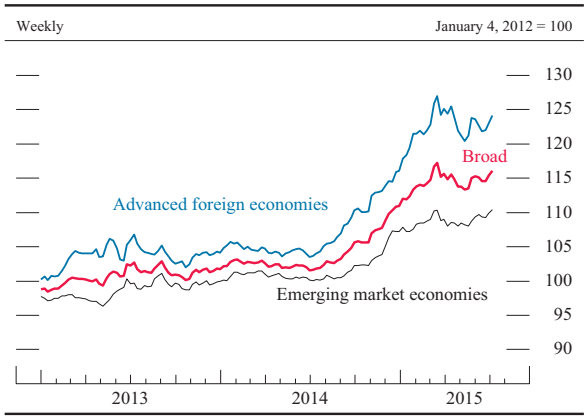
SOURCE: For the euro area, European Central Bank and Eurostat; for Japan, Bank of Japan and Cabinet Office of Japan; for the United States, Federal Reserve Board and Bureau of Economic Analysis.

B. December 2017 expected policy rates



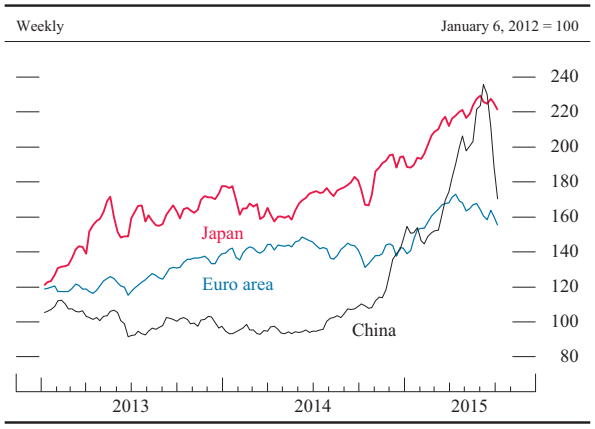
NOTE: The data are three-day moving averages of one-month forward rates from overnight index swap quotes.
SOURCE: Bloomberg and staff calculation.

36. U.S. dollar exchange rate against broad index and selected groups of major currencies



NOTE: The data, which are in foreign currency units per dollar, extend through July 9, 2015.
SOURCE: Federal Reserve Board, Statistical Release H.10, "Foreign Exchange Rates."

37. Equity indexes for selected foreign economies



NOTE: The data extend through July 9, 2015.
SOURCE: For Japan, Tokyo Stock Price Index (TOPIX); for the euro area, Dow Jones Euro STOXX Index; for China, Shanghai Composite Index; all via Bloomberg.

Sovereign yields rose even more in other euro-area countries, especially in Greece. Since the previous report, negotiations among the Greek government, other European authorities, and the International Monetary Fund (IMF) over official financial assistance to Greece have been protracted. In late June, Greek authorities decided to hold a referendum on their creditors' proposals, stalling negotiations and resulting in the cash-strapped Greek government missing a payment of €1½ billion in principal to the IMF. With fears of a potential exit from the euro area and acute problems at Greek banks accelerating withdrawals of Greek bank deposits, Greek authorities declared a bank holiday and imposed capital controls. Negotiations resumed after Greek citizens voted to reject the creditor proposals, but the closure of the banks contributed to a further deterioration of economic conditions in Greece. Over the previous weekend, Greece and its creditors reached a preliminary agreement to begin negotiations on a new financing and adjustment program, subject to Greece completing several prior actions. Greek sovereign spreads spiked at the end of June, and Italian and Spanish sovereign spreads rose modestly. These spreads have since retraced substantially; as a result, Greek spreads remain somewhat wider since mid-February, and Italian and Spanish spreads are little changed.

. . . and the dollar remains well above levels of a year ago

The foreign exchange value of the dollar rose appreciably in the second half of 2014 and early 2015. It has changed little, on balance, since then (figure 36). The dollar is stronger against emerging market economy (EME) currencies since February, as U.S. yields have risen and concerns about economic prospects for the EMEs mounted.

Equities in Europe and Japan have moved higher this year, buoyed by encouraging macroeconomic data (figure 37). The Nikkei increased roughly 15 percent, boosted by stronger-than-expected consumer price releases

and strong corporate earnings in addition to continued quantitative easing. EME equity prices are also generally higher. Notably, the Shanghai Composite index has been unusually volatile. It soared 60 percent in the first five months of 2015, reportedly reflecting repeated monetary policy easing measures and increased investor leverage. However, since mid-June, the index has dropped about 20 percent, on net, even while Chinese authorities have introduced a number of measures to stem the decline, including the People's Bank of China providing direct liquidity support to fund stock purchases.

In numerous foreign economies, economic growth stepped down in the first quarter

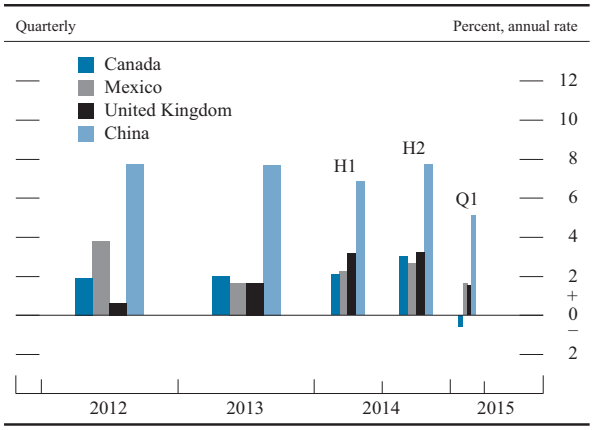
Economic growth slowed in the first quarter in many of our main trading partners (figure 38). In China, weakness in exports and the real estate sector led to a significant step-down in GDP growth in the first quarter. Weak exports also constrained growth in Mexico and the United Kingdom. GDP contracted around ½ percent in Brazil. And, in Canada, real GDP also contracted in the first quarter, in part because lower oil prices weighed on investment in the energy sector and severe winter weather depressed consumption. Recent economic data for the second quarter have been mixed.

By contrast, in the euro area and Japan, economic growth picked up during the first quarter of 2015, and data thus far point to solid growth during the second quarter (figure 39). Growth in these economies continues to receive support from highly accommodative monetary policies and lower commodity prices. Nevertheless, the situation in Greece remains a concern for the euro area.

After falling significantly at the beginning of the year, foreign inflation began to recover but remained low

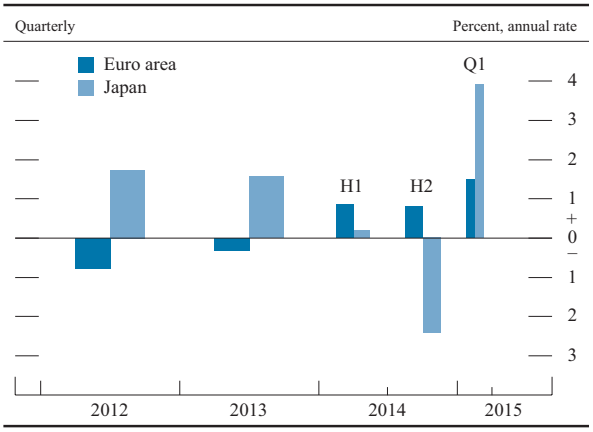
Largely reflecting the plunge in oil prices last year, headline inflation fell further early in the year in the AFEs and the EMEs. However, as

38. Real gross domestic product growth in selected foreign economies



SOURCE: For Canada, Statistics Canada; for Mexico, Instituto Nacional de Estadistica Geografia e Informatica, from Haver Analytics; for the United Kingdom, Office for National Statistics; for China, staff estimates based on data from CEIC Data.

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



SOURCE: For the euro area, Eurostat; for Japan, Cabinet Office Government of Japan.

energy prices rebounded during the first half of the year, monthly foreign inflation readings also began to turn up. Nevertheless, 12-month inflation in a number of major trading partners remained substantially below their central banks' target, including in the euro area, Japan, and the United Kingdom.

In response, foreign central banks maintained highly accommodative monetary policies

A number of foreign central banks eased monetary policy. Some central banks cut policy rates, including those in Canada, China, India, and Korea. In several cases, including in Denmark, Sweden, and Switzerland, these cuts included moves that left policy rates negative. In addition to cutting benchmark rates, the People's Bank of China also lowered the reserve requirement ratio. The ECB launched a program to purchase public-sector securities, and the Bank of Japan continued to purchase assets at a rapid pace. Meanwhile, the Bank of England kept its policy rate at the historically low level of 0.5 percent, where it has been since March 2009.

Part 2
Monetary Policy

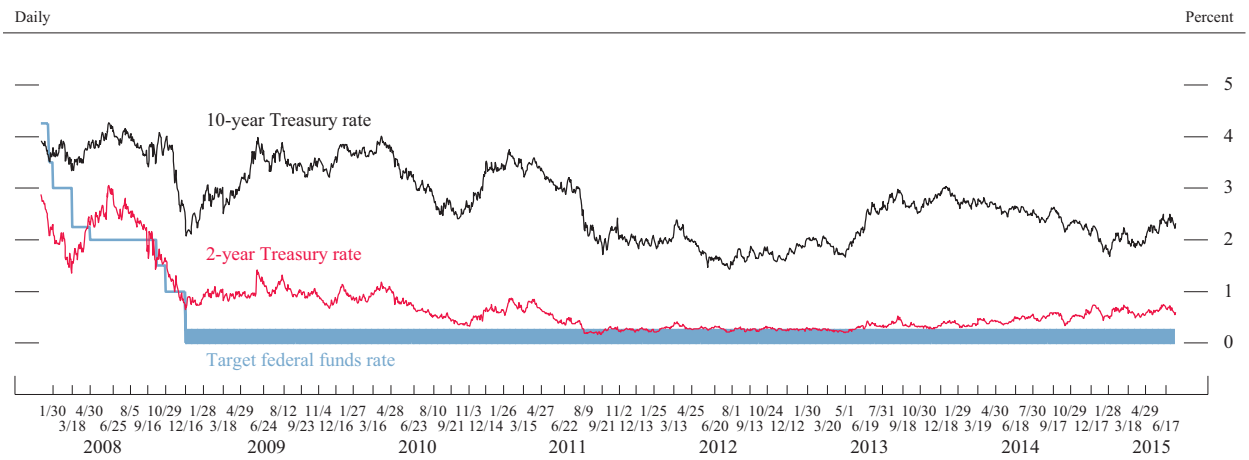
To support further progress toward maximum employment and price stability, the Federal Open Market Committee (FOMC) has kept the target federal funds rate at its effective lower bound and maintained the Federal Reserve's holdings of longer-term securities at sizable levels. At its two most recent meetings, the Committee indicated that it will be appropriate to raise the target range for the federal funds rate when it has seen further improvement in the labor market and is reasonably confident that inflation will move back to its 2 percent objective over the medium term. The Federal Reserve has continued to plan for the eventual normalization of monetary policy, including by testing the operational readiness of the policy tools to be used.

To support further progress toward its statutory objectives, the FOMC has kept the target federal funds rate at its lower bound . . .

The FOMC has maintained the target range of 0 to ¼ percent for the federal funds rate to support continued progress toward its statutory objectives of maximum employment and price stability (figure 40). The Committee has further reiterated that, in determining how long to maintain this target range, it will assess realized and expected progress toward its objectives. This assessment will continue to 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. Based on its assessment of those factors, the Committee maintained the judgment at its January meeting that it could be patient in beginning to normalize the stance of monetary policy, and it stated at its March meeting that a start of the normalization process remained unlikely at its April meeting.[4] Chair Yellen indicated that, subsequent to the April meeting, the FOMC

4. See Board of Governors of the Federal Reserve System (2015), "Federal Reserve Issues FOMC Statement," press release, January 28, www.federalreserve.gov/newsevents/press/monetary/20150128a.htm; and Board of Governors of the Federal Reserve System (2015), "Federal Reserve Issues FOMC Statement," press release, March 18, www.federalreserve.gov/newsevents/press/monetary/20150318a.htm.

40. Selected interest rates



Note: The 2-year and 10-year Treasury rates are the constant-maturity yields based on the most actively traded securities. The dates on the horizontal axis are those of regularly scheduled Federal Open Market Committee meetings.
Source: Department of the Treasury; Federal Reserve Board.

would determine the timing of the initial increase in the target federal funds rate on a meeting-by-meeting basis, depending on its assessment of incoming economic information and its implications for the economic outlook.[5]

Specifically, the FOMC anticipates that it will be appropriate to raise the target range for the federal funds rate when it has seen further improvement in the labor market and is reasonably confident that inflation will move back to its 2 percent objective over the medium term. While the Committee has not decided on the timing of the initial increase in the target range for the federal funds rate, according to the June Summary of Economic Projections (SEP), 15 of the 17 policymakers anticipated that conditions may warrant a first increase in the federal funds rate target sometime this year. (The June SEP is included as Part 3 of this report.)

The Committee has reiterated that, when it decides to begin to remove policy accommodation, it will take a balanced approach consistent with its longer-run goals of maximum employment and inflation of 2 percent. Even after the initial increase in the target federal funds rate, the Committee's policy is likely to remain highly accommodative in order to support continued progress toward its objectives of maximum employment and 2 percent inflation.

In addition, the Committee continues to anticipate that, even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run. As pointed out by Chair Yellen in her recent press conferences, FOMC participants provide a number of explanations for this view, with many citing the residual effects of the financial crisis.[6] These effects are expected to ease gradually, but they are seen as likely to continue to constrain spending and credit availability for some time.

. . . and stressed that its policy decisions will be data dependent

In her recent speeches and press conferences, Chair Yellen emphasized that, while the return of the federal funds rate to a more normal level is likely to be gradual, forecasts of the appropriate path of the federal funds rate are conditional on individual projections for economic output, inflation, and other factors, and the Committee's actual policy decisions over time will be data dependent. The FOMC does not intend to embark on any predetermined course of tightening following an initial decision to raise the federal funds rate target range. Accordingly, if the expansion proves to be more vigorous than currently anticipated and inflation moves higher than expected, then the appropriate path would likely follow a higher and steeper trajectory; conversely, if conditions were to prove weaker, then the appropriate trajectory would be lower and less steep.

The size of the Federal Reserve's balance sheet has remained stable

The Committee has maintained its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities (MBS) in agency MBS and of rolling over maturing Treasury securities at auction. This policy, by keeping the Federal Reserve's holdings of longer-term securities at sizable levels, is expected to help

5. See Board of Governors of the Federal Reserve System (2015), "Transcript of Chair Yellen's FOMC Press Conference," March 18, www.federalreserve.gov/mediacenter/files/FOMCpresconf20150318.pdf; and Board of Governors of the Federal Reserve System (2015), "Transcript of Chair Yellen's Press Conference," June 17, www.federalreserve.gov/mediacenter/files/FOMCpresconf20150617.pdf.

6. See Board of Governors, "Transcript of Chair Yellen's FOMC Press Conference," March 18, and Board of Governors, "Transcript of Chair Yellen's Press Conference," June 17, in note 5.

maintain accommodative financial conditions by putting downward pressure on longer-term interest rates and supporting mortgage markets. In turn, those effects are expected to contribute to progress toward both the maximum employment and price-stability objectives of the FOMC.

After the conclusion of the large-scale asset purchase program at the end of October 2014 and with the continuation of the Committee's reinvestment policy, the Federal Reserve's total assets have held steady at around $4.5 trillion (figure 41). Holdings of U.S. Treasury securities in the System Open Market Account (SOMA) have remained at $2.5 trillion, and holdings of agency debt and agency MBS at $1.8 trillion. Consequently, total liabilities on the Federal Reserve's balance sheet were largely unchanged.

Given the Federal Reserve's large securities holdings, interest income on the SOMA portfolio has continued to support substantial remittances to the U.S. Treasury Department. The Federal Reserve provided $96.9 billion of such distributions to the Treasury in 2014 and $21.7 billion during the first quarter of 2015.[7] Remittances total over $500 billion on a cumulative basis since 2008.

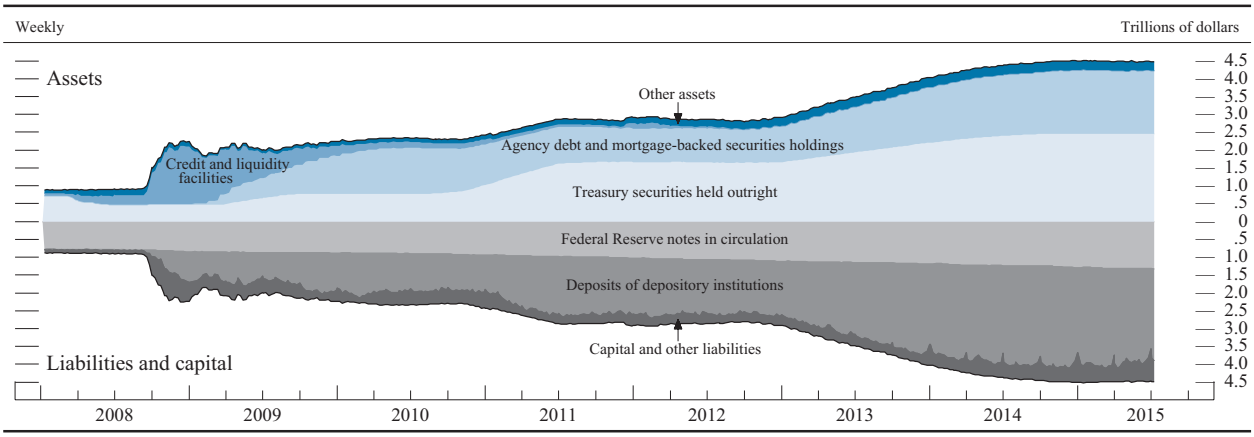
The FOMC continued to plan for the eventual normalization of monetary policy . . .

FOMC meeting participants have continued their discussions about the eventual normalization of the stance and conduct of monetary policy.[8] The participants

7. See Board of Governors of the Federal Reserve System (2015), "Federal Reserve System Publishes Annual Financial Statements," press release, March 20, www.federalreserve.gov/newsevents/press/other/20150320a.htm; and Board of Governors of the Federal Reserve System (2015), *Quarterly Report on Federal Reserve Balance Sheet Developments* (Washington: Board of Governors, May), www.federalreserve.gov/monetarypolicy/files/quarterly_balance_sheet_developments_report_201505.pdf.

8. See Board of Governors of the Federal Reserve System (2015), "Minutes of the Federal Open Market Committee, March 17–18, 2015," press release, April 8, www.federalreserve.gov/newsevents/press/monetary/20150408a.htm; and Board of Governors of the Federal Reserve System (2015), "Minutes of the Federal Open Market Committee, April 28–29, 2015," press release, May 20, www.federalreserve.gov/newsevents/press/monetary/20150520a.htm.

41. Federal Reserve assets and liabilities



NOTE: "Credit and liquidity facilities" consists of primary, secondary, and seasonal credit; term auction credit; central bank liquidity swaps; support for Maiden Lane, Bear Stearns, and AIG; and other credit facilities, including the Primary Dealer Credit Facility, the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility, the Commercial Paper Funding Facility, and the Term Asset-Backed Securities Loan Facility. "Other assets" includes unamortized premiums and discounts on securities held outright. "Capital and other liabilities" includes reverse repurchase agreements, the U.S. Treasury General Account, and the U.S. Treasury Supplementary Financing Account. The data extend through July 8, 2015.

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

emphasized that, during the early stages of policy normalization, it will be a priority to ensure appropriate control over the federal funds rate and other short-term interest rates. Consequently, the discussions involved various tools that could be used to control the level of short-term interest rates, even while the balance sheet of the Federal Reserve remains very large, as well as approaches to eventually normalizing the size and composition of the Federal Reserve's balance sheet.

As was the case before the crisis, the Committee intends to adjust the stance of monetary policy during normalization primarily through actions that influence the level of the federal funds rate and other short-term interest rates. The Committee indicated that, when economic conditions warrant the commencement of policy firming, the Federal Reserve intends to continue to target a range for the federal funds rate that is 25 basis points wide, set the interest rate it pays on excess reserves (the IOER rate) equal to the top of the target range for the federal funds rate, and set the offering rate associated with an overnight reverse repurchase agreement (ON RRP) facility equal to the bottom of the target range for the federal funds rate. The Committee will further allow aggregate capacity of the ON RRP facility to be temporarily elevated to support policy implementation and will use other tools, such as term operations, as necessary. The Committee expects that it will be appropriate to reduce the capacity of the facility fairly soon after it commences policy firming. Regarding the balance sheet, the Committee intends to reduce securities holdings in a gradual and predictable manner primarily by ceasing to reinvest repayments of principal on securities held in the SOMA. The Committee noted that economic and financial conditions could change, and that it was prepared to make adjustments to its normalization plans if warranted. (For more information, see the box "Policy Normalization Principles and Plans: Additional Details.")

. . . including by testing the policy tools to be used

The Federal Reserve continued to test the operational readiness of its policy tools, conducting daily ON RRP operations and a series of term RRP operations. At its March meeting, the Committee approved further tests of term RRP operations over quarter-ends through January 2016.[9] In addition, the Federal Reserve conducted two further series of Term Deposit Facility (TDF) operations. In these TDF operations, the Federal Reserve eliminated the three-day lag between the execution of an operation and settlement that existed in previous tests. These operations showed that bank demand for term deposits continues to be strong even for incremental increases in yield.

To date, testing has progressed smoothly, and, in particular, short-term market rates have generally traded above the ON RRP rate, which suggests that the facility will be a useful supplementary tool for the FOMC in addition to the IOER rate to control the federal funds rate during the normalization process. Overall, testing operations reinforced the Federal Reserve's confidence in its view that it has the tools necessary to tighten policy at the appropriate time.

9. See Board of Governors, "Minutes of the Federal Open Market Committee, March 17–18, 2015," in note 8.

Policy Normalization Principles and Plans: Additional Details

Over the past four years, the Federal Open Market Committee (FOMC) has discussed ways to normalize the stance of monetary policy and the Federal Reserve's securities holdings. The discussions have been part of prudent planning and have not been meant to imply that the move toward normalization would necessarily begin soon. In June 2011, the Committee made public a first set of normalization principles.[1] In light of subsequent changes in the System Open Market Account (SOMA) portfolio and enhancements in the tools the Committee will have available to implement policy during normalization, the Committee concluded that some aspects of the eventual normalization process would likely differ from those specified earlier. Accordingly, in September 2014, the FOMC announced that all participants but one had agreed on the following principles and plans for policy normalization:[2]

- The Committee will determine the timing and pace of policy normalization—meaning steps to raise the federal funds rate and other short-term interest rates to more normal levels and to reduce the Federal Reserve's securities holdings—so as to promote its statutory mandate of maximum employment and price stability.
    - When economic conditions and the economic outlook warrant a less accommodative monetary policy, the Committee will raise its target range for the federal funds rate.
    - During normalization, the Federal Reserve intends to move the federal funds rate into the target range set by the FOMC primarily by adjusting the interest rate it pays on excess reserve (IOER) balances.
    - During normalization, the Federal Reserve intends to use an overnight reverse repurchase agreement (ON RRP) facility and other supplementary tools as needed to help control the federal funds rate. The Committee will use an ON RRP facility only to the extent necessary and will phase it out when it is no longer needed to help control the federal funds rate.
- The Committee intends to reduce the Federal Reserve's securities holdings in a gradual and predictable manner primarily by ceasing to reinvest repayments of principal on securities held in the SOMA.
    - The Committee expects to cease or commence phasing out reinvestments after it begins increasing the target range for the federal funds rate; the timing will depend on how economic and financial conditions and the economic outlook evolve.
    - The Committee currently does not anticipate selling agency mortgage-backed securities as part of the normalization process, although limited sales might be warranted in the longer run to reduce or eliminate residual holdings. The timing and pace of any sales would be communicated to the public in advance.
- The Committee intends that the Federal Reserve will, in the longer run, hold no more securities than necessary to implement monetary policy efficiently and effectively, and that it will hold primarily Treasury securities, thereby minimizing the effect of Federal Reserve holdings on the allocation of credit across sectors of the economy.
- The Committee is prepared to adjust the details of its approach to policy normalization in light of economic and financial developments.

At the March 2015 FOMC meeting, all participants agreed to provide the following additional details on the principles and plans for policy normalization.[3] When economic conditions warrant the commencement of policy firming, the Federal Reserve intends to:

- Continue to target a range for the federal funds rate that is 25 basis points wide.
- Set the IOER rate equal to the top of the target range for the federal funds rate and set the offering rate associated with an ON RRP facility equal to the bottom of the target range for the federal funds rate.
- Allow aggregate capacity of the ON RRP facility to be temporarily elevated to support policy implementation; adjust the IOER rate and the parameters of the ON RRP facility, and use other tools such as term operations, as necessary for appropriate monetary control, based on policymakers' assessments of the efficacy and costs of their tools. The Committee expects that it will be appropriate to reduce the capacity of the facility fairly soon after it commences policy firming.

1. See Board of Governors of the Federal Reserve System (2011), "Minutes of the Federal Open Market Committee, June 21–22, 2011," press release, July 12, www.federalreserve.gov/newsevents/press/monetary/20110712a.htm.

2. See Board of Governors of the Federal Reserve System (2014), "Federal Reserve Issues FOMC Statement on Policy Normalization Principles and Plans," press release, September 17, www.federalreserve.gov/newsevents/press/monetary/20140917c.htm.

3. See Board of Governors of the Federal Reserve System (2015), "Minutes of the Federal Open Market Committee, March 17–18, 2015," press release, April 8, www.federalreserve.gov/newsevents/press/monetary/20150408a.htm.

Part 3
Summary of Economic Projections

The following material appeared as an addendum to the minutes of the June 16–17, 2015, meeting of the Federal Open Market Committee.

In conjunction with the Federal Open Market Committee (FOMC) meeting held on June 16–17, 2015, meeting participants submitted their projections of the most likely outcomes for real output growth, the unemployment rate, inflation, and the federal funds rate for each year from 2015 to 2017 and over the longer run.[10] Each participant's projection was based on information available at the time of the meeting together with his or her assessment of appropriate monetary policy and assumptions about the factors likely to affect economic outcomes. The longer-run projections represent each participant's assessment of the value to which each variable would be expected to converge, over time, under appropriate monetary policy and in the absence of further shocks to the economy. "Appropriate monetary policy" is defined as the future path of policy that each participant deems most likely to foster outcomes for economic activity and inflation that best satisfy his or her individual interpretation of the Federal Reserve's objectives of maximum employment and stable prices.

FOMC participants generally expected that, under appropriate monetary policy, growth of real gross domestic product (GDP) in 2015 would be somewhat below their individual estimates of the U.S. economy's longer-run normal growth rate but would increase in 2016 before slowing to or toward its longer-run rate in 2017 (table 1 and figure 1). Participants generally expected that the unemployment rate would continue to decline in 2015 and 2016, and that the unemployment rate would be at or below their individual judgments of its longer-run normal level by the end of

10. The incoming president of the Federal Reserve Bank of Philadelphia assumed office after the June FOMC meeting, on July 1, and a new president of the Federal Reserve Bank of Dallas has yet to be selected. Blake Prichard and Helen E. Holcomb, first vice presidents of the Federal Reserve Banks of Philadelphia and Dallas, respectively, submitted economic projections.

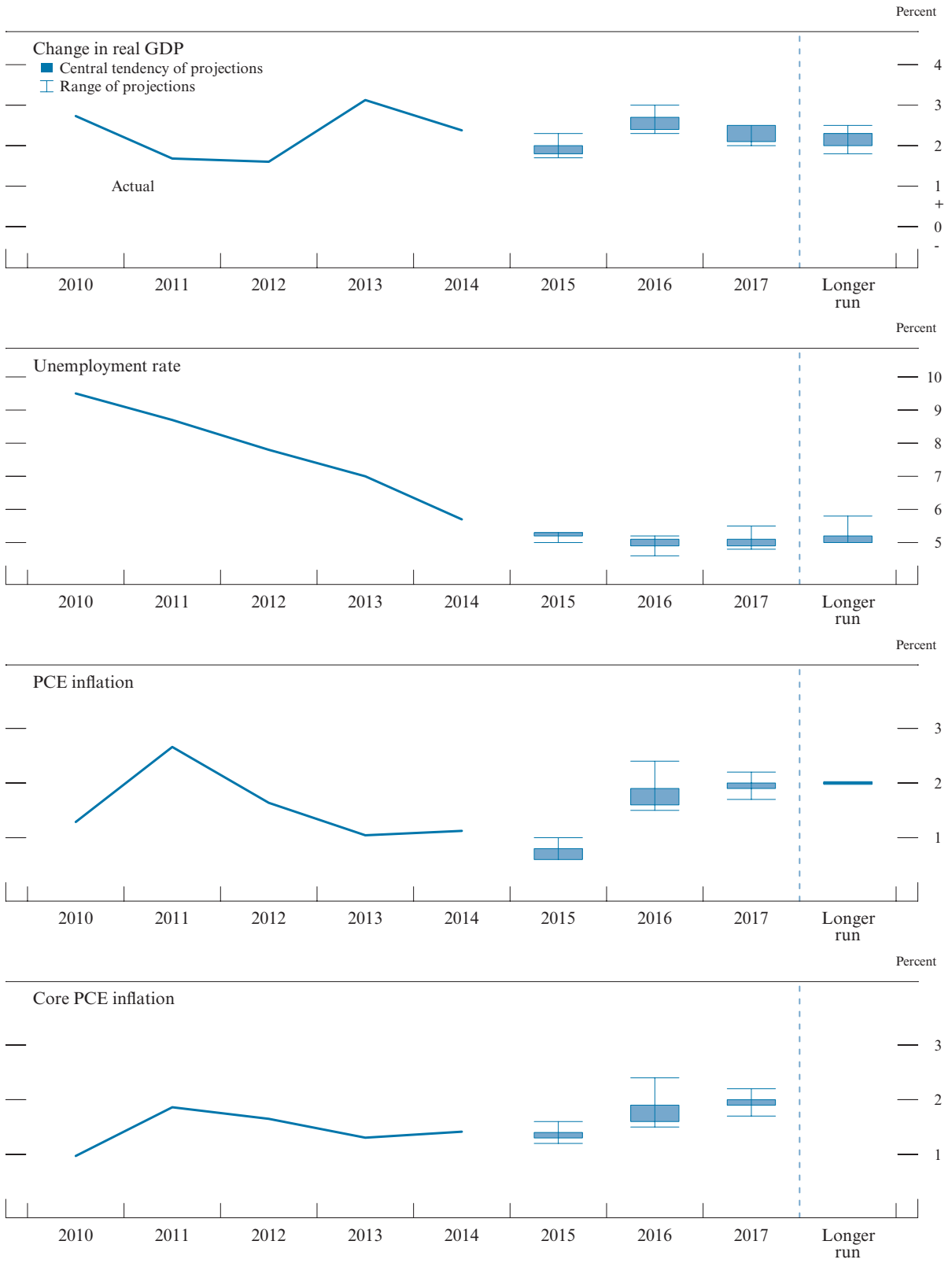
Table 1. Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents, June 2015
Percent

Variable	Central tendency[1]				Range[2]			
	2015	2016	2017	Longer run	2015	2016	2017	Longer run
Change in real GDP	1.8 to 2.0	2.4 to 2.7	2.1 to 2.5	2.0 to 2.3	1.7 to 2.3	2.3 to 3.0	2.0 to 2.5	1.8 to 2.5
March projection	2.3 to 2.7	2.3 to 2.7	2.0 to 2.4	2.0 to 2.3	2.1 to 3.1	2.2 to 3.0	1.8 to 2.5	1.8 to 2.5
Unemployment rate	5.2 to 5.3	4.9 to 5.1	4.9 to 5.1	5.0 to 5.2	5.0 to 5.3	4.6 to 5.2	4.8 to 5.5	5.0 to 5.8
March projection	5.0 to 5.2	4.9 to 5.1	4.8 to 5.1	5.0 to 5.2	4.8 to 5.3	4.5 to 5.2	4.8 to 5.5	4.9 to 5.8
PCE inflation	0.6 to 0.8	1.6 to 1.9	1.9 to 2.0	2.0	0.6 to 1.0	1.5 to 2.4	1.7 to 2.2	2.0
March projection	0.6 to 0.8	1.7 to 1.9	1.9 to 2.0	2.0	0.6 to 1.5	1.6 to 2.4	1.7 to 2.2	2.0
Core PCE inflation[3]	1.3 to 1.4	1.6 to 1.9	1.9 to 2.0		1.2 to 1.6	1.5 to 2.4	1.7 to 2.2	
March projection	1.3 to 1.4	1.5 to 1.9	1.8 to 2.0		1.2 to 1.6	1.5 to 2.4	1.7 to 2.2	

Note: Projections of change in real gross domestic product (GDP) and projections for both measures of inflation are 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 March projections were made in conjunction with the meeting of the Federal Open Market Committee on March 17–18, 2015.

1. The central tendency excludes the three highest and three lowest projections for each variable in each year.
2. The range for a variable in a given year includes all participants' projections, from lowest to highest, for that variable in that year.
3. Longer-run projections for core PCE inflation are not collected.

Figure 1. Central tendencies and ranges of economic projections, 2015–17 and over the longer run



NOTE: Definitions of variables are in the general note to table 1. The data for the actual values of the variables are annual.

2017. Participants anticipated that inflation, as measured by the four-quarter percent change in the price index for personal consumption expenditures (PCE), would be appreciably below 2 percent this year but expected it to step up next year, and a substantial majority of participants projected that inflation would be at or close to the Committee's goal of 2 percent in 2017.

As shown in figure 2, all but two participants anticipated that further improvement in economic conditions and the economic outlook would make it appropriate to begin raising the target range for the federal funds rate in 2015. The economic outlooks of individual participants implied that it likely would be appropriate to raise the target federal funds rate fairly gradually over the projection period in order to promote labor market conditions and inflation the Committee judges most consistent with attaining its mandated objectives of maximum employment and stable prices. Most participants continued to expect that it would be appropriate for the federal funds rate to stay appreciably below its longer-run level for some time after inflation and unemployment are near mandate-consistent levels, reflecting the effects of remaining headwinds holding back the economic expansion, and other factors.

Most participants viewed the uncertainty associated with their outlooks for economic growth and the unemployment rate as broadly similar to the average level of the past 20 years. Most participants also judged the level of uncertainty about inflation to be broadly similar to the average level of the past 20 years, although some participants viewed it as higher. In addition, most participants continued to see the risks to the outlook for economic growth and for the unemployment rate as broadly balanced, though some viewed the risks to economic growth as weighted to the downside. A majority of participants saw the risks to inflation as balanced; of the five who did not see inflation risks as balanced, four saw risks as tilted to the downside.

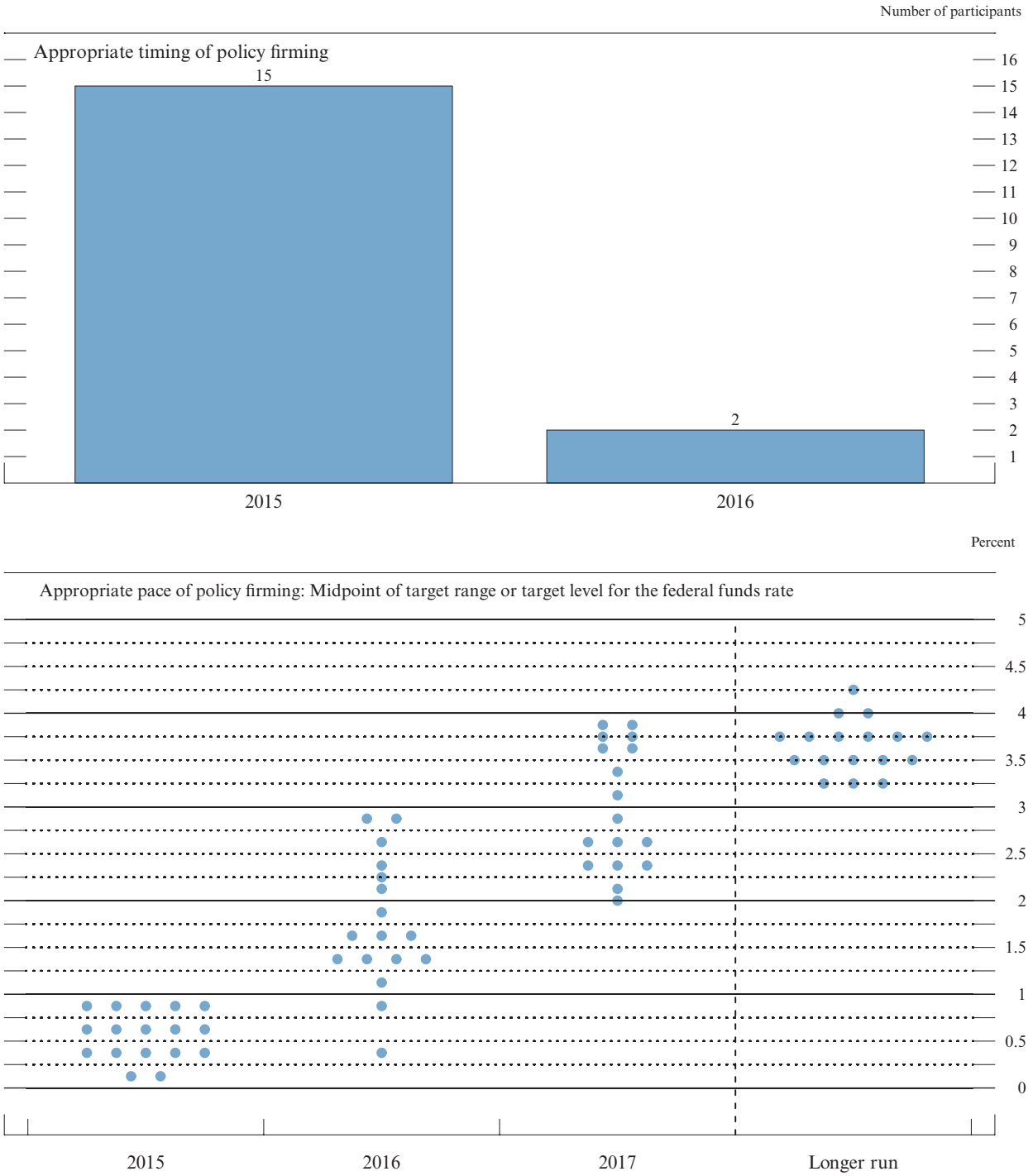
The Outlook for Economic Activity

Participants generally projected that, conditional on their individual assumptions about appropriate monetary policy, real GDP would grow slowly in the first half of 2015, but that this near-term weakness would give way to growth in 2016 that exceeds their estimates of its longer-run normal rate; most participants expected real GDP growth to slow in 2017 to rates at or near their individual estimates of the longer-run rate. Participants generally regarded the weakness in economic activity in the first half of this year to be temporary and pointed to a number of factors that they expected would contribute to solid output growth through 2016, including improving labor market conditions, strengthened household and business balance sheets, waning effects of the earlier increases in the exchange value of the dollar, a boost to consumer spending from low energy prices, diminishing restraint from fiscal policy, and still-accommodative monetary policy.

Compared with their Summary of Economic Projections (SEP) contributions in March, all participants revised down their projections of real GDP growth for 2015, but many expected the economy to make up at least some of the shortfall over the remainder of the forecast period. Beyond the near term, changes in participants' forecasts were small. The central tendencies of participants' current projections for real GDP growth were 1.8 to 2.0 percent in 2015, 2.4 to 2.7 percent in 2016, and 2.1 to 2.5 percent in 2017. The central tendency of the projections of GDP growth in the longer run was unchanged from March at 2.0 to 2.3 percent.

Most participants projected that the unemployment rate would continue to decline through 2016, and nearly all projected that by the fourth quarter of 2017, the unemployment rate would be at or below their individual judgments of its longer-run normal level. The central tendencies of participants' forecasts for the unemployment rate in the fourth

Figure 2. Overview of FOMC participants' assessments of appropriate monetary policy



NOTE: In the upper panel, the height of each bar denotes the number of FOMC participants who judge that, under appropriate monetary policy, the first increase in the target range for the federal funds rate from its current range of 0 to ¼ percent will occur in the specified calendar year. In March 2015, the numbers of FOMC participants who judged that the first increase in the target federal funds rate would occur in 2015 and 2016 were, respectively, 15 and 2. In the lower panel, each shaded circle indicates the value (rounded to the nearest ⅛ 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.

quarter of each year were 5.2 to 5.3 percent in 2015, and 4.9 to 5.1 percent in both 2016 and 2017. Compared with the March SEP, participants' projections for the unemployment rate edged up in 2015 but were little different over the medium term. Several participants indicated that the differences from their March projections for the unemployment rate over the medium term were modest in part because of the monetary policy response that they incorporated into their forecasts to mitigate an otherwise weaker trajectory for expenditures.

Figures 3.A and 3.B show the distribution of participants' views regarding the likely outcomes for real GDP growth and the unemployment rate through 2017 and in the longer run. Some of the diversity of views reflected participants' individual assessments of a number of factors, including the effects of lower oil prices on consumer spending and business investment, the extent to which dollar appreciation would affect real activity, the rate at which the forces that have been restraining the pace of the economic recovery would continue to abate, the trajectory for growth in consumption as labor market slack diminishes, and the appropriate path of monetary policy. Relative to the March SEP, the dispersion of participants' projections for real GDP growth in 2015 narrowed considerably, reflecting in part the release of the national income and product accounts data for the first quarter of this year, which were not available when the FOMC met in March.

The Outlook for Inflation

All participants projected headline PCE inflation to come in at or below 1 percent this year—mostly due to the temporary effects of earlier declines in energy prices and decreases in non-energy import prices—but to climb to 1½ percent or more in 2016. A sizable majority of participants expected that headline inflation would be at or close to the Committee's goal in 2017. Most participants projected only a slight decline in core PCE inflation this year and anticipated a gradual rise over the remainder of the forecast period. Relative to the March SEP, participants' projections for PCE inflation changed very little. The central tendencies for PCE inflation were 0.6 to 0.8 percent in 2015, 1.6 to 1.9 percent in 2016, and 1.9 to 2.0 percent in 2017; for core PCE inflation, the central tendencies were 1.3 to 1.4 percent in 2015, 1.6 to 1.9 percent in 2016, and 1.9 to 2.0 percent in 2017. Factors cited by participants as likely to contribute to inflation rising toward 2 percent included stable longer-term inflation expectations, steadily diminishing resource slack, a pickup in wage growth, the waning effects of declines in energy prices, and still-accommodative monetary policy.

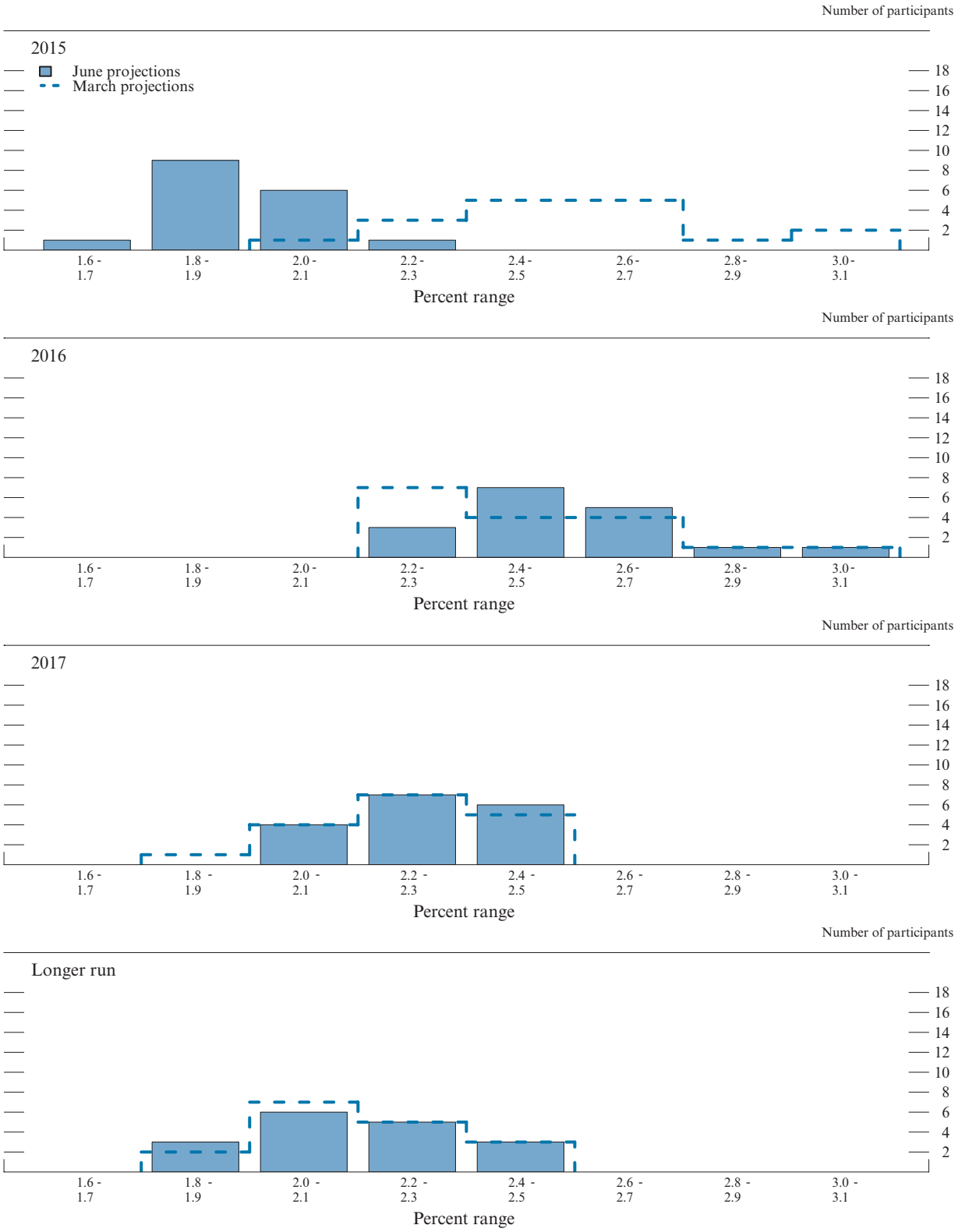
Figures 3.C and 3.D provide information on the distribution of participants' views about the outlook for inflation. The range of projections for PCE inflation in 2015 narrowed, albeit mostly on the basis of the lowering of just one projection; otherwise, the ranges of participants' projections for both headline and core PCE inflation were nearly identical to what was reported in March.

Appropriate Monetary Policy

Participants judged that it would be appropriate to begin normalization of monetary policy as labor market indicators and inflation moved to or toward values the Committee regards as consistent with the attainment of its mandated objectives of maximum employment and price stability. As shown in figure 2, all but two participants anticipated that it would be appropriate to begin raising the target range for the federal funds rate during 2015. However, a sizable majority projected that the appropriate level of the federal funds rate would remain below their individual estimates of its longer-run normal level through 2017.

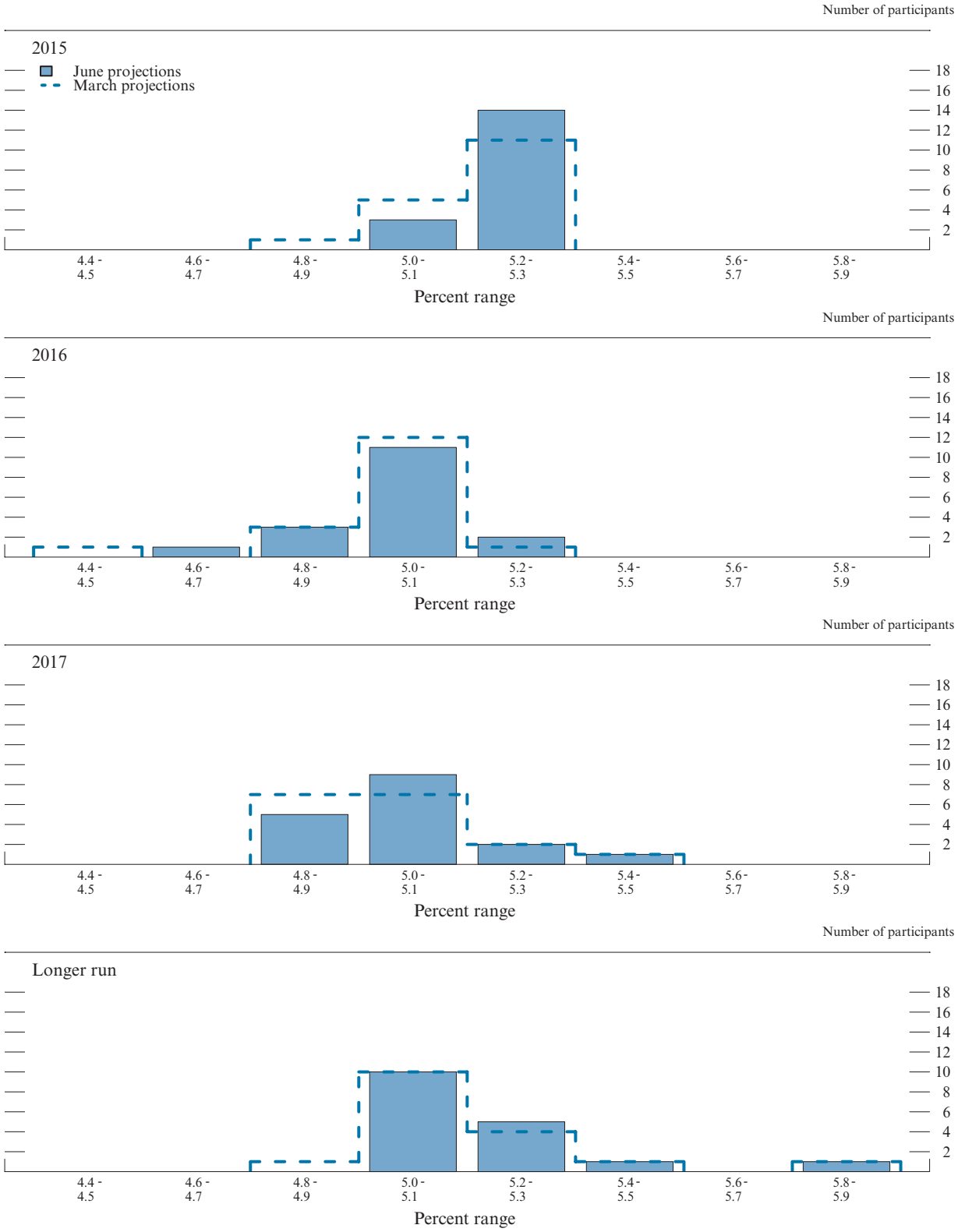
All but a few participants projected that the unemployment rate would be at or somewhat above their estimates of its longer-run normal level at the end of the year in which

Figure 3.A. Distribution of participants' projections for the change in real GDP, 2015–17 and over the longer run



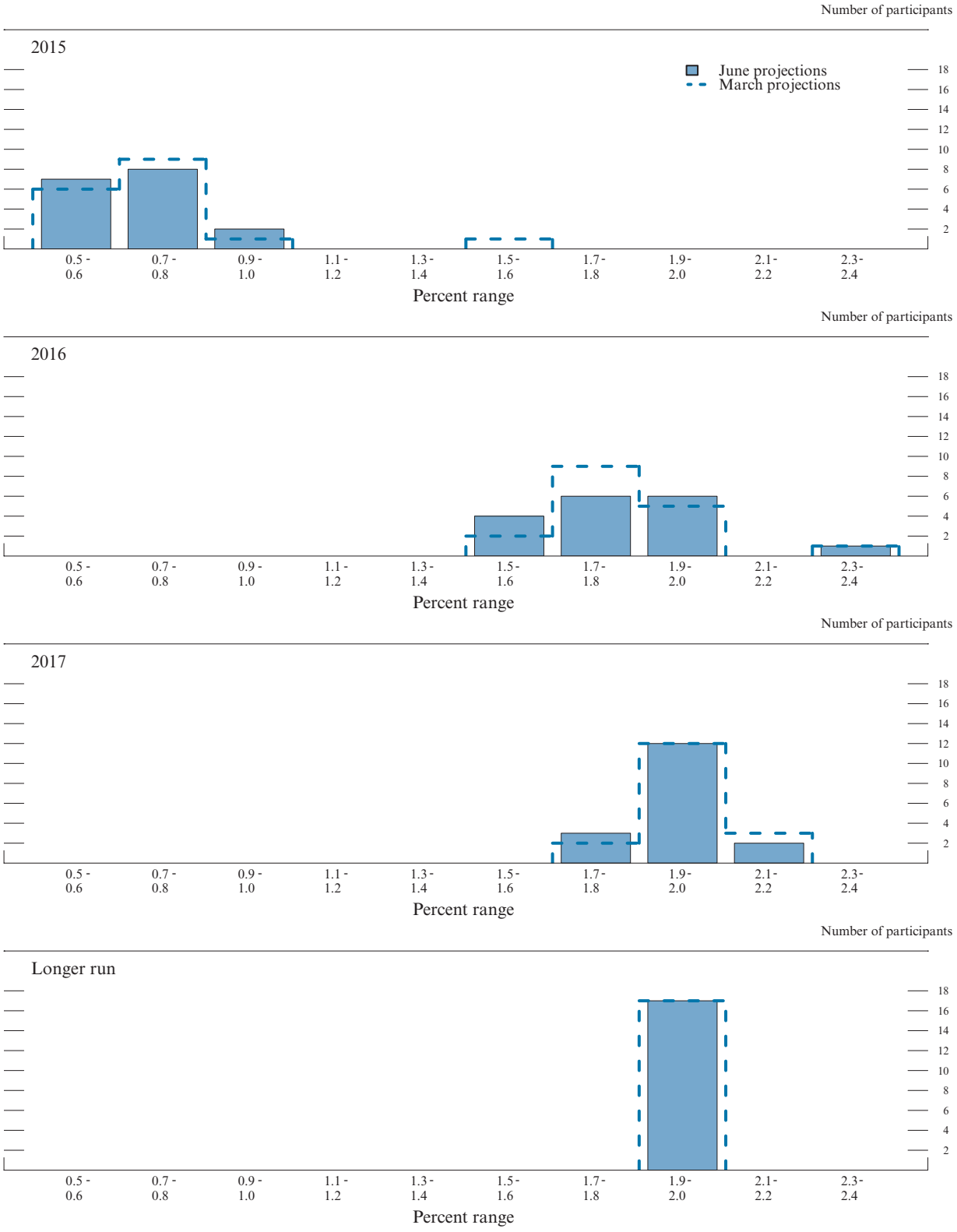
NOTE: Definitions of variables are in the general note to table 1.

Figure 3.B. Distribution of participants' projections for the unemployment rate, 2015–17 and over the longer run



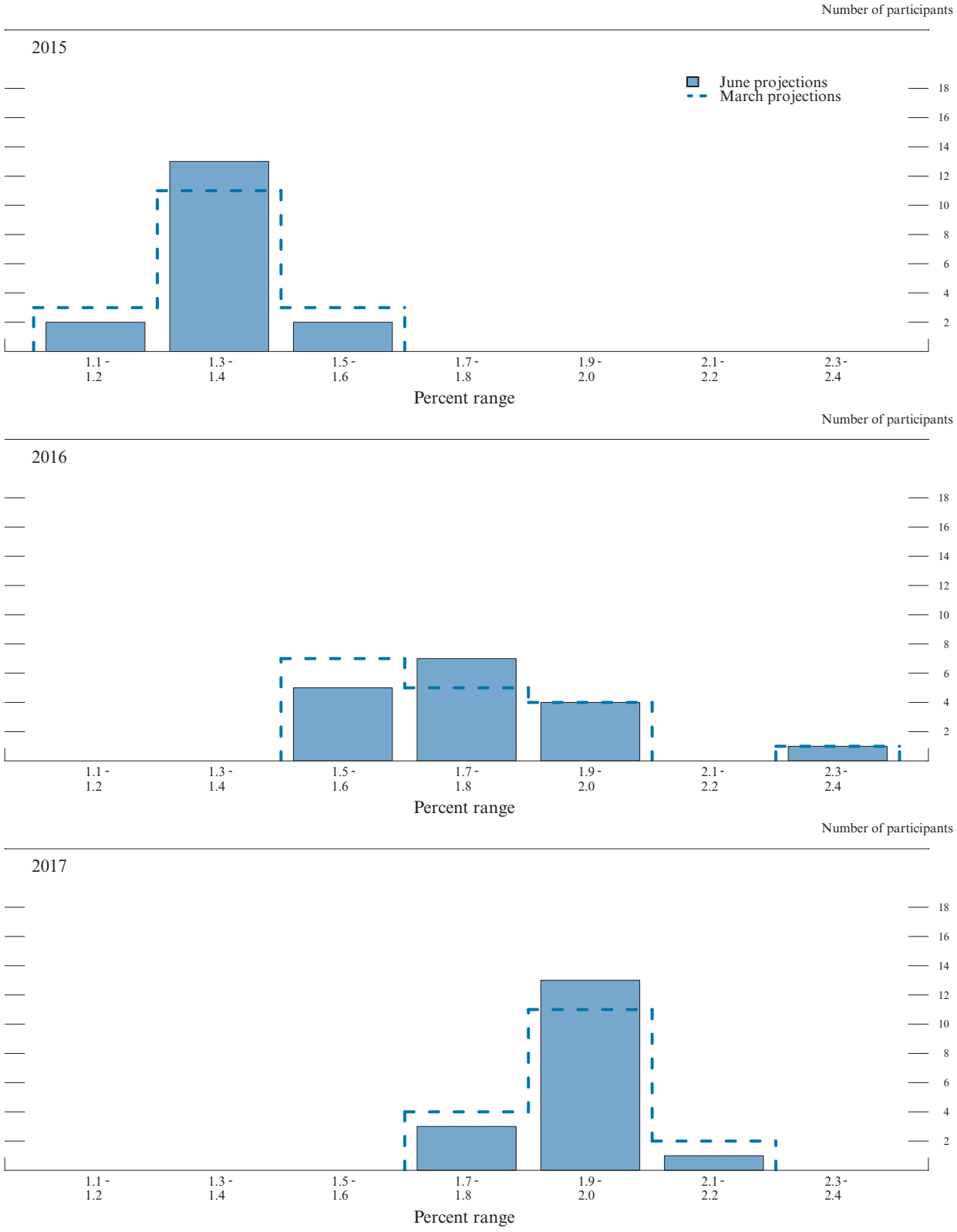
NOTE: Definitions of variables are in the general note to table 1.

Figure 3.C. Distribution of participants' projections for PCE inflation, 2015–17 and over the longer run



NOTE: Definitions of variables are in the general note to table 1.

Figure 3.D. Distribution of participants' projections for core PCE inflation, 2015–17



NOTE: Definitions of variables are in the general note to table 1.

they judged the initial increase in the target range for the federal funds rate would be warranted, and all participants projected that unemployment would decline further after the commencement of normalization. All participants projected that inflation would be below the Committee's 2 percent objective that year, but they also saw inflation rising notably closer to 2 percent in the following year.

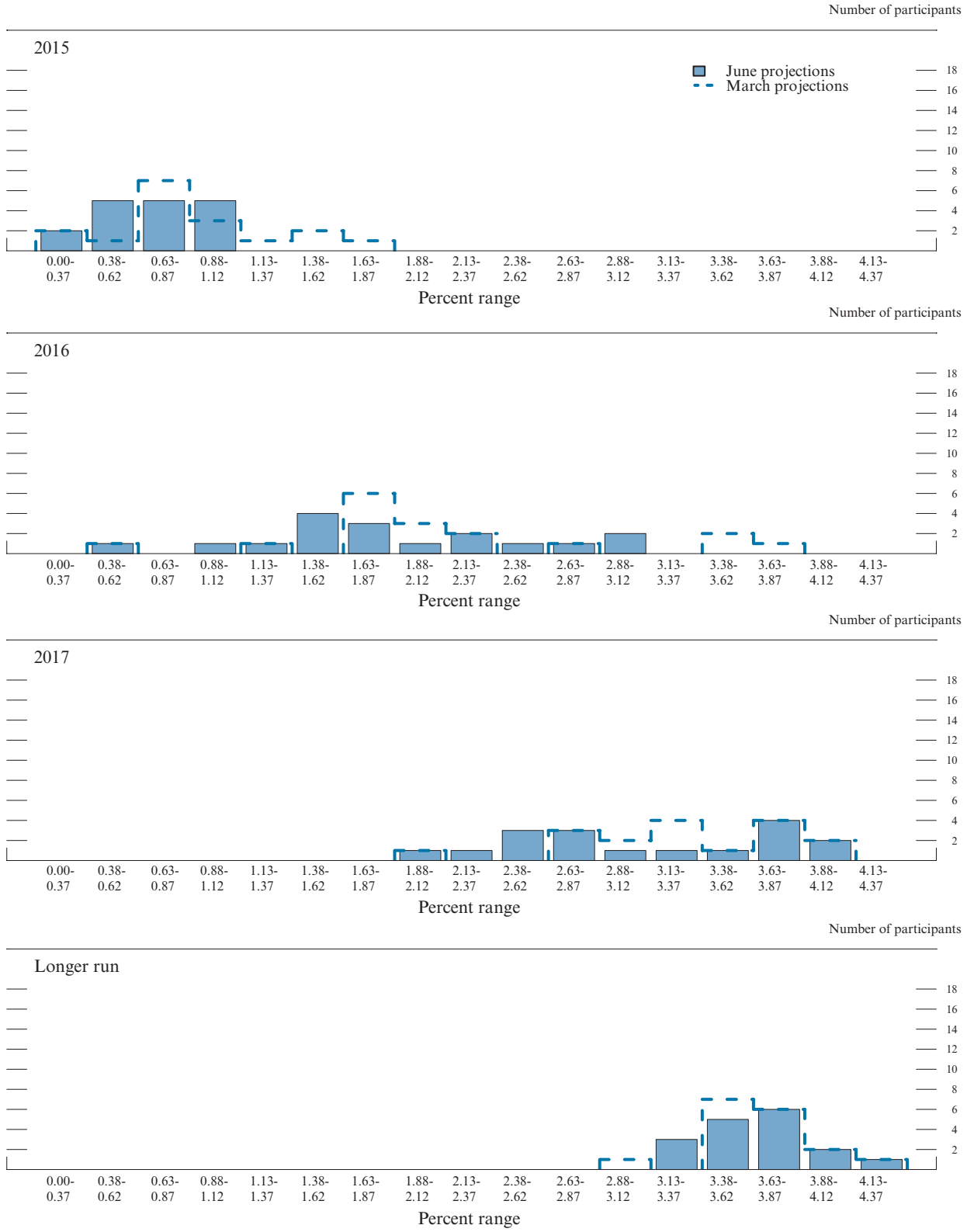
Figure 3.E provides the distribution of participants' judgments regarding the appropriate level of the target federal funds rate at the end of each calendar year from 2015 to 2017 and over the longer run. Relative to their March projections, most participants considered a lower level of the federal funds rate to be appropriate over some part of the projection period. The median projection for the federal funds rate at the end of 2015 was unchanged from March at 0.63 percent; however, the mean federal funds rate projection of 0.58 percent for that date was 19 basis points lower than in March. The median projections for the ends of 2016 and 2017 were 1.63 percent and 2.88 percent, respectively—both 25 basis points lower than in March. Compared with the March SEP, the dispersion of the projections for the appropriate level of the federal funds rate was a bit narrower over 2015 and 2016, and about the same as in March for 2017.

A sizable majority of participants judged that it would be appropriate for the federal funds rate at the end of 2017 to remain below its longer-run normal level, with about half of all participants projecting the federal funds rate at that time to be more than ½ percentage point lower than their estimates of its longer-run value. Participants provided a number of reasons why they thought it would be appropriate for the federal funds rate to remain below its longer-run normal level for some time after inflation and the unemployment rate were near mandate-consistent levels. These reasons included the expectation that headwinds that have been holding back the recovery would continue to exert some restraint on economic activity, that weak real activity abroad and the recent appreciation of the dollar were likely to persist and temper spending and production in the United States, that residual slack in the labor market would still be evident in some measures of labor utilization other than the unemployment rate, and that the risks to the economic outlook were asymmetric in part because of the constraints on monetary policy associated with the effective lower bound on the federal funds rate.

Relative to the March SEP, participants made at most modest adjustments to their estimates of the longer-run level of the federal funds rate. These changes left the median estimate of the longer-run normal federal funds rate unchanged from March at 3.75 percent; the central tendency for the federal funds rate in the longer run was 3.5 to 3.75 percent, also the same as in March.

Participants' views of the appropriate path for monetary policy were informed by their judgments about the state of the economy, including their estimates of the values of the unemployment rate and other labor market indicators that would be consistent with maximum employment, the extent to which labor market conditions were currently perceived to be falling short of maximum employment, and the prospects for inflation to return to the Committee's longer-term objective of 2 percent over the medium term. Also noted by participants were the implications of international developments for the domestic economy, the uncertainty regarding the reaction by economic decisionmakers to the beginning of policy normalization after a lengthy period with the federal funds rate at the effective lower bound, the economic benefits of limiting any associated disruptions in financial markets, and a general desire to practice risk management in setting monetary policy. In addition, some participants mentioned the prescriptions of various monetary policy rules as factors they considered in judging the appropriate path for the federal funds rate.

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, 2015–17 and over the longer run



NOTE: The midpoints of the target ranges for the federal funds rate and the target levels for the federal funds rate are measured at the end of the specified calendar year or over the longer run.

Uncertainty and Risks

A large majority of participants continued to judge the levels of uncertainty attending their projections for real GDP growth and the unemployment rate as broadly similar to the norms of the previous 20 years (figure 4).[11] As in March, most participants saw the risks to their outlooks for real GDP growth as broadly balanced, although some participants again viewed the risks to real GDP growth as weighted to the downside. Those participants who viewed the risks as weighted to the downside cited, for example, concern about the limited ability of monetary policy to respond to negative shocks to the economy when the federal funds rate is at its effective lower bound, a fragile foreign economic outlook, and weak readings on productivity growth. A large majority of participants judged the risks to the outlook for the unemployment rate to be broadly balanced.

Participants generally agreed that the levels of uncertainty associated with their inflation forecasts were broadly similar to historical norms. A few policymakers indicated that their confidence in the likelihood of inflation moving toward the policy objective of 2 percent inflation had increased. In all, 11 participants viewed the risks to their inflation forecast as balanced, up from 8 in the March SEP. The risks were still seen as tilted to the downside by 5 participants who cited the possibility that the effects of the high exchange value of the dollar on domestic inflation could persist for longer than anticipated, that longer-term inflation expectations might coalesce on a lower level of inflation than assumed, or that, in current circumstances, it could be difficult for the Committee to respond effectively to low-inflation outcomes. Conversely, 1 participant saw risks to inflation as weighted to the upside, citing uncertainty about the timing and efficacy of the Committee's withdrawal of monetary policy accommodation.

Table 2. Average historical projection error ranges

Percentage points

Variable	2015	2016	2017
Change in real GDP[1]	±1.4	±2.0	±2.1
Unemployment rate[1]	±0.4	±1.2	±1.8
Total consumer prices[2]	±0.8	±1.0	±1.0

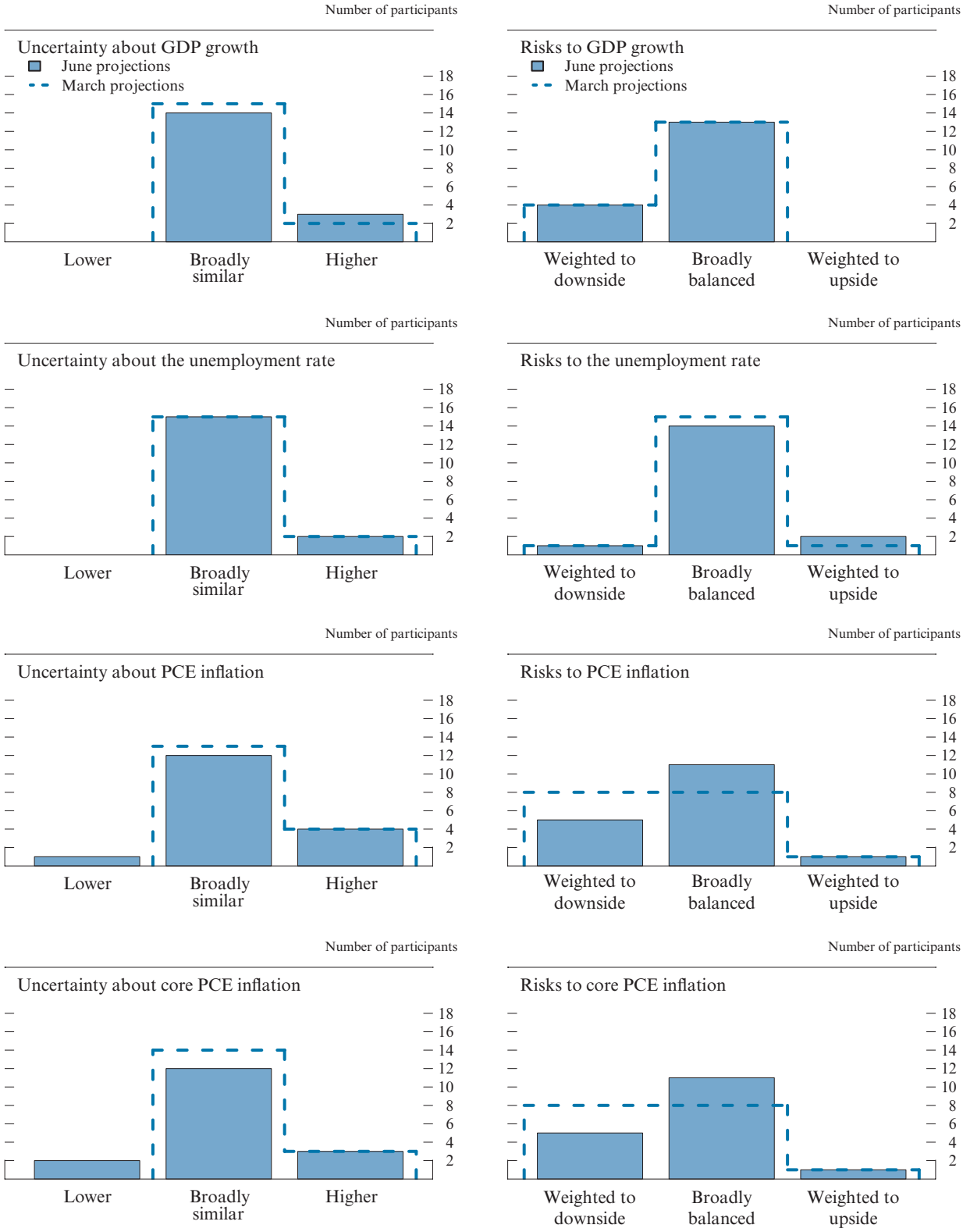
NOTE: Error ranges shown are measured as plus or minus the root mean squared error of projections for 1995 through 2014 that were released in the summer by various private and government forecasters. As described in the box "Forecast Uncertainty," under certain assumptions, there is about a 70 percent probability that actual outcomes for real GDP, unemployment, and consumer prices 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 (2007), "Gauging the Uncertainty of the Economic Outlook from Historical Forecasting Errors," Finance and Economics Discussion Series 2007-60 (Washington: Board of Governors of the Federal Reserve System, November), available at www.federalreserve.gov/pubs/feds/ 2007/200760/200760abs.html; and Board of Governors of the Federal Reserve System, Division of Research and Statistics (2014), "Updated Historical Forecast Errors," memorandum, April 9, www.federalreserve.gov/foia/files/20140409-historical-forecast-errors.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. Projection is percent change, fourth quarter of the previous year to the fourth quarter of the year indicated.

11. Table 2 provides estimates of the forecast uncertainty for the change in real GDP, the unemployment rate, and total consumer price inflation over the period from 1995 through 2014. 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. Uncertainty and risks in economic projections



NOTE: For definitions of uncertainty and risks in economic projections, see the box "Forecast Uncertainty." Definitions of variables are in the general note to table 1.

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. 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 1.6 to 4.4 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 1.2 to 2.8 percent in the current year and 1.0 to 3.0 percent in the second and third years.

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 variable is greater than, smaller than, or broadly similar to typical levels of forecast uncertainty in the past, as shown in table 2. 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, participants judge whether each variable is more likely to be above or below their projections of the most likely outcome. These judgments about the uncertainty and the risks attending each participant's projections are distinct from the diversity of participants' views about the most likely outcomes. Forecast uncertainty is concerned with the risks associated with a particular projection rather than with divergences across a number of different projections.

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.

Abbreviations

AFE	advanced foreign economy
BHC	bank holding company
CDS	credit default swap
CMBS	commercial mortgage-backed securities
CRE	commercial real estate
ECB	European Central Bank
ECI	employment cost index
E&I	equipment and intellectual property products
EME	emerging market economy
FOMC	Federal Open Market Committee; also, the Committee
GDP	gross domestic product
IMF	International Monetary Fund
IOER	interest on excess reserves
MBS	mortgage-backed securities
ON RRP	overnight reverse repurchase agreement
PCE	personal consumption expenditures
RRP	reverse repurchase agreement
SEP	Summary of Economic Projections
SLOOS	Senior Loan Officer Opinion Survey on Bank Lending Practices
SOMA	System Open Market Account
TDF	Term Deposit Facility
TIPS	Treasury Inflation-Protected Securities