

# MONETARY POLICY REPORT

February 14, 2017



Board of Governors of the Federal Reserve System



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# LETTER OF TRANSMITTAL

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BOARD OF GOVERNORS OF THE  
FEDERAL RESERVE SYSTEM

Washington, D.C., February 14, 2017

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,

A handwritten signature in cursive script that reads "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 31, 2017*

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

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

The inflation rate over the longer run is primarily determined by monetary policy, and hence the Committee has the ability to specify a longer-run goal for inflation. The Committee reaffirms its judgment that inflation at the rate of 2 percent, as measured by the annual change in the price index for personal consumption expenditures, is most consistent over the longer run with the Federal Reserve's statutory mandate. The Committee would be concerned if inflation were running persistently above or below this objective. Communicating this symmetric inflation goal clearly to the public helps keep longer-term inflation expectations firmly anchored, thereby fostering price stability and moderate long-term interest rates and enhancing the Committee's ability to promote maximum employment in the face of significant economic disturbances. The maximum level of employment is largely determined by nonmonetary factors that affect the structure and dynamics of the labor market. These factors may change over time and may not be directly measurable. Consequently, it would not be appropriate to specify a fixed goal for employment; rather, the Committee's policy decisions must be informed by assessments of the maximum level of employment, recognizing that such assessments are necessarily uncertain and subject to revision. The Committee considers a wide range of indicators in making these assessments. Information about Committee participants' estimates of the longer-run normal rates of output growth and unemployment is published four times per year in the FOMC's Summary of Economic Projections. For example, in the most recent projections, the median of FOMC participants' estimates of the longer-run normal rate of unemployment was 4.8 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 stated otherwise, the time series in the figures extend through, for daily data, February 9, 2017; for monthly data, January 2017; and, for quarterly data, 2016:Q4. In bar charts, except as noted, the change for a given period is measured to its final quarter from the final quarter of the preceding period.

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## SUMMARY

Labor market conditions continued to strengthen over the second half of 2016. Payroll employment has continued to post solid gains, averaging 200,000 per month since last June, a touch higher than the pace in the first half of 2016, though down modestly from its 225,000-per-month pace in 2015. The unemployment rate has declined slightly since mid-2016; the 4.8 percent reading in January of this year was in line with the median of Federal Open Market Committee (FOMC) participants' estimates of its longer-run normal level. The labor force participation rate has edged higher, on net, since midyear despite a structural trend that is moving down as a result of changing demographics of the population. In addition, wage growth seems to have picked up somewhat relative to its pace of a few years ago.

Consumer price inflation moved higher last year but remained below the FOMC's longer-run objective of 2 percent. The price index for personal consumption expenditures (PCE) increased 1.6 percent over the 12 months ending in December, 1 percentage point more than in 2015, importantly reflecting that energy prices have turned back up and declines in non-oil import prices have waned. The PCE price index excluding food and energy items, which provides a better indication than the headline index of where overall inflation will be in the future, rose 1.7 percent over the 12 months ending in December, about  $\frac{1}{4}$  percentage point more than its increase in 2015. Meanwhile, survey-based measures of longer-run inflation expectations have remained generally stable, though some are at relatively low levels; market-based measures of inflation compensation have moved up in recent months but also are at low levels.

Real gross domestic product is estimated to have increased at an annual rate of  $2\frac{3}{4}$  percent in the second half of the year after rising only 1 percent in the first half. Consumer

spending has been expanding at a moderate pace, supported by solid income gains and the ongoing effects of increases in wealth. The housing market has continued its gradual recovery, and fiscal policy at all levels of government has provided a modest boost to economic activity. Business investment had been weak for much of 2016 but posted larger gains toward the end of the year. Notwithstanding a transitory surge of exports in the third quarter, the underlying pace of exports has remained weak, a reflection of the appreciation of the dollar in recent years and the subdued pace of foreign economic growth.

Domestic financial conditions have generally been supportive of economic growth since mid-2016 and remain so despite increases in interest rates in recent months. Long-term Treasury yields and mortgage rates moved up from their low levels earlier last year but are still quite low by historical standards. Broad measures of stock prices rose, and the financial sector outperformed the broader equity market. Spreads of yields of both speculative- and investment-grade corporate bonds over yields of comparable-maturity Treasury securities declined from levels that were somewhat elevated relative to the past several years. Even with an ongoing easing in mortgage credit standards, mortgage credit is still relatively difficult to access for borrowers with low credit scores, undocumented income, or high debt-to-income ratios. Student and auto loans are broadly available, including to borrowers with nonprime credit scores, and the availability of credit card loans for such borrowers appears to have expanded somewhat over the past several quarters. In foreign financial markets, meanwhile, equities, bond yields, and the exchange value of the U.S. dollar have all risen, and risk spreads have generally declined since June.

Financial vulnerabilities in the U.S. financial system overall have continued to be moderate

since mid-2016. U.S. banks are well capitalized and have sizable liquidity buffers. Funding markets functioned smoothly as money market mutual fund reforms took effect in October. The ratio of household debt to income has changed little in recent quarters and is still far below the peak level it reached about a decade ago. Nonfinancial corporate business leverage has remained elevated by historical standards even though outstanding riskier corporate debt declined slightly last year. In addition, valuation pressures in some asset classes increased, particularly late last year. The Federal Reserve has continued to take steps to strengthen the financial system, including finalizing a rule that imposes total loss-absorbing capacity and long-term debt requirements on the largest internationally active bank holding companies as well as concluding an extensive review of its stress-testing and capital planning programs.

In December, the FOMC raised the target for the federal funds rate to a range of  $\frac{1}{2}$  to  $\frac{3}{4}$  percent after maintaining it at  $\frac{1}{4}$  to  $\frac{1}{2}$  percent for a year. The decision to increase the federal funds rate reflected realized and expected labor market conditions and inflation. With the stance of monetary policy remaining accommodative, the Committee has anticipated some further strengthening in labor market conditions and a return of inflation to the Committee's 2 percent objective.

The Committee has continued to emphasize that, in determining the timing and size of future adjustments to the target range for the federal funds rate, it will assess realized and expected economic conditions relative to its objectives of maximum employment and 2 percent inflation. The Committee has expected that economic conditions will evolve in a manner that will warrant only gradual increases in the federal funds rate, and that the federal funds rate will likely remain, for some time, below levels that are expected to prevail in the longer run. Consistent with this outlook, in the most recent Summary of Economic Projections (SEP), which was compiled at the time of the December meeting of the FOMC, most participants projected that the appropriate level of the federal funds rate would be below its longer-run level through 2018. (The December SEP is included as Part 3 of this report.)

With respect to its securities holdings, the Committee has stated that it will continue to reinvest principal payments from its securities portfolio, and that it expects to maintain this policy until normalization of the level of the federal funds rate is well under way. This policy of keeping the Committee's holdings of longer-term securities at sizable levels should help sustain accommodative financial conditions.



## PART 1

### RECENT ECONOMIC AND FINANCIAL DEVELOPMENTS

Labor market conditions continued to improve during the second half of last year and early this year. Payroll employment has increased 200,000 per month, on average, since June, and the unemployment rate has declined slightly further, reaching 4.8 percent in January, in line with the median of Federal Open Market Committee (FOMC) participants' estimates of its longer-run normal level. The labor force participation rate has edged higher, on net, which is all the more notable given a demographically induced downward trend.

The 12-month change in the price index for overall personal consumption expenditures (PCE) was 1.6 percent in December—still below the Committee's 2 percent objective but up noticeably from 2015, when the increase in top-line prices was held down by declines in energy prices. The 12-month change in the index excluding food and energy prices (the core PCE price index) was 1.7 percent last year. Measures of longer-term inflation expectations have been generally stable, though some survey-based measures remain lower than a few years ago; market-based measures of inflation compensation moved higher in recent months but also remain below their levels from a few years ago.

Real gross domestic product (GDP) is estimated to have increased at an annual rate of 2¾ percent over the second half of 2016 after increasing just 1 percent in the first half. The economic expansion continues to be supported by accommodative financial conditions—including the still-low cost of borrowing for many households and businesses—and gains in household net wealth, which has been boosted further by a rise in the stock market in recent months and by increases in households' real income spurred by continuing job gains. However, net exports were a moderate drag on GDP growth in the second half, as imports picked up and the rise in the exchange value of the dollar in recent years remained a drag on export demand.

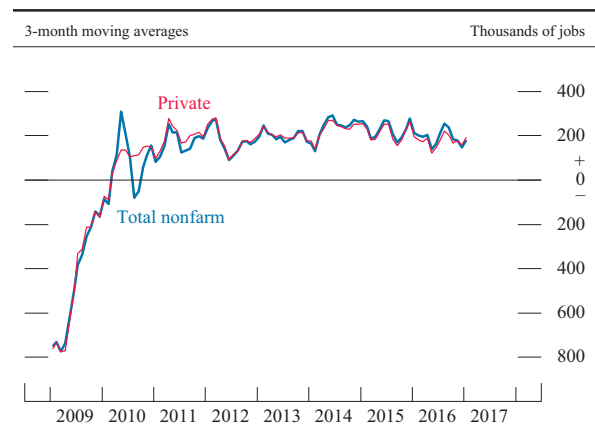
### Domestic Developments

#### The labor market has continued to tighten gradually . . .

Labor market conditions strengthened over the second half of 2016 and early this year. Payroll employment has continued to post solid gains, averaging 200,000 per month since last June (figure 1). This rate of job gains is a bit higher than that seen during the first half of 2016, though it is a little slower than the 225,000 monthly pace in 2015. The unemployment rate has declined slightly further, on net, since the middle of last year. After dipping as low as 4.6 percent in November, the unemployment rate stood at 4.8 percent in January, in line with the median of FOMC participants' estimates of its longer-run normal level.

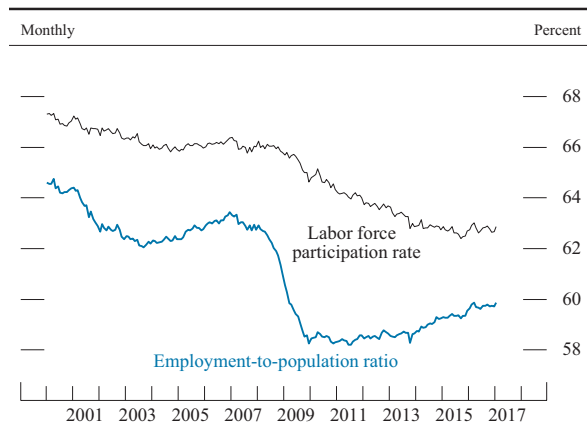
The labor force participation rate, at 62.9 percent, is up slightly since June 2016. Changing demographics and other longer-run structural changes in the labor market likely

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 percentage of the population aged 16 and over.  
SOURCE: Department of Labor, Bureau of Labor Statistics.

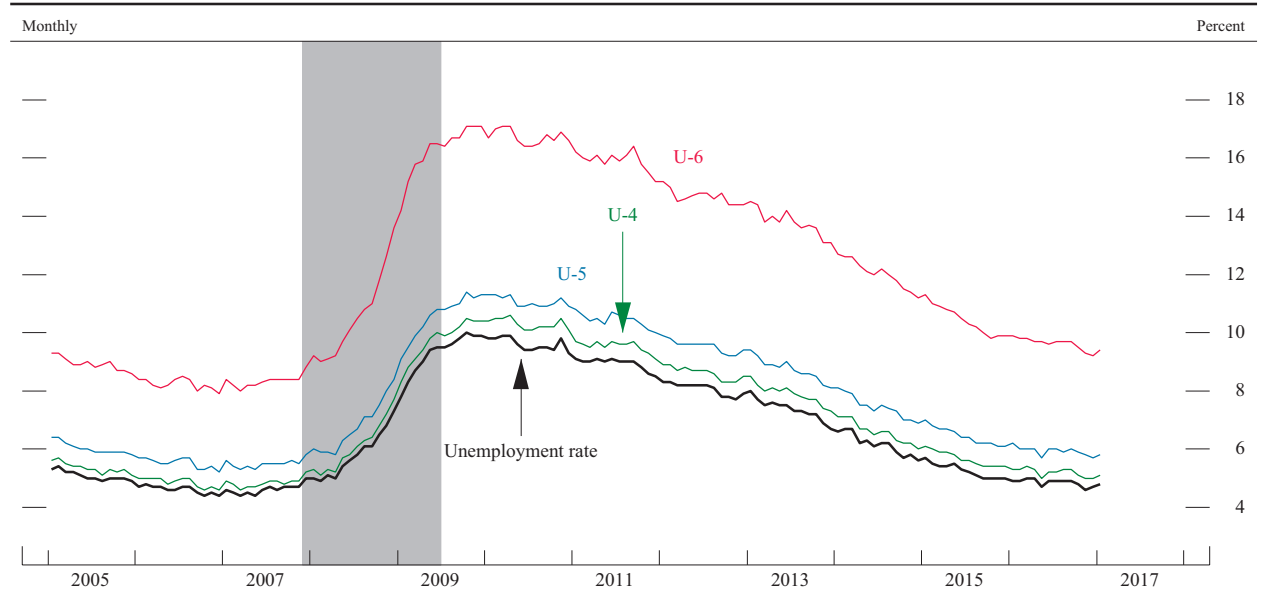
have continued to put downward pressure on the participation rate. A flat or increasing trajectory of the participation rate should therefore be viewed as a cyclical improvement relative to that downward trend. Reflecting the slightly higher participation rate and the small drop in the unemployment rate, the employment-to-population ratio has moved up about  $\frac{1}{4}$  percentage point since mid-2016 (figure 2). (For additional historical context on the economic recovery, see the box “[The Recovery from the Great Recession and Remaining Challenges.](#)”)

### ... and is close to full employment

Other indicators are also consistent with a healthy labor market. Layoffs as a share of private employment, as measured in the Job Openings and Labor Turnover Survey (JOLTS), remained at a low level through December, and recent readings on initial claims for unemployment insurance, a more timely measure, point to a very low pace of involuntary separations. The JOLTS quits rate has generally continued to trend up and is now close to pre-crisis levels, indicating that workers feel increasingly confident about their employment opportunities. In addition, the rate of job openings as a share of private employment has remained near record-high levels. The share of workers who are employed part time but would like to work full time—which is part of the U-6 measure of underutilization from the Bureau of Labor Statistics (BLS)—is still somewhat elevated, however, even though it has declined further; as a result, the gap between U-6 and the headline unemployment rate is somewhat wider than it was in the years before the Great Recession (figure 3).

The jobless rate for African Americans also continued to edge lower in the second half of 2016, while the rate for Hispanics remained flat; as with the overall unemployment rate, these rates are near levels seen leading into the recession. Despite these gains, the average unemployment rates for these groups of Americans have remained high relative to the aggregate, and those gaps have not narrowed over the past decade (figure 4).

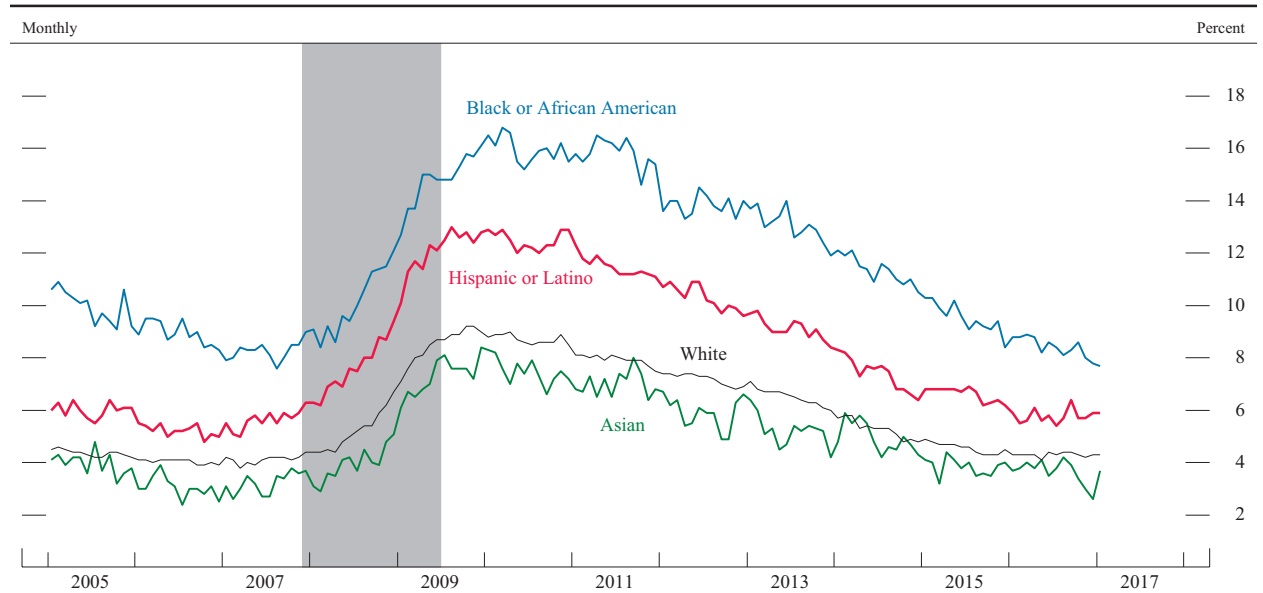
3. Measures of labor underutilization



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

SOURCE: Department of Labor, Bureau of Labor Statistics.

4. Unemployment rate by race and ethnicity



NOTE: Unemployment rate measures total unemployed as a percentage of the labor force. Persons whose ethnicity is identified as Hispanic or Latino may be of any race. The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.

SOURCE: Department of Labor, Bureau of Labor Statistics.

## The Recovery from the Great Recession and Remaining Challenges

### The Great Recession severely affected the U.S. economy . . .

The Great Recession of 2008 and 2009, and the financial crisis that precipitated it, resulted in massive job losses and falling incomes for American households. The Great Recession was, along many dimensions, the most severe downturn since the Great Depression almost 80 years earlier. Economic output declined outright for 18 months, leaving real gross domestic product (GDP) 4½ percent below its previous peak. More than 8½ million jobs were lost, on net, and the unemployment rate soared from 4½ percent in 2007 to a peak of 10 percent in late 2009 (text figure 3). The labor force participation rate (LFPR), the fraction of the population either employed or counted as unemployed, fell steeply, from 66 percent in 2007 to 63 percent in 2014 (text figure 2). Household incomes tumbled, with real income for the median family declining more than 8 percent from 2007 to 2012.

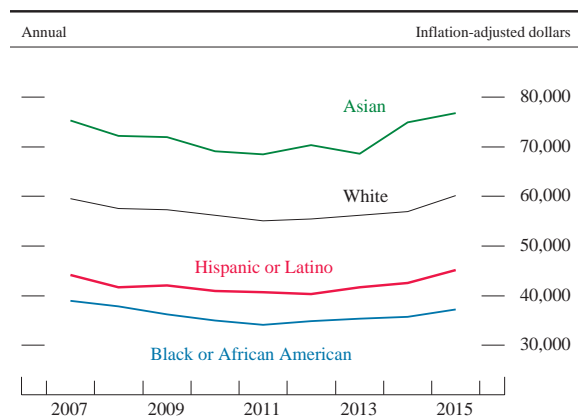
The hardships were particularly acute for certain groups of Americans. As text figure 4 shows, unemployment rates for blacks and Hispanics rose considerably more during the recession than did such rates for the nation as a whole. Of particular note, inflation-adjusted median household incomes for black households declined more than 12 percent from peak to trough, substantially more in percentage terms than for white, Hispanic, or Asian households (figure A).<sup>1</sup>

### . . . but considerable progress has been made

In the eight years since the crisis, the U.S. economy has made considerable progress across a broad range of measures; this progress has occurred while the resilience of the financial system has been shored up. More than 15 million jobs have been created, on net, since the fall of 2009, and the unemployment rate has fallen by half. In addition, the LFPR has moved roughly sideways since 2014, which should be viewed as a cyclical improvement given the demographic changes and other secular trends that have put downward pressure on participation for the past 10 years. The robust job gains seen during the current

1. Measures of household income derived from surveys—such as the Current Population Survey's Annual Social and Economic Supplement, which informs the Census Bureau's official statistics—may not fully capture earned income (such as from the self-employed) and unearned income (such as transfers and retirement income). These issues are likely to be much more pronounced for the various subgroups than they are for the national median.

A. Median household income, by race and ethnicity



NOTE: Race refers to the race of the head of household. The Hispanic and Latino ethnicity and race categories are not mutually exclusive. Some individuals, for example, are both Hispanic and white, and they are represented in both lines.

SOURCE: Department of Commerce, Bureau of the Census (2016), *Income and Poverty in the United States: 2015*, Table A-1: Households by Total Money Income, Race, and Hispanic Origin of Householder: 1967 to 2015 (Washington: Census Bureau, September), [www.census.gov/library/publications/2016/demo/p60-256.html](http://www.census.gov/library/publications/2016/demo/p60-256.html).

expansion are all the more noteworthy given these demographic pressures.

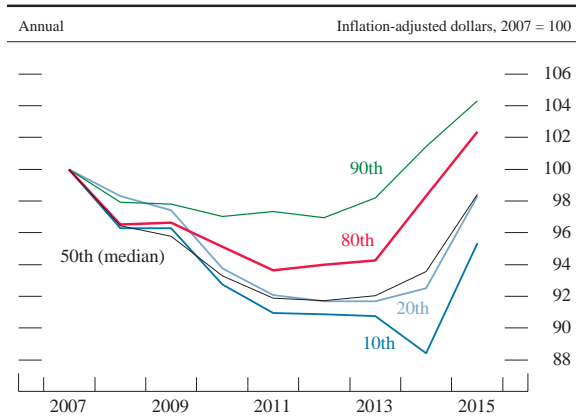
The labor market at present is likely close to being at full employment. The unemployment rate is near the median of Federal Open Market Committee (FOMC) participants' assessments of its longer-run normal value. In addition, real GDP now stands 11 percent above its pre-recession peak, and it is approaching, though still a bit below, the Congressional Budget Office's estimate of potential output—that is, the maximum sustainable level of economic output.<sup>2</sup>

Incomes for the median family have mostly recovered from the Great Recession. Of note, real median income is reported to have risen 5.2 percent in 2015 (figure B).

The recovery compares favorably with those of other advanced economies. GDP has increased faster and unemployment has declined more quickly in the United States than in other major advanced economies (figures C and D). And the Federal Reserve's challenges in getting inflation back up to target are similar to, but not as severe as, those faced by some other major monetary authorities in the past few years. Although

2. Congressional Budget Office (2017), *The Budget and Economic Outlook: 2017 to 2027* (Washington: CBO, January), p. 41, [www.cbo.gov/sites/default/files/115th-congress-2017-2018/reports/52370-outlook.pdf](http://www.cbo.gov/sites/default/files/115th-congress-2017-2018/reports/52370-outlook.pdf).

**B. Indexed household income, by percentile**



SOURCE: Department of Commerce, Bureau of the Census (2016), *Income and Poverty in the United States: 2015*, Table A-2: Selected Measures of Household Income Dispersion: 1967 to 2015 (Washington: Census Bureau, September), [www.census.gov/library/publications/2016/demo/p60-256.html](http://www.census.gov/library/publications/2016/demo/p60-256.html).

consumer price inflation, as measured by the price index for personal consumption expenditures, has run below the FOMC’s 2 percent objective through most of the expansion, in recent months inflation has moved closer to the Committee’s target (text figure 7).

**Nonetheless, challenges remain**

While much progress has been made, important challenges remain for the U.S. economy. GDP growth

has averaged only about 2 percent per year during this expansion, the slowest pace of any postwar recovery (figure E). In part, that subdued pace is due to slower growth in the labor force in recent decades compared with much of the postwar period.<sup>3</sup>

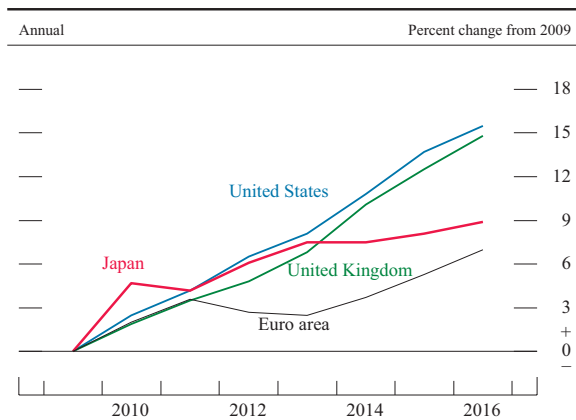
Another source of slow GDP growth has been lackluster labor productivity (text figure 6). Since 2008, output per hour in the business sector has risen about 1 percent per year, far below the pace that prevailed before the recession. Cyclical factors, like weak business investment and firms rebuilding workforces after cutting unusually deeply during the crisis, likely explain some of the slow rise in productivity during this expansion. But structural factors may also be at play, such as declines in innovation, reduced business dynamism, or decreased product market competition.<sup>4</sup> The productivity slowdown has taken place in most advanced economies, which suggests a role for structural factors not specific to the United States.

*(continued on next page)*

3. In particular, the Congressional Budget Office estimates that the contribution to potential GDP growth from trend labor force growth is 2 percentage points lower today than it was 40 years ago. This development reflects a slowing of population growth and a switch from a rising LFPR to a falling one, among other factors. See Congressional Budget Office, *Budget and Economic Outlook*, table 2-3, p. 58, in note 2.

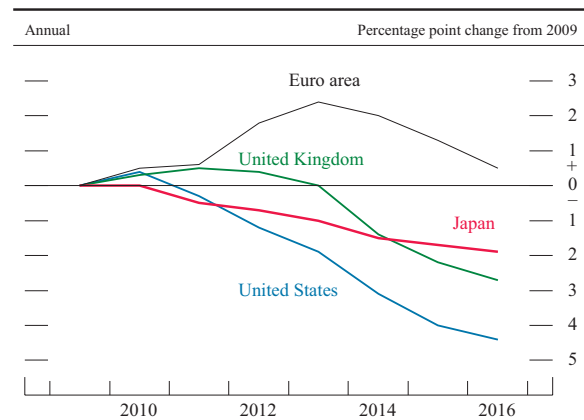
4. See Robert J. Gordon (2016), *The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War* (Princeton, N.J.: Princeton University Press); Steven J.

**C. Real gross domestic product in international context**



SOURCE: Organisation for Economic Co-operation and Development (2017), “OECD Economic Outlook No. 100 (Edition 2016/2),” OECD Economic Outlook: Statistics and Projections (database), <http://dx.doi.org/10.1787/7fa317bf-en> (accessed January 2017).

**D. Unemployment rate in international context**



SOURCE: Organisation for Economic Co-operation and Development (2017), “OECD Economic Outlook No. 100 (Edition 2016/2),” OECD Economic Outlook: Statistics and Projections (database), <http://dx.doi.org/10.1787/7fa317bf-en> (accessed January 2017).

## The Recovery from the Great Recession and Remaining Challenges *(continued)*

Meanwhile, despite the notable pickup in 2015, real incomes for the median family are still a bit lower than they were prior to the recession. Moreover, the gains have not been uniformly distributed; families at the 10th percentile of the income distribution earned about 4 percent less in 2015 than they did in 2007, while families at the 90th percentile earned about 4 percent more than before the Great Recession (figure B).

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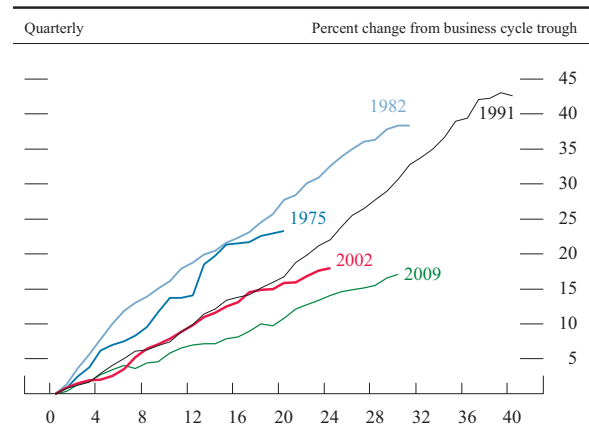
Davis and John Haltiwanger (2014), "Labor Market Fluidity and Economic Performance," NBER Working Paper Series 20479 (Cambridge, Mass.: National Bureau of Economic Research, September); and Philippe Aghion, Nick Bloom, Richard Blundell, Rachel Griffith, and Peter Howitt (2005), "Competition and Innovation: An Inverted-U Relationship," *Quarterly Journal of Economics*, vol. 120 (May), pp. 701–28.

Economists are divided about the causes of the productivity slowdown and their consequences for the outlook. For an optimistic view, see Erik Brynjolfsson and Andrew McAfee (2014), *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* (New York: W.W. Norton & Company). For a less optimistic perspective, see Gordon, *Rise and Fall of American Growth*, earlier in this note. Others have argued that difficulties associated with economic measurement may exaggerate the slowdown; see, for example, David M. Byrne, John G. Fernald, and Marshall B. Reinsdorf (2016), "Does the United States Have a Productivity Slowdown or a Measurement Problem?" *Brookings Papers on Economic Activity*, Spring, pp. 109–57, <https://www.brookings.edu/wp-content/uploads/2016/03/byrnetextspring16bpea.pdf>. Another, more optimistic explanation is that the slowdown in productivity reflects a "constructive pause" as firms adopt new productivity-enhancing technology and organizational practices; see, for example, Paul A. David (1990), "The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox," *American Economic Review*, vol. 80 (May), pp. 355–61.

Similarly, the economic circumstances of blacks and Hispanics have improved since the depths of the recession, but they remain worse, on average, than those of whites or Asians. Unemployment rates for blacks and Hispanics continue to be well above those for their white and Asian counterparts (text figure 4), while incomes for these groups have stayed noticeably lower (figure A).

These challenges lie substantially beyond the reach of monetary policy to address. Monetary policy cannot, for instance, generate technological breakthroughs or address the root causes of inequality.

### E. Real gross domestic product in historical context



NOTE: Real gross domestic product indexed to business cycle trough as dated by the National Bureau of Economic Research. The x-axis shows the number of quarters since the business cycle trough.

SOURCE: Department of Commerce, Bureau of Economic Analysis.

### Labor compensation growth is picking up . . .

The improving labor market appears to be contributing to somewhat larger gains in labor compensation. Major BLS measures of hourly compensation posted larger increases last year. Of these, the measures that include the costs of benefits have posted smaller gains than wage-only measures because of a slowdown in the growth of employer health-care costs. A compensation measure computed by the Federal Reserve Bank of Atlanta, which tracks only the wages of workers who were employed at two points in time spaced 12 months apart, shows even more pickup than these BLS measures (figure 5).

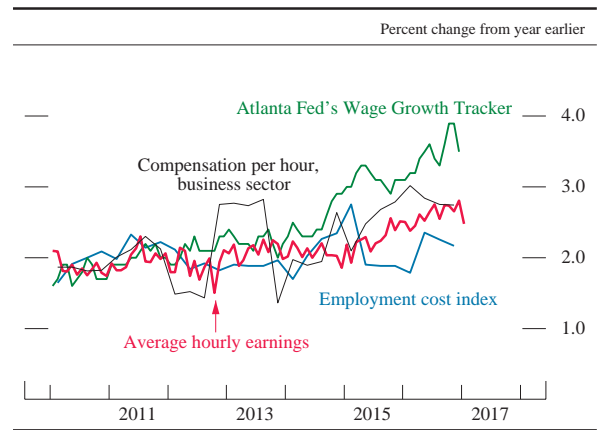
### . . . amid persistently slow productivity growth

As in the previous several years, gains in labor compensation last year occurred against a backdrop of persistently slow productivity growth. Since 2008, labor productivity gains have averaged around 1 percent per year, well below the pace that prevailed from the mid-1990s to 2007 and somewhat below the 1974–95 average of 1½ percent per year (figure 6). Since 2011, output per hour has averaged only a little more than ½ percent per year. The relatively slow pace of productivity growth in recent years is in part a consequence of the slower pace of capital accumulation; diminishing gains in technological innovations and downward trends in business formation also may have played a role.

### Price inflation has picked up over the past year . . .

In recent years inflation has been persistently low, in part because the drop in oil prices and the rise in the exchange value of the dollar since mid-2014 have led to sharp declines in energy prices and relatively weak non-energy import prices. The effects of these earlier developments have been waning, however, and overall inflation has been moving up toward the FOMC’s 2 percent target; the 12-month

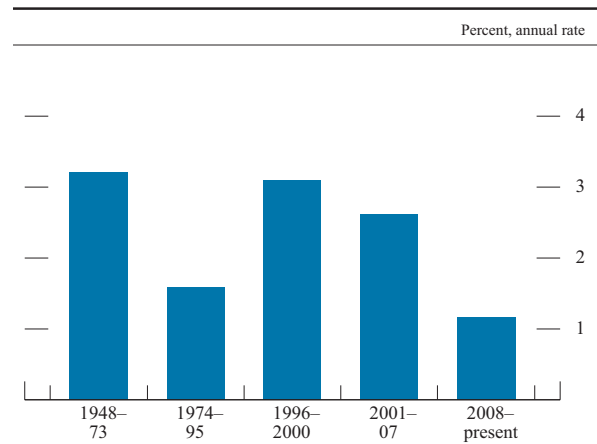
5. Measures of change in hourly compensation



NOTE: Business-sector compensation is the four-quarter percentage change of the four-quarter moving average. 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; for the Atlanta Fed’s Wage Growth Tracker, the data are shown as a three-month moving average and extend through December 2016.

SOURCE: Department of Labor, Bureau of Labor Statistics; Federal Reserve Bank of Atlanta, Wage Growth Tracker.

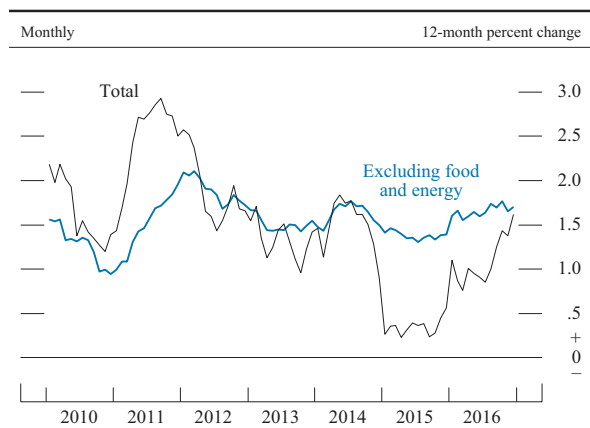
6. Change in business-sector output per hour



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 2016:Q4.

SOURCE: Department of Labor, Bureau of Labor Statistics.

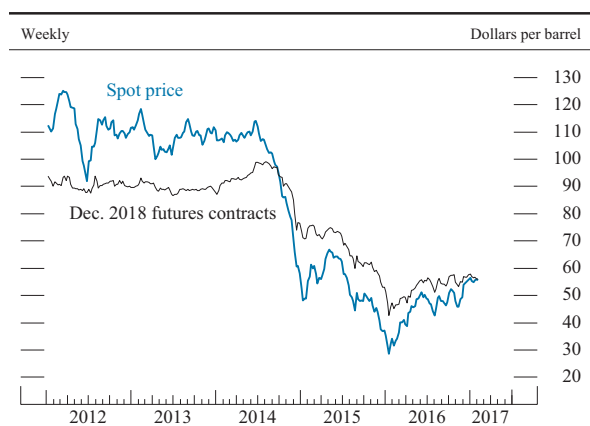
## 7. Change in the price index for personal consumption expenditures



NOTE: The data extend through December 2016; changes are from one year earlier.

SOURCE: Department of Commerce, Bureau of Economic Analysis.

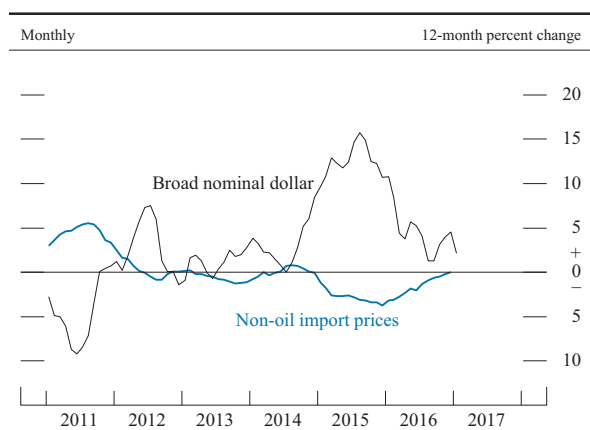
## 8. Brent spot and futures prices



NOTE: The data are weekly averages of daily data and extend through February 9, 2017.

SOURCE: NYMEX via Bloomberg.

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



NOTE: The data for non-oil import prices extend through December 2016.

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

change in overall PCE prices reached 1.6 percent in December, compared with only 0.6 percent over 2015. The PCE price index excluding food and energy items, which provides a better indication than the headline figure of where overall inflation will be in the future, rose 1.7 percent over the 12 months ending in December, somewhat greater than the 1.4 percent increase in the prior year, as prices for a wide range of core goods and services accelerated. Nonetheless, the rate of inflation for both total and core PCE prices remains below the Committee's target (figure 7).

## ... as oil and other commodity prices moved up moderately

The similar readings for headline and core PCE inflation last year partly reflect an upturn in crude oil in 2016 following the sharp decline in the prior two years. Since July, oil prices traded mostly in the \$45 to \$50 per barrel range until the November OPEC agreement regarding production cuts in 2017 (figure 8). In the wake of that agreement, prices moved up to about \$55, roughly \$15 per barrel higher since late 2015. Retail gasoline prices also rose after the November OPEC agreement, but that increase has partially reversed in recent weeks.

After falling during 2014 and 2015, non-oil import prices stabilized in late 2016, supported by the rise in nonfuel commodity prices as well as by an uptick in foreign inflation (figure 9). In particular, prices of metals have increased in the past few months, boosted by production cuts combined with improved prospects for demand both in the United States and abroad. However, factors holding non-oil import prices down include dollar appreciation in the second half of 2016 and lower prices of agricultural goods last fall, as U.S. harvests hit record-high levels for many crops.



### Survey measures of longer-term inflation expectations have been generally stable . . .

Wage- and price-setting decisions are likely influenced by expectations for inflation. Surveys of professional forecasters outside the Federal Reserve System indicate that their longer-term inflation expectations have remained stable and consistent with the FOMC’s 2 percent objective for PCE inflation. In contrast, the median inflation expectation over the next 5 to 10 years as reported by the University of Michigan Surveys of Consumers has generally trended downward over the past few years, though it is little changed from a year ago; this measure was at 2.5 percent in early February (figure 10). It is unclear how best to interpret that downtrend; this measure of inflation expectations has been above actual inflation for much of the past 20 years.

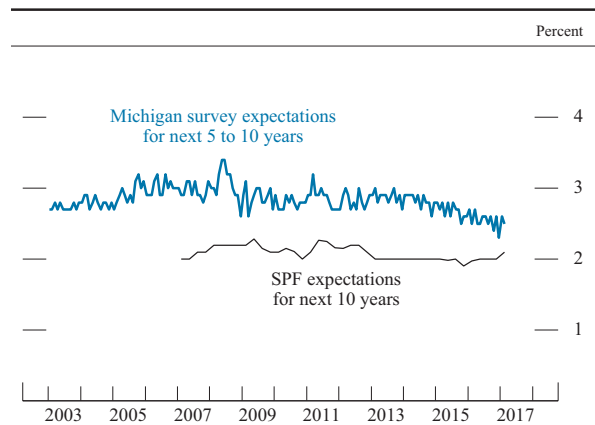
### . . . and market-based measures of inflation compensation have moved up notably in recent months but also remain relatively low

TIPS-based inflation compensation (5 to 10 years forward), after declining to very low levels through the middle of 2016, has risen to nearly 2 percent and is about 20 basis points higher than it was at the end of 2015. However, this level is still below the 2½ to 3 percent range that persisted for most of the 10 years prior to 2014 (figure 11).

### Real GDP growth picked up in the second half of 2016

Real GDP is reported to have increased at an annual rate of 2¾ percent in the second half of 2016 after increasing just 1 percent in the first half (figure 12). Much of the step-up reflects the stabilization of inventory investment, which held down GDP growth considerably in the first half of last year, as well as a pickup in government purchases of goods and services. Private domestic final purchases—that is, final purchases by U.S. households

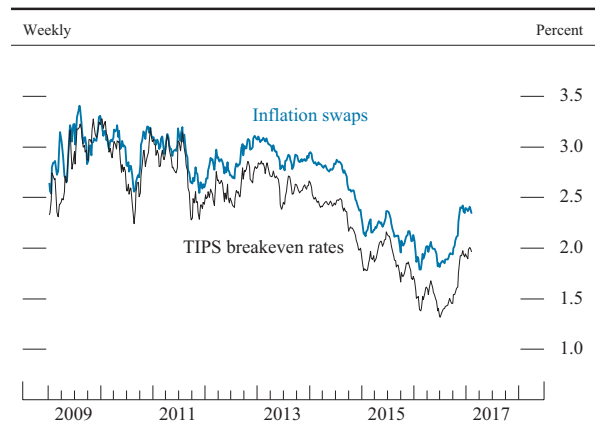
10. Median inflation expectations



NOTE: The Michigan survey data are monthly and extend through February; the February data are preliminary. The SPF data for inflation expectations for personal consumption expenditures are quarterly and extend from 2007:Q1 through 2017:Q1.

SOURCE: University of Michigan Surveys of Consumers; Federal Reserve Bank of Philadelphia, Survey of Professional Forecasters (SPF).

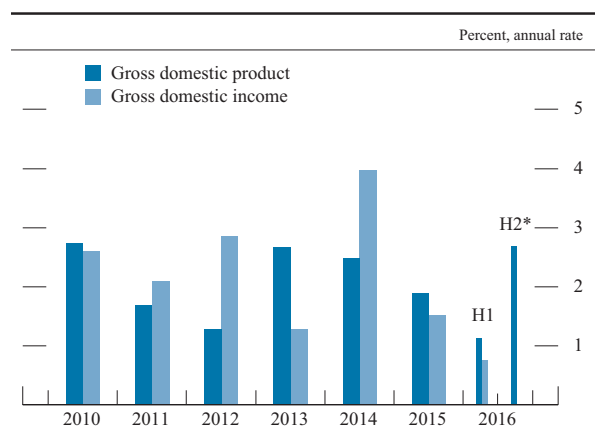
11. 5-to-10-year-forward inflation compensation



NOTE: The data are weekly averages of daily data and extend through February 10, 2017. TIPS is Treasury Inflation-Protected Securities.

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

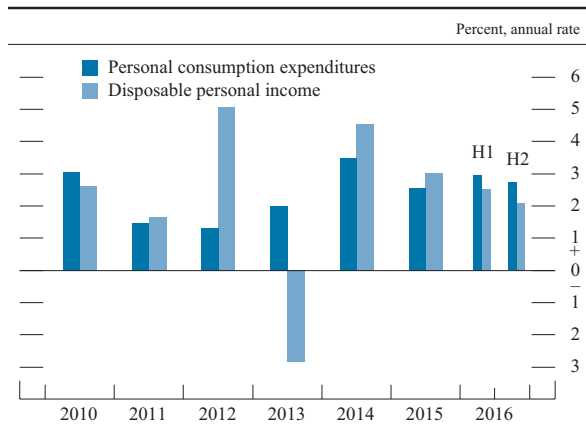
12. Change in real gross domestic product and gross domestic income



\* Gross domestic income is not yet available for 2016:H2.

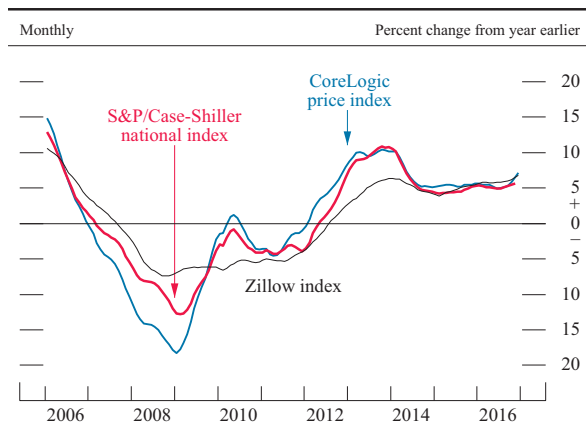
SOURCE: Department of Commerce, Bureau of Economic Analysis.

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



SOURCE: Department of Commerce, Bureau of Economic Analysis.

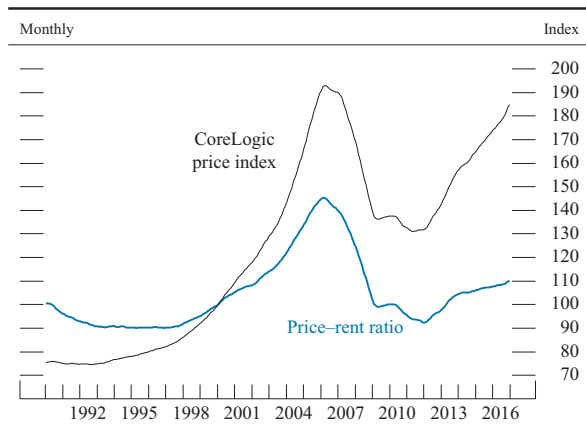
14. Prices of existing single-family houses



NOTE: The data for the S&P/Case-Shiller index extend through November 2016. The data for the Zillow and CoreLogic indexes extend through December 2016.

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

15. Nominal house prices and price–rent ratio



NOTE: The data extend through December 2016. The CoreLogic price index is seasonally adjusted by Federal Reserve Board staff. The price–rent ratio is the ratio of nominal house prices to the consumer price index of rent of primary residence. The data are indexed to 100 in January 2000.

SOURCE: For prices, CoreLogic; for rents, Department of Labor, Bureau of Labor Statistics.

and businesses—grew more steadily than GDP last year and posted a fairly solid gain in the second half. PCE growth was bolstered by rising incomes and wealth, while private fixed investment was weak despite the low costs of borrowing for many households and businesses. Although the FOMC has increased the federal funds rate twice as this expansion has progressed—once in December 2015 and again in December 2016—in ¼ percentage point steps, overall financial conditions have been sufficiently accommodative to support somewhat-faster-than-trend growth in real activity.

**Gains in income and wealth have continued to support consumer spending . . .**

Real consumer spending rose at an annual rate of 2¾ percent in the second half of 2016, a solid pace similar to the one seen in the first half. Consumption has been supported by the ongoing improvement in the labor market and the associated increases in real disposable personal income (DPI)—that is, income after taxes and adjusted for price changes. Real DPI increased 2¼ percent in 2016 following a gain of 3 percent in 2015, when purchasing power was boosted by falling energy prices (figure 13).

Consumer spending has also been supported by further increases in household net worth. Broad measures of U.S. equity prices rose solidly over the past year, and house prices continued to move up (figure 14). (In nominal terms, national house prices are approaching their peaks of the mid-2000s, though relative to rents or income, house price valuations are much lower than a decade ago (figure 15).) Buoyed by these cumulative increases in home and equity prices, aggregate household net worth has risen appreciably from its level during the recession, and the ratio of household net worth to income remains well above its historical average (figure 16). The benefits of homeownership have not been distributed evenly; see the box “Homeownership by Race and Ethnicity.”

**... as does credit availability**

Consumer credit has continued to expand somewhat faster than income amid stable delinquencies on consumer debt (figure 17). Auto and student loans remain widely available even to borrowers with lower credit scores, and outstanding balances on these types of loans continued to expand at a robust pace. Credit card balances continued to grow and were 6 percent higher than one year earlier in December. That said, credit card standards have remained tight for nonprime borrowers. As a result, delinquencies on credit cards are still near low historical levels.

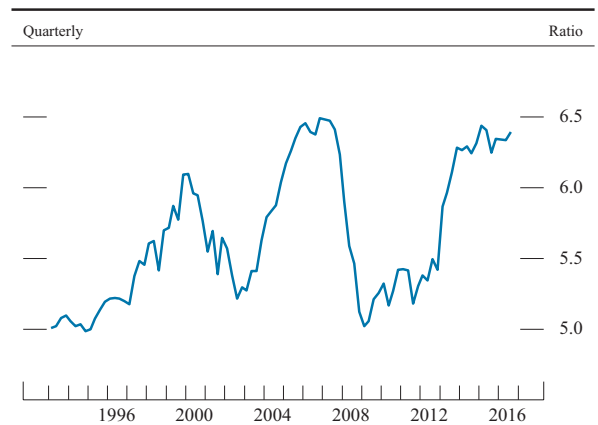
**Consumer confidence is strong**

Household spending has also been supported by favorable consumer sentiment. In 2015 and through most of 2016, readings from the overall index of consumer sentiment from the Michigan survey were solid, likely reflecting rising incomes and job gains. Sentiment has improved further in the past couple of months (figure 18). The share of households expecting real income gains over the next year or two is now close to its pre-recession level despite having lagged improvements in the headline sentiment measure earlier in the recovery.

**Housing construction has been sluggish despite rising home demand**

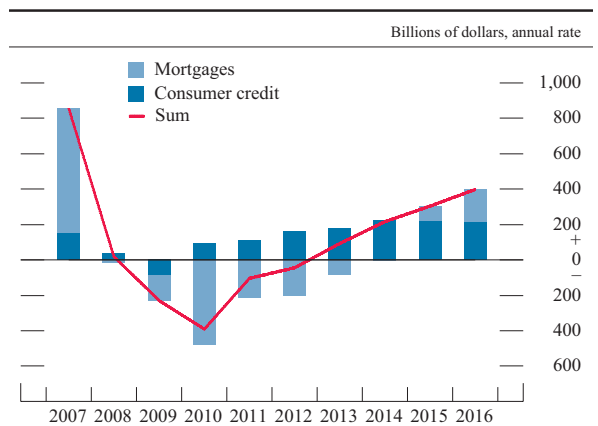
Residential investment spending appears to have only edged higher in 2016 following a larger gain in the previous year. Single-family housing starts registered a moderate increase in 2016, while multifamily housing starts flattened out on balance (figure 19). The pace of construction activity in 2016 remained sluggish despite solid gains in house prices and ongoing improvements in demand for both new and existing homes (figure 20). As a result, the months' supply of inventories of homes for sale dropped to low levels, and the aggregate vacancy rate moved to its lowest level since 2005. Reportedly, tight supplies of skilled labor and developed lots have been restraining home construction.

16. Wealth-to-income ratio



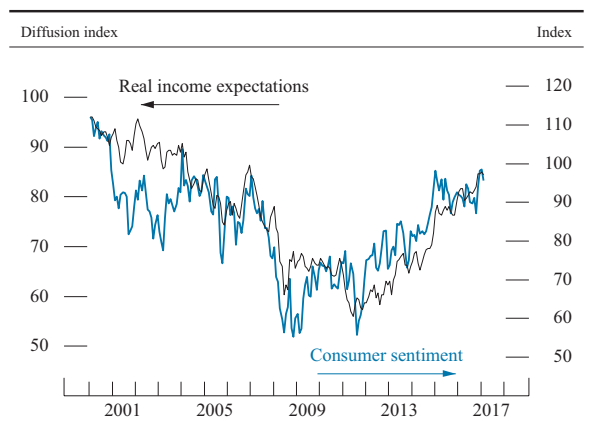
NOTE: The data extend through 2016:Q3. The series is the ratio of household net worth to disposable personal income.  
 SOURCE: For net worth, Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States"; for income, Department of Commerce, Bureau of Economic Analysis.

17. Changes in household debt



NOTE: Changes are calculated from year-end to year-end except 2016 changes, which are calculated from Q3 to Q3.  
 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 extend through February 2017; the February data are preliminary. The consumer sentiment data are monthly and are indexed to 100 in 1966. The real income expectations data are calculated as the net percentage of survey respondents expecting family income to go up more than prices during the next year or two plus 100 and are shown as a three-month moving average.  
 SOURCE: University of Michigan Surveys of Consumers.

## Homeownership by Race and Ethnicity

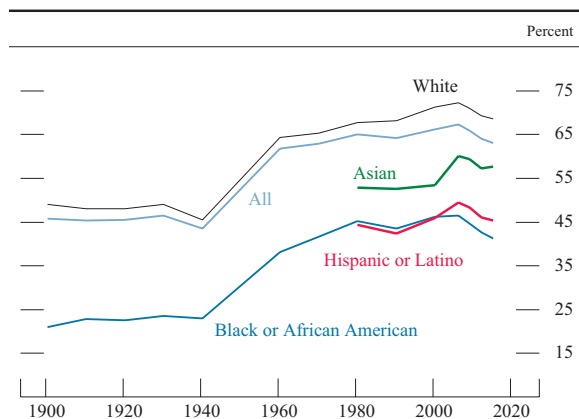
Most households in the United States own their homes, and among those who do not, many continue to aspire to own their homes.<sup>1</sup> The popularity of homeownership may stem from the amenities and financial benefits that are associated with ownership. For example, on the financial side, owning a home protects households against volatility in rental prices and may help them build wealth as they repay their mortgage.<sup>2</sup> Historically, we have seen disparities in homeownership across racial and ethnic groups, and these disparities are an important dimension of racial inequality in the United States.<sup>3</sup>

1. A 2014 survey indicated that over 90 percent of young renters reported that they intended to purchase a home in the future. See Fannie Mae (2014), *Fannie Mae National Housing Survey: What Younger Renters Want and the Financial Constraints They See* (Washington: Fannie Mae, May), [www.fanniemae.com/resources/file/research/housingsurvey/pdf/nhsmay2014presentation.pdf](http://www.fanniemae.com/resources/file/research/housingsurvey/pdf/nhsmay2014presentation.pdf).

2. See Todd Sinai and Nicholas S. Souleles (2005), "Owner-Occupied Housing as a Hedge against Rent Risk," *The Quarterly Journal of Economics*, vol. 120 (2), pp. 763–89; see also David Laibson (1997), "Golden Eggs and Hyperbolic Discounting," *Quarterly Journal of Economics*, vol. 112 (2), pp. 443–78. Of course, as the financial crisis made clear, homeownership carries risks as well. For example, highly leveraged homeowners are at risk of negative equity if house prices decline, which tends to impede mobility; see Fernando Ferreira, Joseph Gyourko, and Joseph Tracy (2010), "Housing Busts and Household Mobility," *Journal of Urban Economics*, vol. 68 (July), pp. 34–45.

3. Following standard practice, the homeownership rate is calculated here as the fraction of households that own their home. Thus, trends in household formation influence trends in the homeownership rate, and declining household formation in recent years has helped support the homeownership rate. See Andrew Paciorek (2016), "The Long and Short of Household Formation," *Real Estate Economics*, vol. 44 (1), pp. 7–40.

### A. Homeownership rates, by race and ethnicity



NOTE: The data are every 10 years through 2000, except 1950; after 2000, the data are for 2006, 2009, 2012, and 2015. Persons whose ethnicity is identified as Hispanic or Latino may be of any race.

SOURCE: Department of Commerce, Bureau of the Census.

Nationally representative data from 1900 through 2015 indicate that the overall homeownership rate rose sharply from 1940 to 1960 (figure A).<sup>4</sup> Research suggests that this surge in homeownership reflected a combination of factors, including the postwar economic boom and an easing of terms for mortgage credit (such as reduced down payment requirements and longer terms to maturity) through government-backed lending programs run by the Federal Housing Administration and the Veterans Administration.<sup>5</sup> The homeownership rate then edged up slightly further, on net, between 1960 and 2006. However, since the onset of the housing crash and the financial crisis in 2007, the homeownership rate has declined as foreclosures became elevated for several years and first-time homebuying dropped and remained subdued.<sup>6</sup>

These post-crisis declines in homeownership have been similar for white, black, and Hispanic households and somewhat smaller for Asian households.<sup>7</sup> Thus, the large gaps between the homeownership rates of white households and those of black and Hispanic households have held steady, while the smaller gap between white and Asian households has narrowed slightly. Perhaps the most striking feature of the data is the persistence of the black–white homeownership gap, which has measured about 25 to 30 percentage points throughout the past 115 years. Potential reasons for this persistence will be discussed shortly.

The likelihood of owning one's home rises with age. Thus, the aging of the U.S. population contributed to increasing homeownership before 2006 and would

4. The data are decennial census data from 1900 through 2000 as well as American Community Survey (ACS) data from 2006, 2009, 2012, and 2015. For individual-level census and ACS data, see Steven Ruggles, Katie Genadek, Ronald Goeken, Josiah Grover, and Matthew Sobek (2015), *Integrated Public Use Microdata Series: Version 6.0* [machine-readable database] (Minneapolis: University of Minnesota). The ACS has been conducted annually by the U.S. Census Bureau since 2000. Data on homeownership are not available in the 1950 census data.

5. See Daniel K. Fetter (2014), "The Twentieth-Century Increase in U.S. Home Ownership: Facts and Hypotheses," in Eugene N. White, Kenneth Snowden, and Price Fishback, eds., *Housing and Mortgage Markets in Historical Perspective* (Chicago: University of Chicago Press).

6. See Neil Bhutta (2015), "The Ins and Outs of Mortgage Debt during the Housing Boom and Bust," *Journal of Monetary Economics*, vol. 76, pp. 284–98.

7. Households are classified by race and ethnicity according to the race and ethnicity of the household head, defined here as either the survey respondent or the spouse of the respondent if older. The Hispanic ethnicity and race categories are not mutually exclusive. Some individuals are, for example, both Hispanic and white. The Asian category includes Pacific Islanders. Homeownership rates for Hispanic and Asian households are not shown before 1980 because, prior to 1980, Hispanic status was not asked about directly and the Asian population was quite small.

have caused the homeownership rate to continue rising after 2006, all else being equal. Examining the data separately by age group reveals homeownership trends that differ from overall averages, with stronger declines in homeownership observed for young and middle-aged households. For example, among households headed by a person 30 to 39 years old, homeownership rates fell more than 10 percentage points between 2006 and 2015 for all major races and ethnicities (figure B).<sup>8</sup> For both white and black households in this age range, the homeownership rate peaked in 1980, much earlier than the overall national average; by 2015, it stood well below its level in 1960. Over the past century, the black–white homeownership gap has actually widened for households in this age range.

In light of the gains in education, income, and access to credit and housing over the long term for minorities in the United States, the persistence of the black–white gap is surprising. A considerable amount of academic research has sought to better understand differences in homeownership rates across racial and ethnic groups.<sup>9</sup> Many factors have been found to influence the likelihood of homeownership, and

some of these may have had offsetting effects on the black–white gap. For example, from 1940 to 1960, the migration of many black families from the South to northern central cities (where owning a home was less likely regardless of race) tended to offset the positive effects on the homeownership rate from gains in income and education.<sup>10</sup>

In more recent decades, the relative rise in the fraction of black households headed by a single parent may have offset factors that otherwise would have generated increases in homeownership rates, including the introduction and enforcement of anti-discrimination laws, such as the Equal Credit Opportunity Act and the Fair Housing Act. Research on the black–white and Hispanic–white gaps indicates that a large portion of these gaps in recent years can be attributed to socioeconomic differences—such as age, income, and family structure—across groups.<sup>11</sup> That said, some of the overall gap is not explainable on the basis of those variables and could reflect other factors such as location and housing preferences; it also could reflect continued discrimination in housing and credit markets.<sup>12</sup> Finally, recent research has also documented larger differences in credit scores between whites and minorities than can be explained by income disparities; thus, the tighter mortgage credit environment that prevails today relative to a dozen or more years ago could cause the homeownership gap to widen in the near term.<sup>13</sup>

8. For more complete data on homeownership rates by age since 1900, see Laurie Goodman, Rolf Pendall, and Jun Zhu (2015), *Headship and Homeownership: What Does the Future Hold?* (Washington: Urban Institute, June), [www.urban.org/sites/default/files/2000257-headship-and-homeownership-what-does-the-future-hold.pdf](http://www.urban.org/sites/default/files/2000257-headship-and-homeownership-what-does-the-future-hold.pdf).

9. For a review of the literature, see Donald R. Haurin, Christopher E. Herbert, and Stuart S. Rosenthal (2007), “Homeownership Gaps among Low-Income and Minority Households,” *Cityscape*, vol. 9 (2), pp. 5–52.

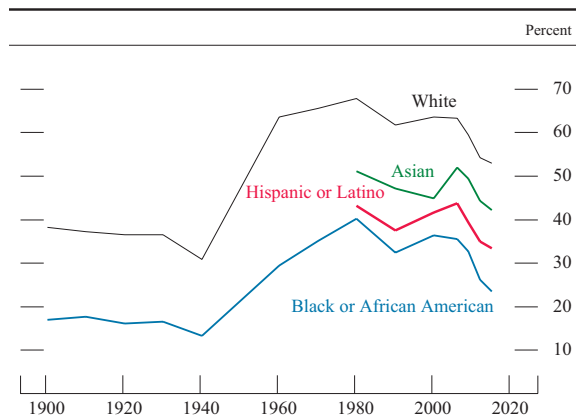
10. See William J. Collins and Robert A. Margo (2001), “Race and Home Ownership: A Century-Long View,” *Explorations in Economic History*, vol. 38 (January), pp. 68–92.

11. See Stuart A. Gabriel and Stuart S. Rosenthal (2005), “Homeownership in the 1980s and 1990s: Aggregate Trends and Racial Gaps,” *Journal of Urban Economics*, vol. 57 (January), pp. 101–27; and Eric Fesselmeier, Kien T. Le, and Kiat Ying Seah (2012), “A Household-Level Decomposition of the White–Black Homeownership Gap,” *Regional Science and Urban Economics*, vol. 42 (January), pp. 52–62.

12. See Kerwin Kofi Charles and Erik Hurst (2002), “The Transition to Home Ownership and the Black–White Wealth Gap,” *Review of Economics and Statistics*, vol. 84 (May), pp. 281–97.

13. See Neil Bhutta and Daniel Ringo (2016), “Credit Availability and the Decline in Mortgage Lending to Minorities after the Housing Boom,” FEDS Notes (Washington: Board of Governors of the Federal Reserve System, September 29), <https://www.federalreserve.gov/econresdata/notes/feds-notes/2016/credit-availability-and-the-decline-in-mortgage-lending-to-minorities-after-the-housing-boom-20160929.html>. For additional research on heightened credit score thresholds in recent years, see Steven Laufer and Andrew Paciorek (2016), “The Effects of Mortgage Credit Availability: Evidence from Minimum Credit Score Lending Rules,” Finance and Economics Discussion Series 2016-098 (Washington: Board of Governors of the Federal Reserve System, December), <https://www.federalreserve.gov/econresdata/feds/2016/files/2016098pap.pdf>.

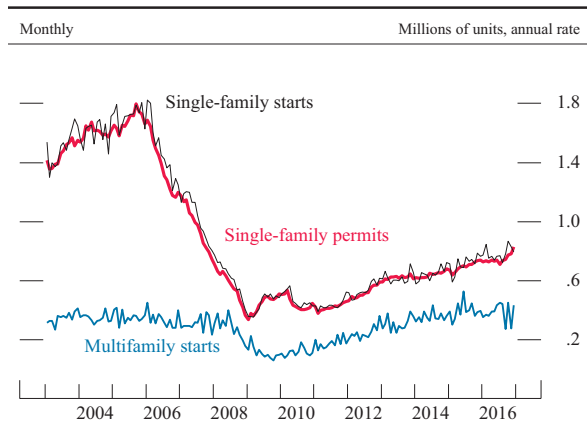
**B. Homeownership rates, by race and ethnicity, for households headed by persons aged 30 to 39**



NOTE: The data are every 10 years through 2000, except 1950; after 2000, the data are for 2006, 2009, 2012, and 2015. Persons whose ethnicity is identified as Hispanic or Latino may be of any race.

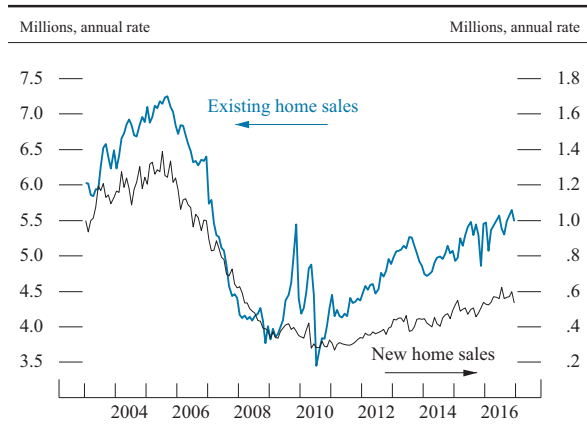
SOURCE: Department of Commerce, Bureau of the Census.

19. Private housing starts and permits



NOTE: The data extend through December 2016.  
SOURCE: Department of Commerce, Bureau of the Census.

20. New and existing home sales



NOTE: The data extend through December 2016. New home sales includes only single-family sales. Existing home sales includes single-family, condo, townhome, and co-op sales.  
SOURCE: For new 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 November, and the mortgage rate data are weekly through February 9, 2017. 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.

Homebuying and residential construction have been supported by low interest rates and ongoing easing of credit standards for mortgages. Banks indicated in the October 2016 Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS) that they eased standards on several categories of residential home purchase loans.<sup>1</sup> Even so, mortgage credit is still relatively difficult to access for borrowers with low credit scores, harder-to-document income, or high debt-to-income ratios. Although mortgage rates moved up from their all-time low levels over the second half of last year, they remain quite low by historical standards, and, consequently, housing affordability remains favorable (figure 21).

**Business investment may be turning up after a period of surprising weakness**

Real outlays for business investment—that is, private nonresidential fixed investment—were generally weak in 2016 but posted larger gains toward the end of the year (figure 22). Last year’s weakness occurred despite moderate increases in aggregate demand and generally favorable financing conditions, and it was widespread across categories of equipment investment. Investment in equipment and intangibles moved down over most of the year, likely reflecting the effects of the combination of low oil prices, weak export demand, and a muted longer-run demand outlook among businesses. Although such declines are unusual outside of a recession, spending on these items did turn up in the fourth quarter. Investment in drilling and mining structures, which had been falling sharply since the drop in oil prices in 2014, fell further through most of 2016 but seems to be bottoming out. Outside of the energy sector, investment in nonresidential structures increased moderately in 2016. Finally, after having been subdued for much of 2016, a widespread set of business sentiment indicators improved notably near the end of last year.

1. The SLOOS is available on the Board’s website at <https://www.federalreserve.gov/boarddocs/snloansurvey>.

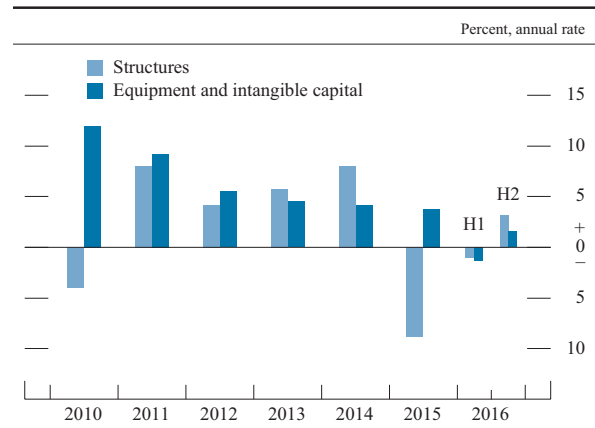
### Financing conditions for nonfinancial firms have generally remained favorable

Nonfinancial businesses have continued to raise funds through bond issuance and bank loans, albeit at a somewhat slower pace than in the first half of 2016 (figure 23). The pace of such borrowing was supported in part by continued low interest rates: Corporate bond yields for speculative-grade borrowers have declined since last June, and those for investment-grade borrowers have increased but a fair bit less than those on comparable-maturity Treasury securities (figure 24). Banks indicated in the October 2016 and January 2017 SLOOS that they eased lending terms on commercial and industrial loans in the second half of the year, but that standards on such loans remained unchanged relative to earlier in 2016; banks continued to tighten standards on commercial real estate loans over the second half of last year.

### Net exports held down second-half real GDP growth

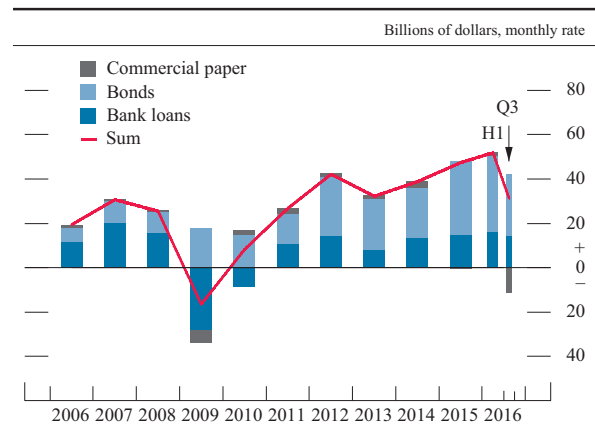
The rise in the dollar since mid-2014 and subdued foreign economic growth have continued to weigh on U.S. exports (figure 25). Nevertheless, exports increased at a moderate pace in the second half of 2016, but with much of the increase a result of rising agricultural exports. In particular, soybean exports surged in the third quarter before falling back toward a more normal level in the fourth quarter. Consistent with the stronger exchange value of the dollar, imports jumped in the second half of the year after having been about flat in the first half, when investment demand for imported equipment was very weak. Overall, real net exports were a moderate drag on real GDP growth in the second half of 2016. Although the trade balance and current account deficit narrowed slightly in the second and third quarters of 2016, the trade balance widened in the fourth quarter, as imports significantly outpaced exports (figure 26).

22. Change in real private nonresidential fixed investment



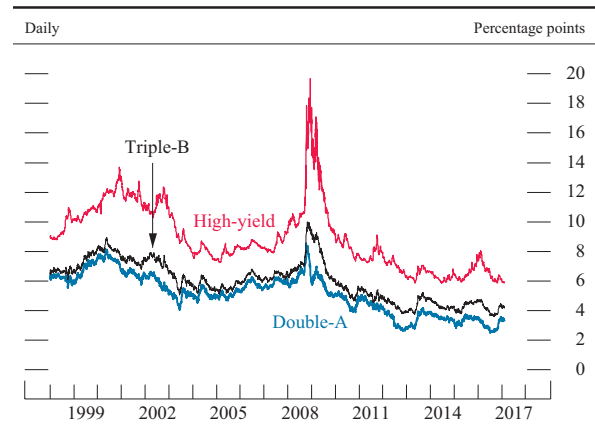
SOURCE: Department of Commerce, Bureau of Economic Analysis.

23. Selected components of net debt financing for nonfinancial businesses



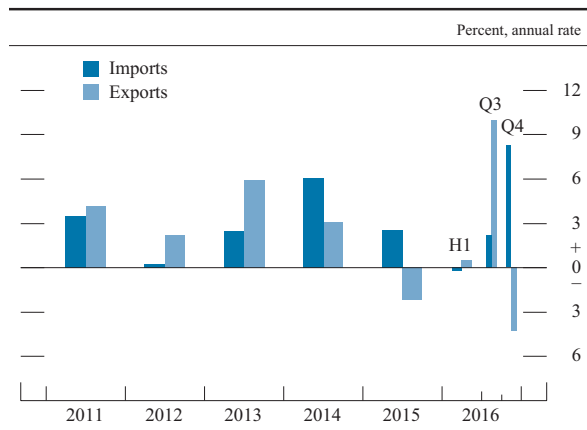
SOURCE: Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

24. Corporate bond yields, by securities rating



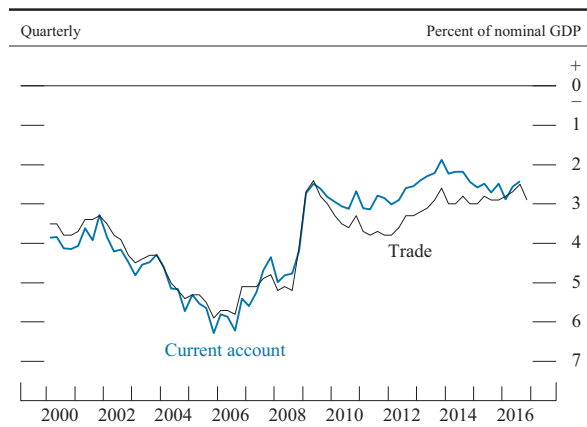
NOTE: The yields shown are yields on 10-year bonds.  
SOURCE: BofA Merrill Lynch Global Research, used with permission.

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



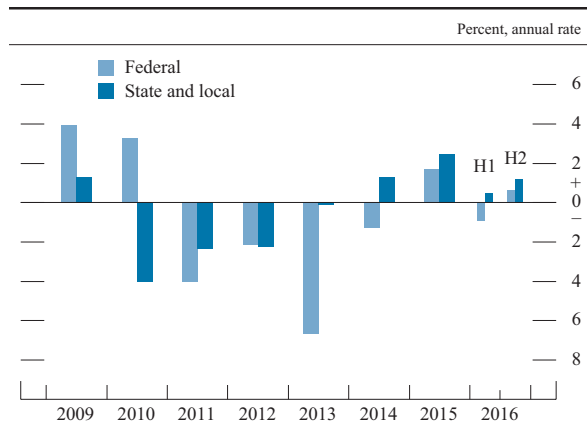
SOURCE: Department of Commerce, Bureau of Economic Analysis.

26. U.S. trade and current account balances



NOTE: The data for the current account extend through 2016:Q3. GDP is gross domestic product.  
SOURCE: Department of Commerce, Bureau of Economic Analysis.

27. Change in real government expenditures on consumption and investment



SOURCE: Department of Commerce, Bureau of Economic Analysis.

**Federal fiscal policy was a roughly neutral influence on GDP growth in 2016 . . .**

After being a drag on aggregate demand during much of the expansion, discretionary changes in federal fiscal policy have had a more neutral influence over the past two years. During 2016, policy actions had little effect on taxes and transfers, and federal purchases of goods and services are little changed over this period (figure 27). The federal budget deficit increased in fiscal year 2016 to 3.2 percent of GDP from 2.4 percent in fiscal 2015. Revenues rose only 1 percent last year in nominal terms and fell as a share of GDP because of soft personal income tax revenues and a decline in corporate income tax collections. Outlays rose 5 percent, edging up as a share of GDP, owing to increases in mandatory spending and interest payments as well as a shift in the timing of some payments that ordinarily would have been made in fiscal 2017 (figure 28). The Congressional Budget Office forecasts the deficit to be about the same size (as a share of GDP) in fiscal 2017 and in the next couple of years before rising thereafter. Consequently, the ratio of debt held by the public to nominal GDP is projected to remain near its current level of 77 percent of GDP for the next couple of years and then begin to rise (figure 29).

**. . . and real purchases at the state and local level continue to increase, albeit at a tepid pace**

The fiscal conditions of most state and local governments have continued to improve, though the pace of improvement has been slower in recent quarters than it had been previously. The ongoing improvement facilitated a step-up in the average pace of employment gain in the sector to the strongest rate since 2008. At the same time, however, real investment in structures by state and local governments has declined, on net, since the first quarter of 2016 after trending up during the prior two years (figure 30). All told, total real state and local purchases rose anemically in 2016. On the other side of the ledger,



revenue growth was subdued overall, with little growth in tax collections at the state level but moderate gains at the local level.

### Financial Developments

#### The expected path for the federal funds rate over the next several years steepened

Against the backdrop of continued strengthening in the labor market and an increase in inflation over the course of 2016, the path of the federal funds rate implied by market quotes on interest rate derivatives has moved up, on net, since the middle of last year. Following the U.S. elections in November, the expected policy path in the United States steepened significantly, apparently reflecting investors' expectations of a more expansionary fiscal policy. Meanwhile, market-based measures of uncertainty about the policy rate approximately one to two years ahead also increased, on balance, suggesting that some of the firming in market rates may reflect a rise in term premiums.

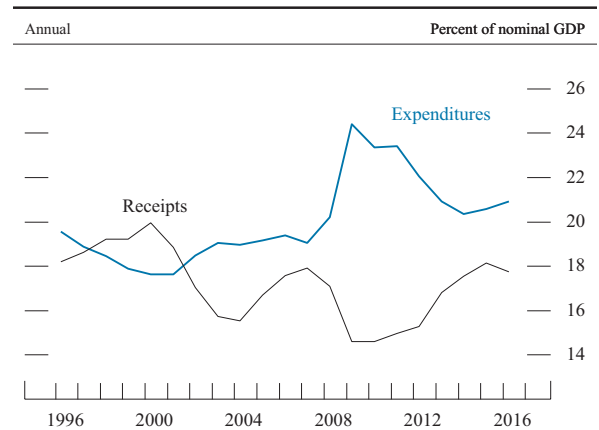
Survey-based measures of the expected path of policy also moved up in recent months. In the Survey of Primary Dealers that was conducted by the Federal Reserve Bank of New York just prior to the January 2017 FOMC meeting, the median dealer expected two rate hikes in 2017 and three rate hikes in 2018 as the most likely outcome.<sup>2</sup>

#### U.S. nominal Treasury yields increased considerably

After dropping significantly during the first half of 2016 and reaching near-historical lows in the aftermath of the U.K. referendum on exit from the European Union, or Brexit, in June, yields on medium- and longer-term nominal Treasury securities rebounded strongly in the second half of last year, with a substantial rise following the U.S.

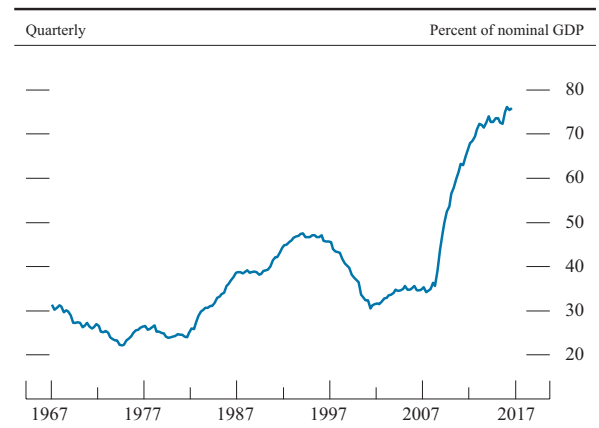
2. The Federal Reserve Bank of New York's Survey of Primary Dealers is available at [https://www.newyorkfed.org/markets/primarydealer\\_survey\\_questions.html](https://www.newyorkfed.org/markets/primarydealer_survey_questions.html).

#### 28. Federal receipts and expenditures



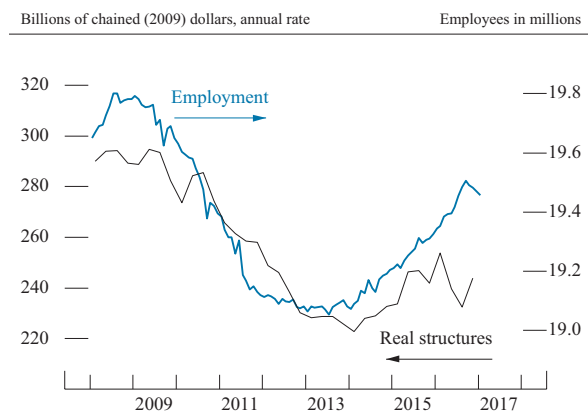
NOTE: The receipts and expenditures data are on a unified-budget basis and are for fiscal years (October through September); gross domestic product (GDP) data are for the four quarters ending in Q3.  
SOURCE: Office of Management and Budget.

#### 29. Federal government debt held by the public



NOTE: The data extend through 2016:Q3. The data for gross domestic product (GDP) are at an annual rate. Federal debt held by the public equals federal debt less Treasury securities held in federal employee defined benefit retirement accounts, evaluated at the end of the quarter.  
SOURCE: For GDP, Department of Commerce, Bureau of Economic Analysis; for federal debt, Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States."

30. State and local employment and structures investment



NOTE: The employment data are monthly, and the structures data are quarterly.  
 SOURCE: For employment data, Department of Labor, Bureau of Labor Statistics; for structures data, Department of Commerce, Bureau of Economic Analysis.

31. 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.

elections (figure 31). Market participants have attributed the increase in yields following the elections primarily to expectations of a more expansionary fiscal policy. The boost in longer-term nominal yields in recent months reflects roughly equal increases in real yields and inflation compensation. Consistent with the changes in Treasury yields, yields on 30-year agency mortgage-backed securities (MBS)—an important determinant of mortgage interest rates—increased significantly over the second half of the year (figure 32). However, Treasury and MBS yields remain quite low by historical standards.

**Broad equity price indexes increased notably . . .**

U.S. equity markets were volatile around the Brexit vote in the United Kingdom but operated without disruptions. Broad equity price indexes have increased notably since late June, with a sizable portion of the gain occurring after the U.S. elections in November (figure 33). Reportedly, equity prices have been supported in part by the perception that corporate tax rates may be reduced. Stock prices of banks, which tend to benefit from a steepening in the yield curve, outperformed the broader market. Moreover, market participants pointed to expectations of changes in the regulatory environment as a factor contributing to the outperformance of bank stocks. By contrast, stock prices of firms that tend to benefit from lower interest rates, such as utilities, declined moderately on net. The implied volatility of the S&P 500 index—the VIX—fell, ending the period close to the bottom of its historical range. (For a discussion of financial stability issues over this same period, see the box “[Developments Related to Financial Stability.](#)”)

**. . . while risk spreads on corporate bonds narrowed**

Bond spreads in the nonfinancial corporate sector declined significantly across the credit spectrum, suggesting increased investor confidence in the outlook for the corporate

sector since the middle of last year. Declines in spreads were particularly large for firms in the energy sector, likely reflecting improved prospects for U.S. producers as they continue to increase efficiency and benefit from higher prices.

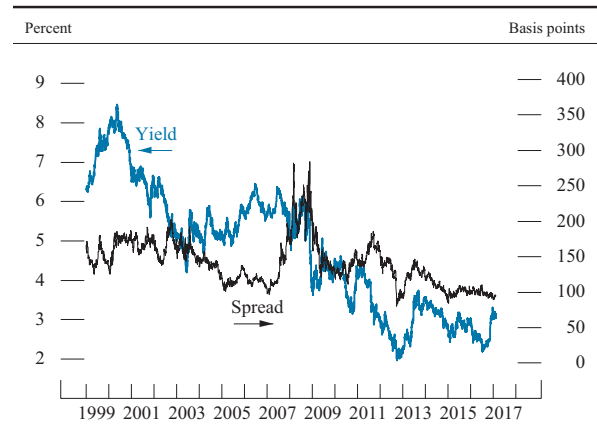
**Treasury market functioning and liquidity conditions in the mortgage-backed securities market were generally stable**

Indicators of Treasury market functioning remained broadly stable over the second half of 2016 and early 2017. A variety of liquidity metrics—including bid-asked spreads and bid sizes—have displayed minimal signs of liquidity pressures overall, with a modest reduction in liquidity following the U.S. elections. In addition, Treasury auctions generally continued to be well received by investors. Liquidity conditions in the agency MBS market were also generally stable.

**The compliance deadline for money market mutual fund reform passed in mid-October with no market disruption**

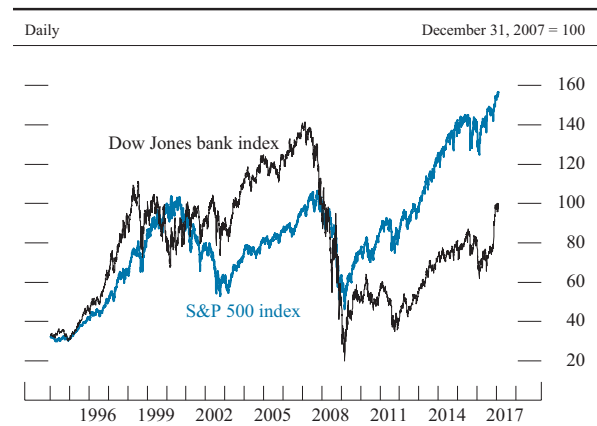
In the weeks leading up to the October 14, 2016, deadline for money market mutual funds (also referred to as money market funds, or MMFs) to comply with a variety of regulatory reforms, shifts in investments from prime to government MMFs were substantial. However, the transition was smooth and without any market disruptions. Overnight Eurodollar deposit volumes fell significantly and have remained low as prime funds pulled back from lending in this market. Meanwhile, the rise in total assets of government funds appeared to contribute to modestly higher levels of take-up at the overnight reverse repurchase agreement (ON RRP) facility through late 2016. Overnight money market rates were little affected, although the spread between the three-month LIBOR (London interbank offered rate) and the OIS (overnight index swap) rate has remained elevated, likely reflecting MMFs’ reduced appetite for term lending.

32. Yield and spread on agency mortgage-backed securities



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

33. Equity prices



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

## Developments Related to Financial Stability

Financial vulnerabilities in the U.S. financial system overall have continued to be moderate since mid-2016. U.S. banks are well capitalized and have sizable liquidity buffers. Nonfinancial corporate business leverage has remained elevated by historical standards, and household borrowing has increased modestly, leaving the household debt-to-income ratio about unchanged. On balance, the ratio of aggregate nonfinancial credit to gross domestic product (GDP) has moved up a little in recent years to about its level in the mid-2000s but remains well below its recent peak. Valuation pressures in some asset classes have been rising, particularly late last year.

Vulnerabilities stemming from leverage in the financial sector appear low. Regulatory capital has remained at historically high levels for most large domestic banks, and all 33 firms participating in the Federal Reserve's supervisory stress tests for 2016 were able to maintain capital ratios above required minimums through the severely adverse recession scenario.<sup>1</sup> Moreover, market-based measures of leverage for domestic banks have decreased somewhat since November. However, valuations of many of the largest foreign banks remain depressed. Despite the settlement on December 23 between Deutsche Bank and the U.S. Department of Justice and some progress toward addressing problems in the Italian banking sector, several large European financial institutions have continued to be vulnerable to unexpected developments. Available data suggest that the leverage of nonbank financial institutions was relatively stable in the second half of 2016.

On balance, vulnerabilities associated with liquidity and maturity transformation are also somewhat below their longer-run average. The reliance of large bank holding companies on short-term funding remains subdued, and their holdings of high-quality liquid assets are robust, owing in part to the implementation of the Liquidity Coverage Ratio. Money market mutual fund (also referred to as money market fund, or MMF) reforms designed to reduce the advantages associated with being the first to exit a fund in times of financial stress led to large declines in prime MMF assets under management, with most of these funds migrating to government MMFs. While the resulting smaller size of prime funds and the new regulations should make the industry more stable, the longer-term effect will depend on the degree to which such activity migrates to other types of short-term investment vehicles that may be subject to similar fragilities.

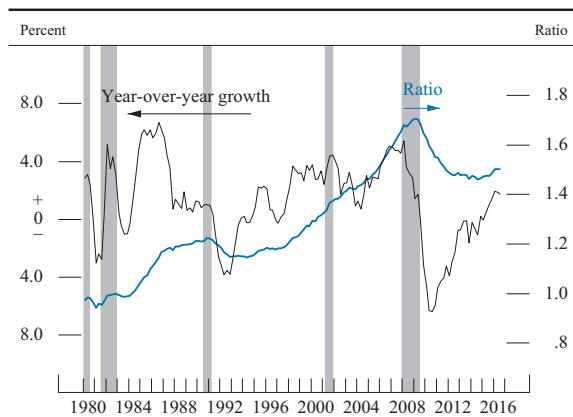
1. The 2016 supervisory stress-test methodology and results are available on the Board's website at <https://www.federalreserve.gov/bankinfo/stress-tests/2016-supervisory-stress-test-results.htm>.

Asset valuation pressures have increased, on balance, since mid-2016, along with several indicators of investors' risk appetite. Although yields on Treasury securities and term premiums increased as market expectations about future growth shifted higher in the fall, they both remain low. In addition, the spread of yields on corporate bonds over those on comparable-maturity Treasury securities narrowed. Estimates of risk premiums in equity markets also declined. Outstanding riskier corporate debt edged down over the past year, but gross issuance of leveraged loans was strong and the share of bond issuance rated B or below remained in the fourth quarter at the high end of its range over the past few years. Commercial real estate (CRE) valuations, which have been an area of growing concern over the past year, rose further, with property prices continuing to climb and capitalization rates decreasing to historically low levels. While CRE debt remains modest relative to the overall size of the economy and the tightening in bank lending standards for CRE loans in the second half of last year may reflect some reduction in the appetite for CRE lending, the heightening of valuation pressures may leave some smaller banks vulnerable to a sizable CRE price decline. Also, residential home prices continued to rise briskly through November. Although most measures of residential valuation have moved up somewhat, they are still only modestly above the levels that would be predicted, given rents and investment costs. The results of the Federal Reserve's 2017 stress tests, for which the scenarios were released on February 3, will help gauge the vulnerability of large U.S. banks to all of these asset valuation pressures.

Vulnerabilities stemming from private nonfinancial-sector borrowing remain moderate. The credit-to-GDP ratio for the corporate sector is elevated after several years of rapid growth. Despite this high leverage, interest-expense ratios are low by historical standards even among higher-risk firms, as are measures of expected default based on accounting and stock return data, especially outside of the oil sector. Turning to households, debt growth was modest through the third quarter of 2016, and the debt-to-income ratio has changed little over the past few years. Except for a recent increase in early-payment delinquencies in subprime auto loans—a small segment of overall indebtedness—broad indicators of household solvency have remained within historical norms. On balance, the private nonfinancial-sector credit-to-GDP ratio is far below the levels seen late last decade and lies near its level in the mid-2000s (figure A).

Last fall, the Federal Reserve Board finalized its framework for setting the Countercyclical Capital Buffer

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



NOTE: The data on the credit-to-GDP ratio and its year-over-year growth are quarterly and extend through 2016:Q3. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.

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

(CCyB) and later voted to maintain the CCyB at zero.<sup>2</sup> In forming its view about the appropriate size of the U.S. CCyB, the Board intends to monitor a wide range of financial and economic indicators and consider their implications for financial system vulnerabilities, including but not limited to asset valuation pressures, risk appetite, leverage in the financial and nonfinancial sectors, and maturity and liquidity transformation in the financial sector. The decision to maintain the CCyB at zero in part reflected an assessment that vulnerabilities associated with financial-sector leverage were at the lower end of their historical ranges.

As part of its effort to improve the resilience of financial institutions and overall financial stability, the Board has also taken several further regulatory steps. Among those steps is that the Board finalized a rule that would impose total loss-absorbing capacity and long-term debt requirements on U.S. global systemically important bank holding companies (G-SIBs) and on the U.S. operations of certain foreign G-SIBS.<sup>3</sup> The final rule would require each covered firm to maintain a

2. See Board of Governors of the Federal Reserve System (2016), "Federal Reserve Board Announces It Has Voted to Affirm Countercyclical Capital Buffer (CCyB) at Current Level of 0 Percent," press release, October 24, <https://www.federalreserve.gov/newsevents/press/bcreg/20161024a.htm>.

3. See Board of Governors of the Federal Reserve System (2016), "Federal Reserve Board Adopts Final Rule to Strengthen the Ability of Government Authorities to Resolve in Orderly Way Largest Domestic and Foreign Banks Operating in the United States," press release, December 15, <https://www.federalreserve.gov/newsevents/press/bcreg/20161215a.htm>.

minimum amount of unsecured long-term debt that could be converted into equity in a possible resolution of that firm, thereby recapitalizing the firm without putting taxpayer funds at risk and diminishing the threat that its failure would pose to financial stability.

In addition, the Board completed an extensive review of its statutory stress-test and Comprehensive Capital Analysis and Review (CCAR) programs and made some related modifications to the rules associated with those programs for the 2017 cycle.<sup>4</sup> Among other changes, the Board removed certain large, noncomplex firms from the qualitative assessment of the CCAR.<sup>5</sup> Moreover, the Board, together with the other federal banking agencies, issued an advance notice of proposed rulemaking, inviting public comment on a set of potential enhanced cybersecurity risk-management and resilience standards that would apply to depository institutions and regulated holding companies with over \$50 billion in assets and to certain financial market infrastructure companies.<sup>6</sup> The standards would be tiered, with an additional set of higher standards for systems that provide key functionality to the financial sector.

The Board and the Federal Deposit Insurance Corporation (FDIC) also have continued to actively engage in the resolution-planning process with the largest banks. As part of that process, the Board and the FDIC announced that Bank of America, BNY Mellon, JPMorgan Chase, and State Street adequately remediated deficiencies in their 2015 resolution plans. The two agencies also announced that Wells Fargo did not adequately remedy all of its deficiencies and will be subject to restrictions on certain activities until the deficiencies are remedied.<sup>7</sup>

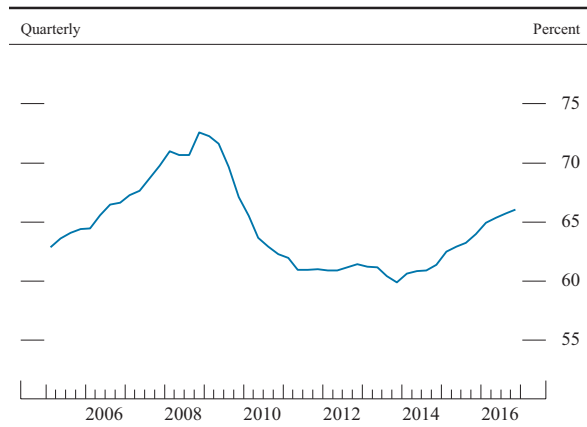
4. See Daniel K. Tarullo (2016), "Next Steps in the Evolution of Stress Testing," speech delivered at the Yale University School of Management Leaders Forum, New Haven, Conn., September 26, <https://www.federalreserve.gov/newsevents/speech/tarullo20160926a.htm>.

5. See Board of Governors of the Federal Reserve System (2017), "Federal Reserve Board Announces Finalized Stress Testing Rules Removing Noncomplex Firms from Qualitative Aspect of CCAR Effective for 2017," press release, January 30, <https://www.federalreserve.gov/newsevents/press/bcreg/20170130a.htm>.

6. See Board of Governors of the Federal Reserve System, Office of the Comptroller of the Currency, and Federal Deposit Insurance Corporation (2016), "Agencies Issue Advanced Notice of Proposed Rulemaking on Enhanced Cyber Risk Management Standards," joint press release, October 19, <https://www.federalreserve.gov/newsevents/press/bcreg/20161019a.htm>.

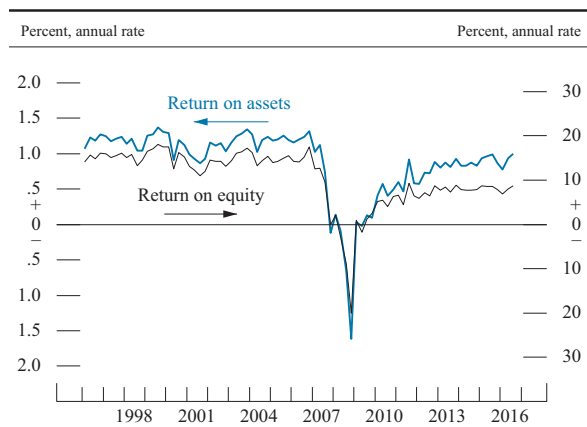
7. See Board of Governors of the Federal Reserve System and Federal Deposit Insurance Corporation (2016), "Agencies Announce Determinations on October Resolution Plan Submissions of Five Systemically Important Domestic Banking Institutions," joint press release, December 13, <https://www.federalreserve.gov/newsevents/press/bcreg/20161213a.htm>.

34. 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.

35. Profitability of bank holding companies



NOTE: The data, which are seasonally adjusted, are quarterly and extend through 2016:Q3.

SOURCE: Federal Reserve Board, Form FR Y-9C, Consolidated Financial Statements for Bank Holding Companies.

### Bank credit continued to expand, and bank profitability improved

Aggregate credit provided by commercial banks continued to grow at a solid pace in the second half of 2016 (figure 34). The expansion in bank credit was driven by strong growth in core loans coupled with an increase in banks’ holdings of securities. Measures of bank profitability improved since the middle of last year but remained below their historical averages (figure 35).

### Municipal bond markets continued to function smoothly

Credit conditions in municipal bond markets have generally remained stable since late June. Over that period, the MCDX—an index of credit default swap spreads for a broad portfolio of municipal bonds—decreased moderately, while yield spreads on 20-year general obligation municipal bonds over comparable-maturity Treasury securities were little changed on balance. The Puerto Rico Oversight, Management, and Economic Stability Act was passed into law in late June, providing the commonwealth with a clearer path toward debt restructuring. Although Puerto Rico missed a small amount of debt payments on general obligation bonds in August, this default appeared to have had no significant effect on the broader municipal bond market.

## International Developments

### Foreign financial market conditions improved despite global political uncertainties

Financial market conditions in both the advanced foreign economies (AFEs) and the emerging market economies (EMEs) have generally improved since June. In the AFEs, increasing distance from the Brexit vote, better-than-expected economic data for Europe, and the continuation of accommodative monetary policies by advanced-economy central banks have

contributed to improved risk sentiment. Advanced-economy bond yields reversed their downward trend seen in the first half of the year and increased notably following the U.S. elections, in part on expectations of a more expansionary U.S. fiscal policy (figure 36).

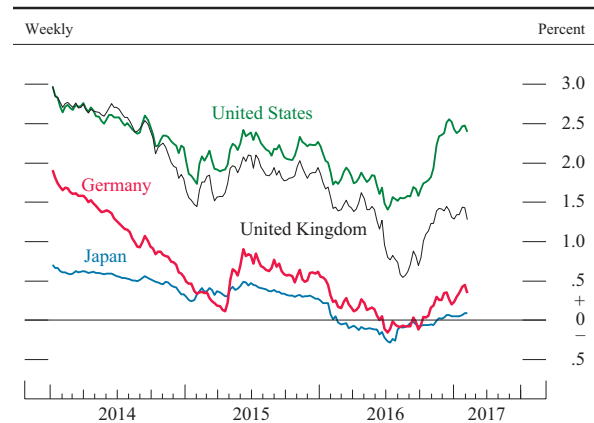
Equity prices in the AFEs have generally risen since June, with financial stocks outperforming broader stock indexes as third-quarter earnings largely beat expectations, several major risk events passed, and the steepening of yield curves was expected to boost profits going forward (figure 37). Despite some widening of euro-area corporate spreads in the last months of 2016, corporate credit conditions in the advanced foreign economies have remained accommodative, with the continuation of corporate asset purchase programs by several AFE central banks and with low corporate spreads.

In EMEs, equities have risen significantly and sovereign yield spreads have narrowed since June, supported in part by higher commodity prices. Financial conditions did tighten briefly following the U.S. elections, with increased capital outflows and wider sovereign spreads, on concerns that higher global interest rates, as well as the possibility of more protectionist trade policies, would weigh on EME growth (figure 38). However, the favorable risk sentiment seen in the summer and early fall of 2016 resumed by the end of the year for most EMEs.

**After depreciating slightly in the first half of last year, the dollar strengthened in the second half**

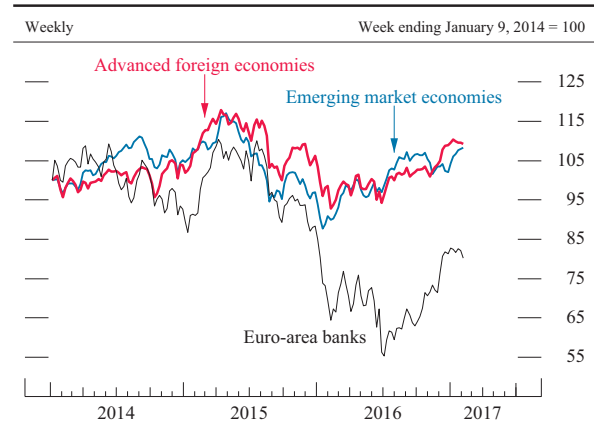
The dollar has strengthened since June, with the broad dollar index—a measure of the trade-weighted value of the dollar against foreign currencies—rising about 4 percent on balance (figure 39). Much of this strengthening of the U.S. dollar reflects the combined influences of the large depreciation of the Mexican peso, expectations of fiscal and trade policy changes after the U.S. elections, and

36. 10-year nominal benchmark yields in selected advanced economies



NOTE: The data are weekly averages of daily data and extend through February 9, 2017. SOURCE: Bloomberg.

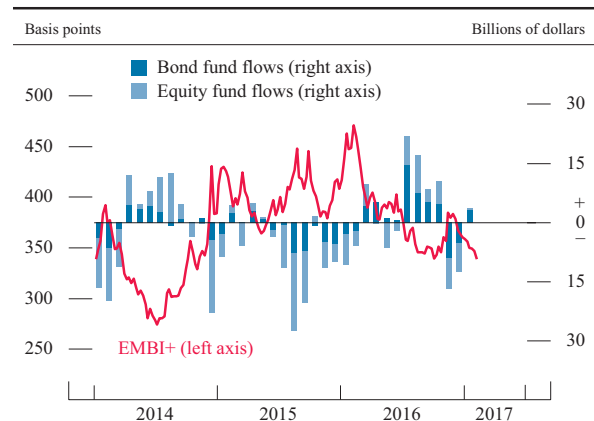
37. Equity indexes for selected foreign economies



NOTE: The data are weekly averages of daily data and extend through February 9, 2017.

SOURCE: For advanced foreign economies, MSCI EAFE Index via Thomson Reuters Datastream; for emerging market economies, MSCI Emerging Markets Index via Thomson Reuters Datastream; for euro-area banks, Dow Jones Euro STOXX Bank Index via Bloomberg. (For Dow Jones Indices licensing information, see the note on the Contents page.)

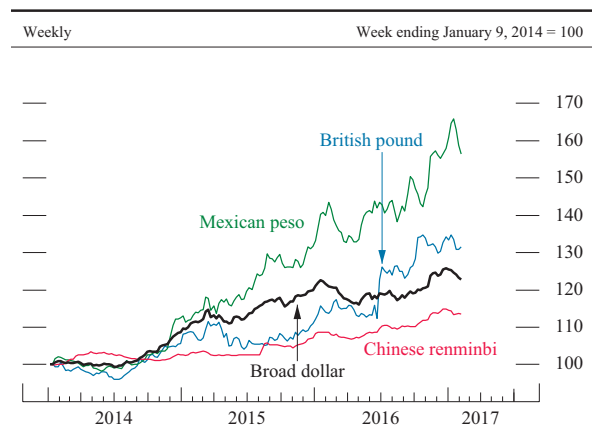
38. Emerging market mutual fund flows and spreads



NOTE: The EMBI+ data are weekly averages of daily data and extend through February 9, 2017. The EPFR data are monthly sums of weekly data. The fund flows data exclude funds located in China.

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

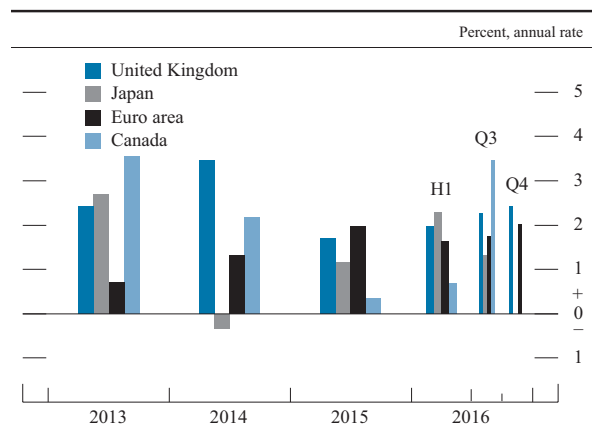
## 39. U.S. dollar exchange rate indexes



NOTE: The data, which are in foreign currency units per dollar, are weekly averages of daily data and extend through February 9, 2017.

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

## 40. Real gross domestic product growth in selected advanced foreign economies



NOTE: The data for the United Kingdom incorporate the flash estimate for 2016:Q4. The data for the euro area incorporate the preliminary flash estimate for 2016:Q4. The data for Japan and Canada extend through 2016:Q3.

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

market expectations of tighter Federal Reserve monetary policy. The Chinese renminbi also weakened notably against the dollar, on net, as capital outflows from China picked up; Chinese authorities tightened capital controls in response.

### In general, AFE economic growth was moderate and inflation remained subdued

In Canada, economic growth picked up sharply in the third quarter, following a contraction in the previous quarter, as oil extraction recovered from the disruptions caused by wildfires in May (figure 40). In contrast, economic growth in Japan in the second and third quarters slowed after a strong first quarter, returning to a more typical moderate pace. Euro-area growth firmed in the second half, and, in the United Kingdom, economic activity was resilient in the aftermath of the Brexit referendum in June. Available indicators suggest that growth in most AFEs was moderate near the end of 2016 and early this year.

Headline inflation in most AFEs increased over the second half of 2016, in part driven by higher oil prices. In the United Kingdom, the substantial sterling depreciation after the Brexit referendum also exerted upward pressure on consumer prices. Even so, core inflation readings in AFEs remained generally subdued, and headline inflation stayed below central bank targets in Canada, the euro area, Japan, and the United Kingdom (figure 41).

### AFE central banks maintained highly accommodative monetary policies

In August, the Bank of England cut its policy rate 25 basis points, announced additional purchases of government and corporate bonds, and introduced a term funding scheme. In September, the Bank of Japan committed to expanding the monetary base until inflation exceeds 2 percent in a stable manner and adopted a new policy framework aimed at controlling the yield curve by targeting short-



and long-term interest rates. In December, the European Central Bank announced an extension of the intended duration of its asset purchases through at least December 2017, albeit with a slight reduction in those purchases beginning in April 2017.

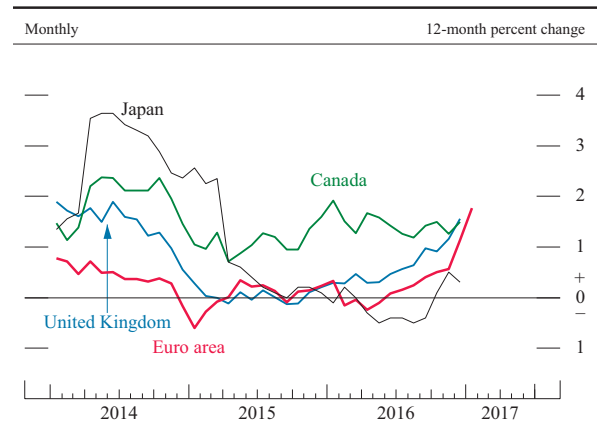
**In EMEs, Asian growth was solid . . .**

Chinese economic activity remained robust in the second half of 2016, as earlier policy easing supported stable manufacturing growth and a strong property market (figure 42). However, the property market cooled somewhat toward the end of the year following the introduction of new macroprudential measures aimed at curbing rapidly rising house prices. Elsewhere in emerging Asia, growth held steady in the third quarter but stepped down in some countries in the fourth, even though exports and manufacturing improved. And in India, a surprise mandatory exchange of large-denomination bank notes—a move aimed at battling tax evasion and corruption—has disrupted activity.

**. . . but many Latin American economies continued to struggle**

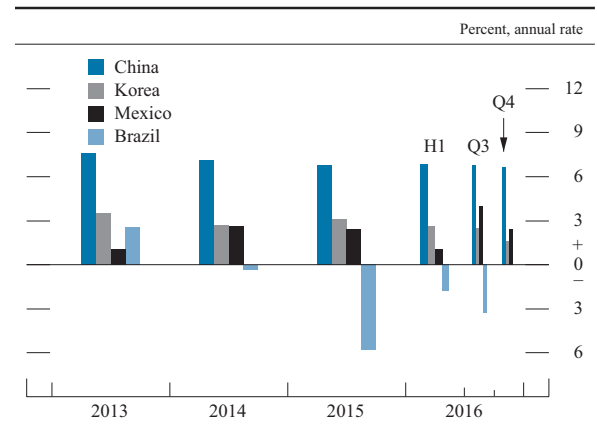
In Mexico, after considerable weakness in the first half of 2016, growth surged in the third quarter, supported in part by a recovery in exports to the United States. However, activity weakened again in the fourth quarter, as consumer and business confidence dropped. Furthermore, inflation in Mexico jumped over the second half of the year, pressured in part by the peso’s sizable depreciation, prompting the Bank of Mexico to hike its policy rate sharply. Brazil’s recession deepened in the third quarter, reflecting in part tight macroeconomic policies, although the central bank began to ease monetary policy as inflation dropped in response to the weak economy. Elsewhere in the region, activity in the third quarter was mixed; Chile’s economy rebounded, but Argentina’s GDP contracted and the crisis in Venezuela deepened.

41. Inflation in selected advanced foreign economies



NOTE: The data for the euro area incorporate the flash estimate for January 2017. The data for Canada, Japan, and the United Kingdom extend through December 2016.  
 SOURCE: For the United Kingdom, Office for National Statistics; for Japan, Ministry of International Affairs and Communications; for the euro area, Statistical Office of the European Communities; for Canada, Statistics Canada; all via Haver Analytics.

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



NOTE: The data for Mexico incorporate the flash estimate for 2016:Q4. The data for China are seasonally adjusted by Board staff. The data for Mexico, Brazil, and Korea are seasonally adjusted by their respective government agencies. The data for Brazil extend through 2016:Q3.  
 SOURCE: For China, China National Bureau of Statistics; for Korea, Bank of Korea; for Mexico, Instituto Nacional de Estadística y Geografía; for Brazil, Instituto Brasileiro de Geografia e Estatística; all via Haver Analytics.



## PART 2

### MONETARY POLICY

In December, the Federal Open Market Committee (FOMC) raised the target for the federal funds rate by  $\frac{1}{4}$  percentage point to a range of  $\frac{1}{2}$  to  $\frac{3}{4}$  percent. The FOMC's decision reflected realized and expected labor market conditions and inflation. Moreover, the decision to raise the target range was consistent with the Committee's expectation that, with gradual adjustments in the stance of monetary policy, economic activity would expand at a moderate pace, labor market conditions would strengthen somewhat further, and inflation would rise to the FOMC's 2 percent objective over the medium term. The Committee expects that economic conditions will evolve in a manner that will warrant only gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run. However, the actual path of the federal funds rate will depend on the economic outlook as informed by incoming data. In addition, the Committee anticipates reinvesting principal payments of its securities holdings until normalization of the level of the federal funds rate is well under way.

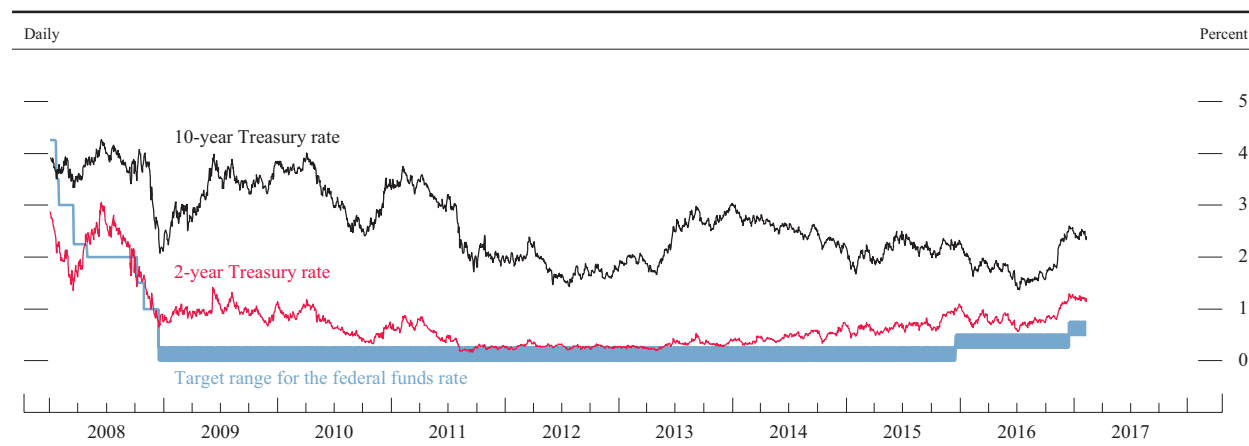
#### The FOMC raised the federal funds rate target range in December

About a year ago, in December 2015, the FOMC raised the target range for the federal funds rate after holding the range at near zero since late 2008 to support economic activity and stem disinflationary pressures in the wake of the Great Recession. At that time, the Committee judged that it had seen sufficient improvement in the labor market and was reasonably confident that inflation would move back to its 2 percent objective, which would warrant an initial increase in the federal funds rate. Through most of 2016, the Committee maintained the target range of  $\frac{1}{4}$  to  $\frac{1}{2}$  percent,

pending further evidence of continued progress toward its objectives. In December, in view of realized and expected labor market conditions and inflation, the FOMC raised the target range for the federal funds rate another  $\frac{1}{4}$  percentage point, to a range of  $\frac{1}{2}$  to  $\frac{3}{4}$  percent (figure 43).<sup>3</sup> The Committee kept that same target range at its most recent meeting, which concluded on February 1.

3. See Board of Governors of the Federal Reserve System (2016), "Federal Reserve Issues FOMC Statement," press release, December 14, <https://www.federalreserve.gov/newsevents/press/monetary/20161214a.htm>.

43. Selected interest rates



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

### Monetary policy continues to support the economic expansion

The Committee has continued to see the federal funds rate as likely to remain, for some time, below the levels that are expected to prevail in the longer run. With gradual adjustments in the stance of monetary policy, the FOMC expects that economic activity will expand at a moderate pace, labor market conditions will strengthen somewhat further, and inflation will rise to 2 percent over the medium term.

Consistent with this outlook, in the most recent Summary of Economic Projections (included as Part 3 of this report), which was compiled at the time of the December 2016 meeting, most participants projected that the appropriate level of the federal funds rate would be below its longer-run level through 2018.

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

Although the Committee has expected that economic conditions will evolve in a manner that will warrant only gradual increases in the federal funds rate, the Committee has continued to emphasize that the actual path of monetary policy will depend on the evolution of the economic outlook. In determining the timing and size of future adjustments to the target range for the federal funds rate, the Committee will assess realized and expected economic conditions relative to its objectives of maximum employment and 2 percent inflation. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments. In light of the current shortfall of inflation from 2 percent, the Committee has indicated that it will carefully monitor actual and expected progress toward its inflation goal.

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

To help maintain accommodative financial conditions, the Committee has continued its existing policy of rolling over maturing Treasury securities at auction and reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. The Federal Reserve's total assets have held steady at around \$4.5 trillion, with holdings of U.S. Treasury securities at \$2.5 trillion and holdings of agency debt and agency mortgage-backed securities at approximately \$1.8 trillion (figure 44). The Committee has for some time stated that it anticipates maintaining this policy until normalization of the level of the federal funds rate is well under way.

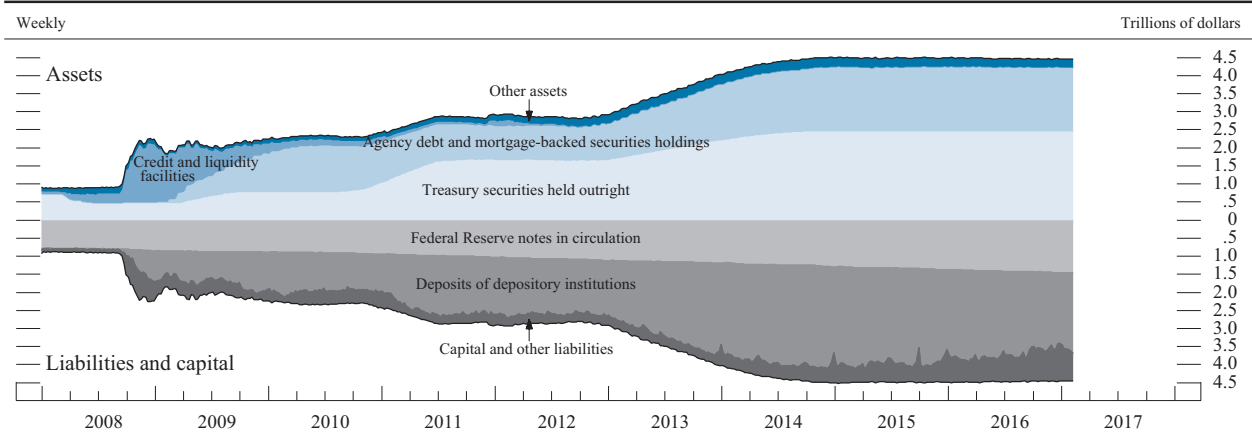
Interest income on the System Open Market Account, or SOMA, portfolio has continued to support substantial remittances to the U.S. Treasury. Preliminary results indicate that the Reserve Banks provided for payments of \$92 billion of their estimated 2016 net income to the Treasury. The Federal Reserve's remittances to the Treasury have averaged about \$80 billion a year since 2008, compared with about \$25 billion a year over the decade prior to 2008.<sup>4</sup>

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

As in December 2015, the Federal Reserve successfully raised the effective federal funds rate in December 2016 using the interest rate paid on reserve balances, together with an overnight reverse repurchase agreement

4. Total remittances include a one-time transfer of \$19.3 billion in December 2015 to reduce the aggregate Reserve Bank capital surplus to \$10 billion, as required by the Fixing America's Surface Transportation Act. See Board of Governors of the Federal Reserve System (2016), "Federal Reserve System Publishes Annual Financial Statements," press release, March 18, <https://www.federalreserve.gov/newsevents/press/other/20160317a.htm>.

## 44. Federal Reserve assets and liabilities



NOTE: "Credit and liquidity facilities" consists of primary, secondary, and seasonal credit; term auction credit; central bank liquidity swaps; support for Maiden Lane, Bear Stearns, and AIG; and other credit facilities, including the Primary Dealer Credit Facility, the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility, the Commercial Paper Funding Facility, and the Term Asset-Backed Securities Loan Facility. "Other assets" includes unamortized premiums and discounts on securities held outright. "Capital and other liabilities" includes reverse repurchase agreements, the U.S. Treasury General Account, and the U.S. Treasury Supplementary Financing Account. The data extend through February 8, 2017.

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

(ON RRP) facility.<sup>5</sup> Specifically, the Federal Reserve raised the interest rate paid on required and excess reserve balances to  $\frac{3}{4}$  percent and the ON RRP offering rate to  $\frac{1}{2}$  percent. In addition, the Board of Governors approved an increase in the discount rate (the primary credit rate) to 1.25 percent. The effective federal funds rate rose into the new range amid orderly trading conditions in money markets. Increases in interest rates in other money markets were similar to the rise in the federal funds rate following the December meeting.

5. 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, <https://www.federalreserve.gov/newsevents/press/monetary/20140917c.htm>.

The total take-up at the ON RRP facility increased modestly in the second half of 2016 as a result of higher demand by government money market mutual funds in the wake of money fund reform that took effect in mid-October.

Although the implementation of monetary policy has been smooth, the Federal Reserve has continued to test the operational readiness of other policy tools as part of prudent planning. Two operations of the Term Deposit Facility were conducted in the second half of 2016; seven-day deposits were offered at both operations with a floating rate of 1 basis point over the interest rate on excess reserves. In addition, the Open Market Desk conducted several small-value exercises solely for the purpose of maintaining operational readiness.



## PART 3

### SUMMARY OF ECONOMIC PROJECTIONS

*The following material appeared as an addendum to the minutes of the December 13–14, 2016, meeting of the Federal Open Market Committee.*

In conjunction with the Federal Open Market Committee (FOMC) meeting held on December 13–14, 2016, meeting participants submitted their projections of the most likely outcomes for real output growth, the unemployment rate, and inflation for each year from 2016 to 2019 and over the longer run.<sup>6</sup> 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, including a path for the federal funds rate and its longer-run value, and assumptions about other factors likely to affect economic outcomes. The longer-run projections represent each participant’s assessment of the value to which each variable would be expected to converge, over time, under appropriate monetary policy and in the absence of further shocks to the economy. “Appropriate monetary policy” is defined as the future path of policy that each participant deems most likely to foster outcomes for economic activity and inflation that best satisfy his or her individual interpretation of the Federal Reserve’s objectives of maximum employment and stable prices.

Most FOMC participants expected that, under appropriate monetary policy, growth in real gross domestic product (GDP) would pick up a bit next year and run at or slightly above their individual estimates of its longer-run rate through 2019. Almost all participants projected that the unemployment rate would run below their estimates of its longer-run normal level in 2017 and remain below that

level through 2019. All participants projected that inflation, as measured by the four-quarter percentage change in the price index for personal consumption expenditures (PCE), would increase over the next two years, and several expected inflation to slightly exceed the Committee’s 2 percent objective in 2018 or 2019. Table 1 and figure 1 provide summary statistics for the projections.

As shown in figure 2, almost all participants expected that the evolution of economic conditions would warrant only gradual increases in the federal funds rate to achieve and sustain maximum employment and 2 percent inflation. Many participants judged that the appropriate level of the federal funds rate in 2019 would be close to their estimates of its longer-run normal level. However, the economic outlook is uncertain, and participants noted that their economic projections and assessments of appropriate monetary policy may change in response to incoming information.

A majority of participants viewed the level of uncertainty associated with their individual forecasts for economic growth, unemployment, and inflation as broadly similar to the norms of the previous 20 years, though some participants saw uncertainty associated with their forecasts as higher than average. Most participants also judged the risks around their projections for economic activity, the unemployment rate, and inflation as broadly balanced, while several participants saw the risks to their forecasts of real GDP growth as weighted to the upside and the risks to their unemployment rate forecasts as tilted to the downside.

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

Table 1. Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents, under their individual assessments of projected appropriate monetary policy, December 2016

Variable	Median <sup>1</sup>					Central tendency <sup>2</sup>					Range <sup>3</sup>				
	2016	2017	2018	2019	Longer run	2016	2017	2018	2019	Longer run	2016	2017	2018	2019	Longer run
Change in real GDP . . . . .	1.9	2.1	2.0	1.9	1.8	1.8–1.9	1.9–2.3	1.8–2.2	1.8–2.0	1.8–2.0	1.8–2.0	1.7–2.4	1.7–2.3	1.5–2.2	1.6–2.2
September projection . . . . .	1.8	2.0	2.0	1.8	1.8	1.7–1.9	1.9–2.2	1.8–2.1	1.7–2.0	1.7–2.0	1.7–2.0	1.6–2.5	1.5–2.3	1.6–2.2	1.6–2.2
Unemployment rate . . . . .	4.7	4.5	4.5	4.5	4.8	4.7–4.8	4.5–4.6	4.3–4.7	4.3–4.8	4.7–5.0	4.7–4.8	4.4–4.7	4.2–4.7	4.1–4.8	4.5–5.0
September projection . . . . .	4.8	4.6	4.5	4.6	4.8	4.7–4.9	4.5–4.7	4.4–4.7	4.4–4.8	4.7–5.0	4.7–4.9	4.4–4.8	4.3–4.9	4.2–5.0	4.5–5.0
PCE inflation . . . . .	1.5	1.9	2.0	2.0	2.0	1.5	1.7–2.0	1.9–2.0	2.0–2.1	2.0	1.5–1.6	1.7–2.0	1.8–2.2	1.8–2.2	2.0
September projection . . . . .	1.3	1.9	2.0	2.0	2.0	1.2–1.4	1.7–1.9	1.8–2.0	1.9–2.0	2.0	1.1–1.7	1.5–2.0	1.8–2.0	1.8–2.1	2.0
Core PCE inflation <sup>4</sup> . . . . .	1.7	1.8	2.0	2.0		1.7–1.8	1.8–1.9	1.9–2.0	2.0		1.6–1.8	1.7–2.0	1.8–2.2	1.8–2.2	
September projection . . . . .	1.7	1.8	2.0	2.0		1.6–1.8	1.7–1.9	1.9–2.0	2.0		1.5–2.0	1.6–2.0	1.8–2.0	1.8–2.1	
Memo: Projected appropriate policy path															
Federal funds rate . . . . .	0.6	1.4	2.1	2.9	3.0	0.6	1.1–1.6	1.9–2.6	2.4–3.3	2.8–3.0	0.6	0.9–2.1	0.9–3.4	0.9–3.9	2.5–3.8
September projection . . . . .	0.6	1.1	1.9	2.6	2.9	0.6–0.9	1.1–1.8	1.9–2.8	2.4–3.0	2.8–3.0	0.4–1.1	0.6–2.1	0.6–3.1	0.6–3.8	2.5–3.8

NOTE: Projections of change in real gross domestic product (GDP) and projections for both measures of inflation are percent changes from the fourth quarter of the previous year to the fourth quarter of the year indicated. PCE inflation and core PCE inflation are the percentage rates of change in, respectively, the price index for personal consumption expenditures (PCE) and the price index for PCE excluding food and energy. Projections for the unemployment rate are for the average civilian unemployment rate in the fourth quarter of the year indicated. Each participant's projections are based on his or her assessment of appropriate monetary policy. Longer-run projections represent each participant's assessment of the rate to which each variable would be expected to converge under appropriate monetary policy and in the absence of further shocks to the economy. The projections for the federal funds rate are the value of the midpoint of the projected appropriate target range for the federal funds rate or the projected appropriate target level for the federal funds rate at the end of the specified calendar year or over the longer run. The September projections were made in conjunction with the meeting of the Federal Open Market Committee on September 20–21, 2016. One participant did not submit longer-run projections for the change in real GDP, the unemployment rate, or the federal funds rate in conjunction with the September 20–21, 2016, meeting, and one participant did not submit such projections in conjunction with the December 13–14, 2016, meeting.

1. For each period, the median is the middle projection when the projections are arranged from lowest to highest. When the number of projections is even, the median is the average of the two middle projections.

2. The central tendency excludes the three highest and three lowest projections for each variable in each year.

3. The range for a variable in a given year includes all participants' projections, from lowest to highest, for that variable in that year.

4. Longer-run projections for core PCE inflation are not collected.

## The Outlook for Economic Activity

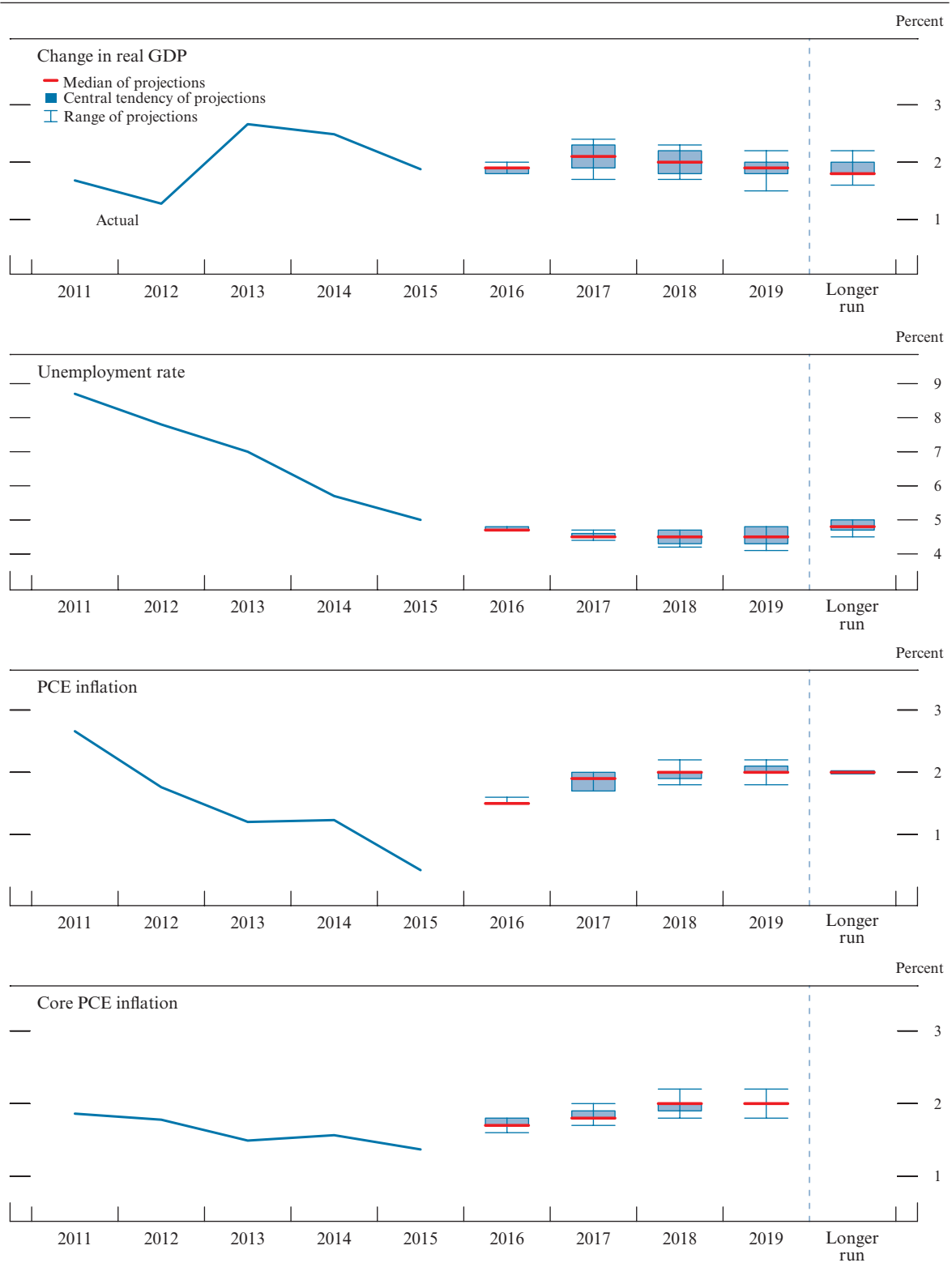
The median of participants' projections for the growth rate of real GDP, conditional on their individual assumptions about appropriate monetary policy, was 1.9 percent in 2016, 2.1 percent in 2017, 2.0 percent in 2018, and 1.9 percent in 2019; the median of projections for the longer-run normal rate of real GDP growth was 1.8 percent. Most participants projected that economic growth would pick up a bit in 2017 from the current year's pace and run at or slightly above their individual estimates of its longer-run rate through 2019. Compared with the September Summary of Economic Projections (SEP), the medians of the projections for real GDP growth were slightly higher over the period from 2017 to 2019, while the median assessment of the longer-run growth rate was unchanged. Since September, almost half of the participants revised up their projections for real GDP growth in 2018 or 2019, generally only slightly.

Those increasing their projections for output growth in those years cited expected changes in fiscal, regulatory, or other policies as factors contributing to their revisions. However, many participants noted that the effects on the economy of such policy changes, if implemented, would likely be partially offset by tighter financial conditions, including higher longer-term interest rates and a strengthening of the dollar.

The median of projections for the unemployment rate in the fourth quarter of 2016 was 4.7 percent, slightly lower than in September. Based on the median projections, the anticipated path of the unemployment rate for coming years also shifted down a bit, with the median for the end of 2019 at 4.5 percent, 0.3 percentage point below the median assessment of the longer-run normal rate of unemployment, which was unchanged from September.

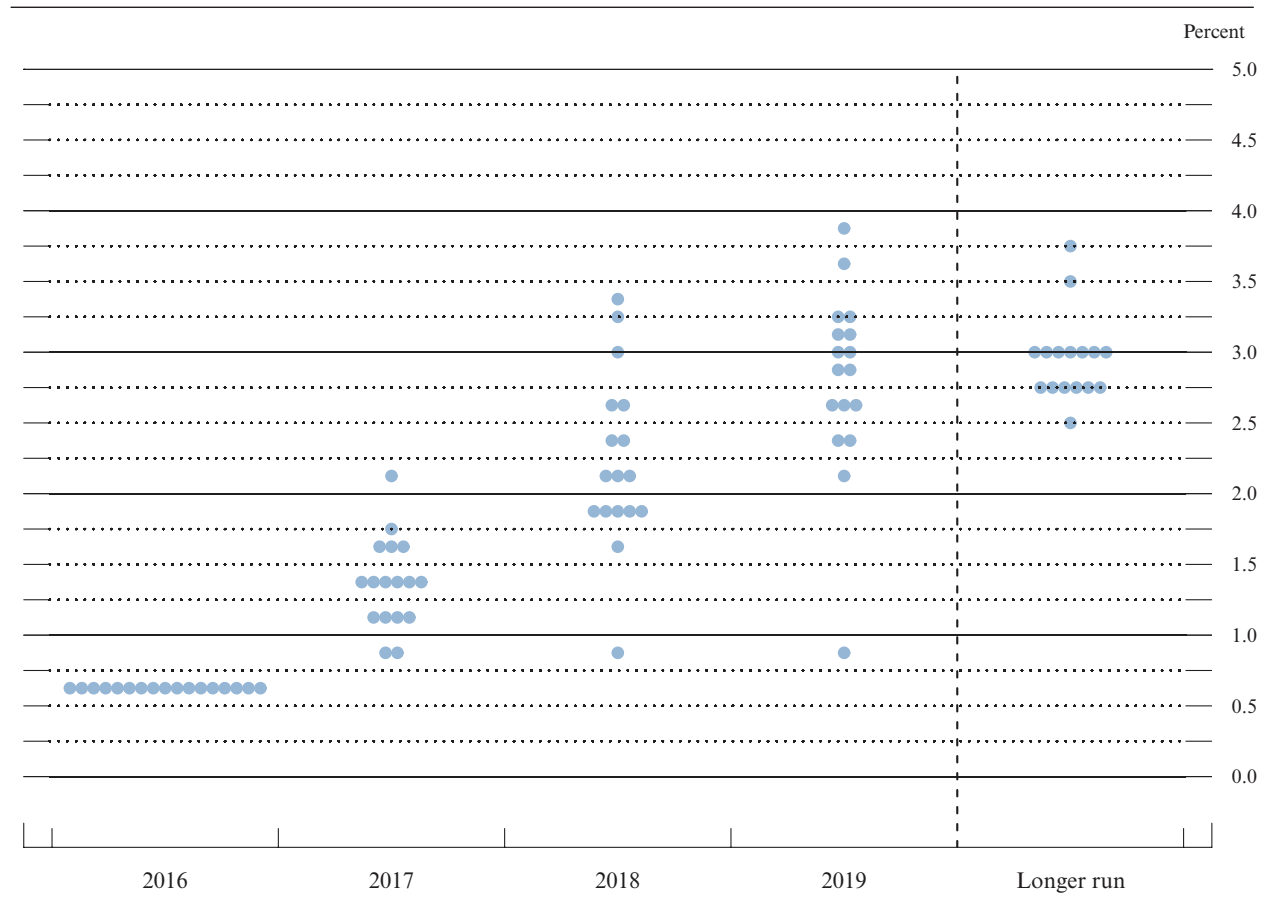


Figure 1. Medians, central tendencies, and ranges of economic projections, 2016–19 and over the longer run



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

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



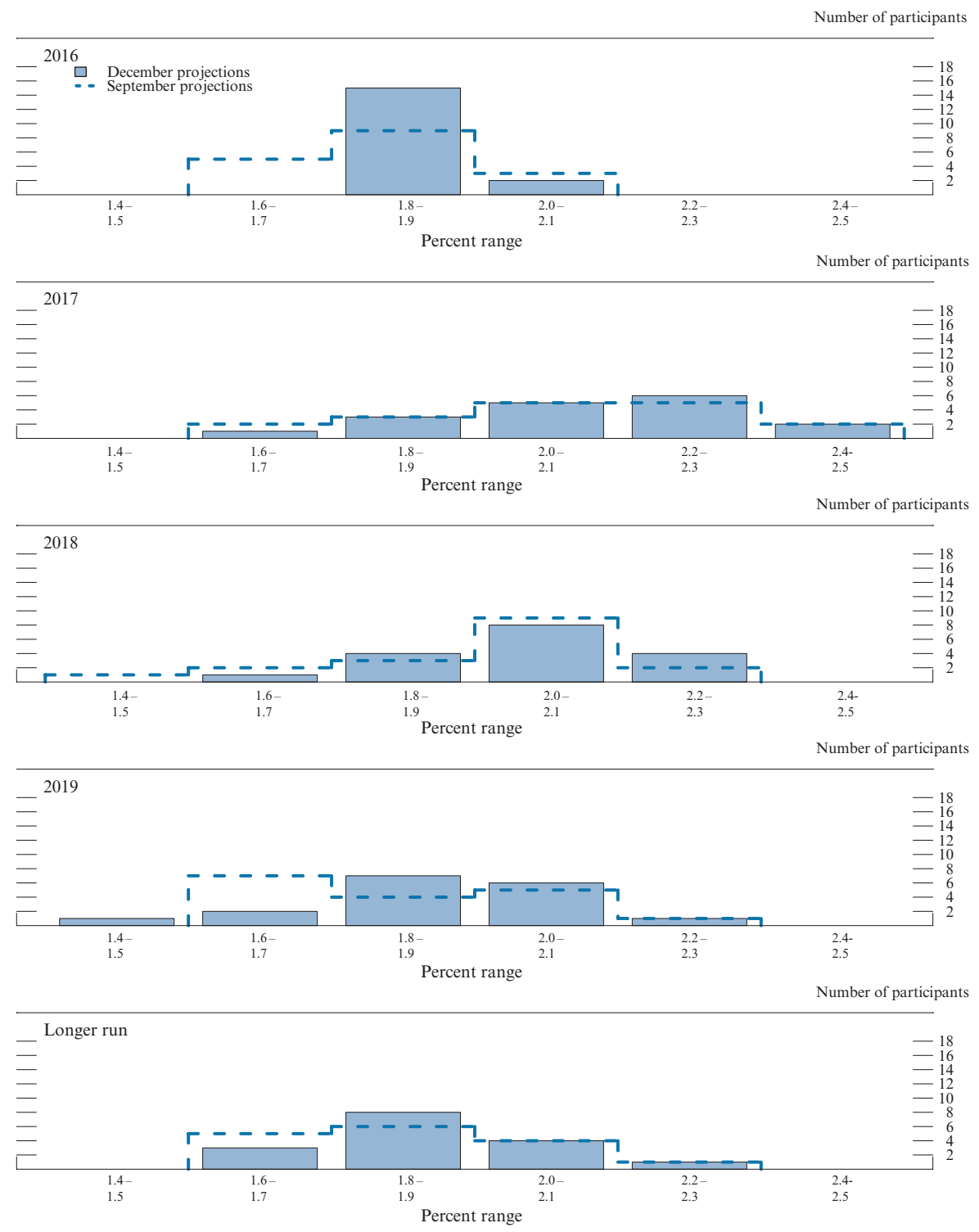
NOTE: Each shaded circle indicates the value (rounded to the nearest  $\frac{1}{8}$  percentage point) of an individual participant's judgment of the midpoint of the appropriate target range for the federal funds rate or the appropriate target level for the federal funds rate at the end of the specified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

Figures 3.A and 3.B show the distributions of participants' projections for real GDP growth and the unemployment rate from 2016 to 2019 and in the longer run. The distributions of individual projections of real GDP growth shifted slightly higher relative to the distribution of the September projections for 2017 through 2019. The distributions of projections for the unemployment rate shifted modestly lower for 2016 through 2019, while the distribution of projections for the longer-run normal rate of unemployment was unchanged.

### *The Outlook for Inflation*

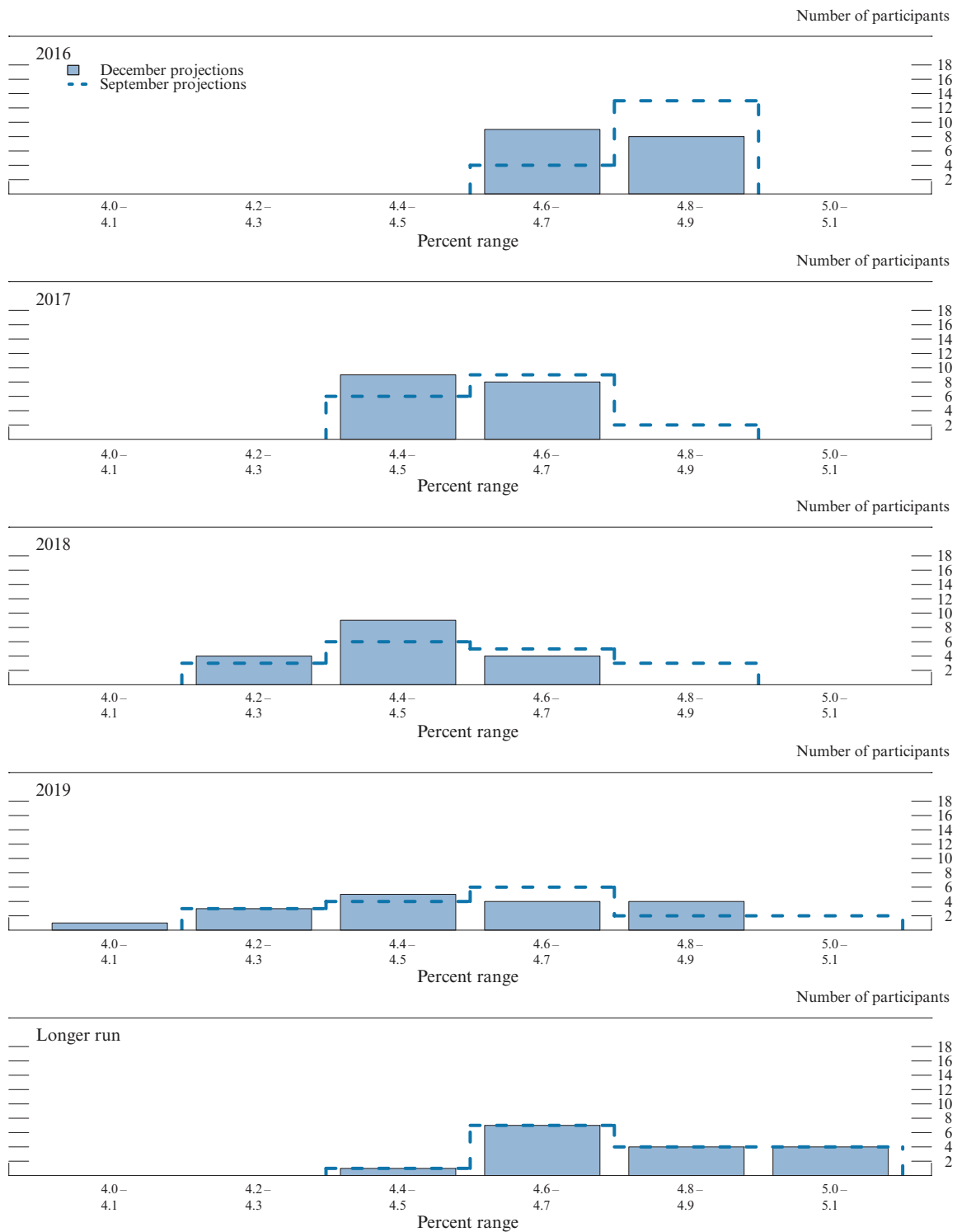
In the December SEP, the median of projections for headline PCE price inflation in 2016 was 1.5 percent, a bit higher than in September. The median of projections for headline PCE price inflation was 1.9 percent in 2017 and 2.0 percent in 2018 and 2019, unchanged from September. Several participants projected that inflation will slightly exceed the Committee's objective in 2018 or 2019. The medians of projections for core PCE price inflation were the same as in September, rising from 1.7 percent in 2016 to 1.8 percent in 2017 and 2.0 percent in 2018 and 2019.

Figure 3.A. Distribution of participants' projections for the change in real GDP, 2016–19 and over the longer run



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

Figure 3.B. Distribution of participants' projections for the unemployment rate, 2016–19 and over the longer run



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

Figures 3.C and 3.D provide information on the distribution of participants' views about the outlook for inflation. The distributions of projections for headline and core PCE price inflation shifted up slightly relative to projections for the September meeting. Some participants attributed the upward shift in projected inflation this year and next to recent data that showed somewhat higher inflation than they had expected. A few saw higher inflation in 2019 in conjunction with somewhat greater undershooting of the unemployment rate below its longer-run normal level.

### *Appropriate Monetary Policy*

Figure 3.E provides the distribution of participants' judgments regarding the appropriate target for the federal funds rate at the end of each year from 2016 to 2019 and over the longer run.<sup>7</sup> All participants saw an increase of 25 basis points in the federal funds rate at the December meeting as appropriate. The distributions for 2017 through 2019 shifted up modestly. The median projections of the federal funds rate continued to show gradual increases, to 1.4 percent at the end of 2017, 2.1 percent at the end of 2018, and 2.9 percent at the end of 2019; the median of the longer-run projections of the federal funds rate was 3.0 percent. The medians of the projections for the level of the federal funds rate for 2017 through 2019 were all 25 basis points higher than in the September projections. A few participants revised up their assessments of the longer-run federal funds

rate 25 basis points, resulting in an increase in the median of 13 basis points.

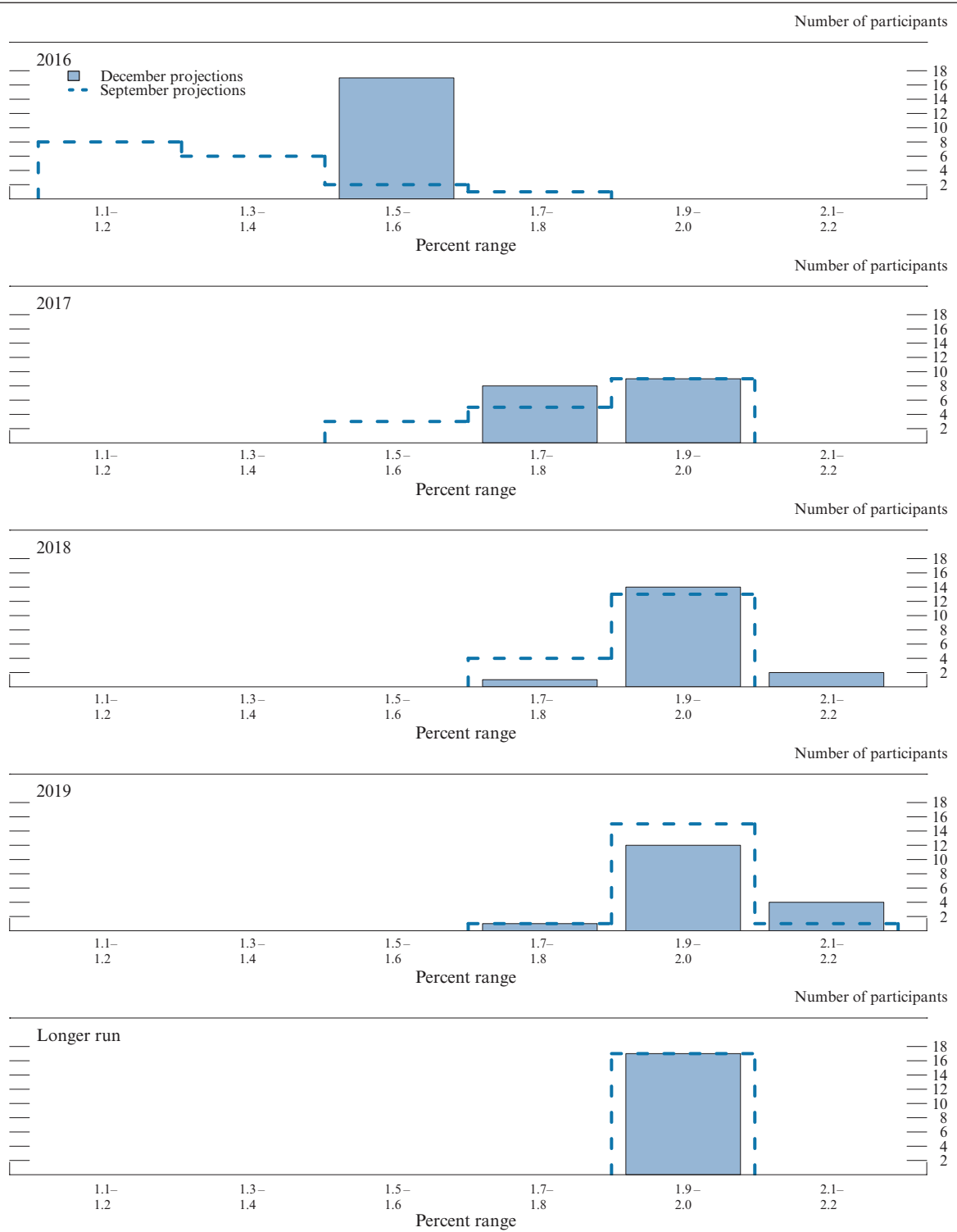
In discussing their December forecasts, many participants expressed a view that increases in the federal funds rate over the next few years would likely be gradual in light of a short-term neutral real interest rate that currently was low—a phenomenon that a number of participants attributed to the persistence of low productivity growth, continued strength of the dollar, a weak outlook for economic growth abroad, strong demand for safe longer-term assets, or other factors—and that was likely to rise only slowly as the effects of these factors faded over time. Some participants noted the continued proximity of short-term nominal interest rates to the effective lower bound, even with an increase at this meeting, as limiting the Committee's ability to increase monetary accommodation to counter possible adverse shocks to the economy. These participants judged that, as a result, the Committee should take a cautious approach to removing policy accommodation. Many participants noted that there was currently substantial uncertainty about the size, composition, and timing of prospective fiscal policy changes, but they also commented that a more expansionary fiscal policy might raise aggregate demand above sustainable levels, potentially necessitating somewhat tighter monetary policy than currently anticipated. Furthermore, several participants indicated that recent inflation data and the continued strengthening in labor market conditions increased their confidence that inflation would move toward the 2 percent objective, making a slightly firmer path of monetary policy appropriate.

### *Uncertainty and Risks*

The left-hand column of figure 4 shows that, for each variable, a majority of participants judged the levels of uncertainty associated with their December projections for real GDP growth, the unemployment rate, headline

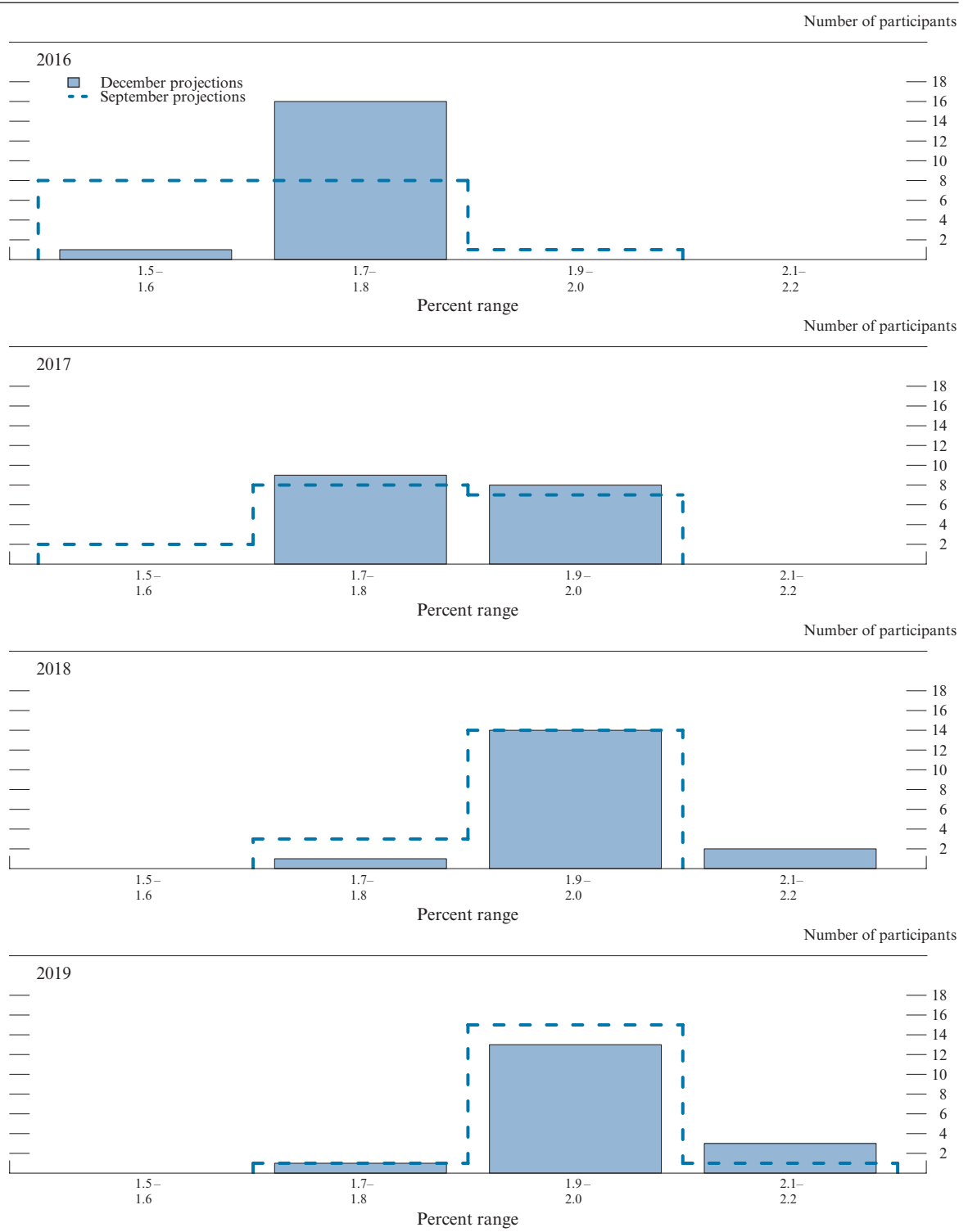
7. One participant's projections for the federal funds rate, real GDP growth, the unemployment rate, and inflation were informed by the view that there are multiple possible medium-term regimes for the U.S. economy, that these regimes are persistent, and that the economy shifts between regimes in a way that cannot be forecast. Under this view, the economy currently is in a regime characterized by expansion of economic activity with low productivity growth and a low short-term real interest rate, but longer-term outcomes for variables other than inflation cannot be usefully projected.

Figure 3.C. Distribution of participants' projections for PCE inflation, 2016–19 and over the longer run



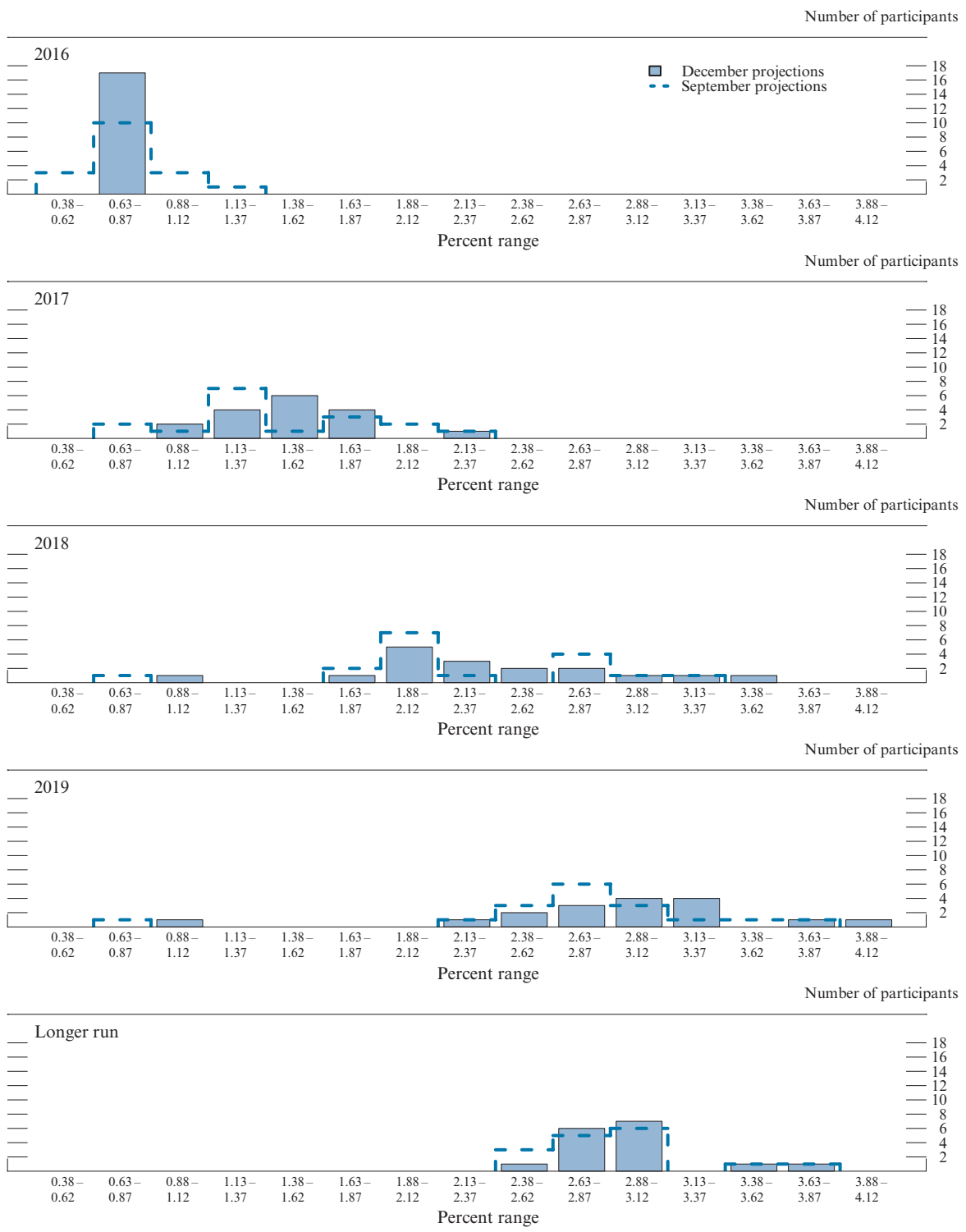
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.D. Distribution of participants' projections for core PCE inflation, 2016–19



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

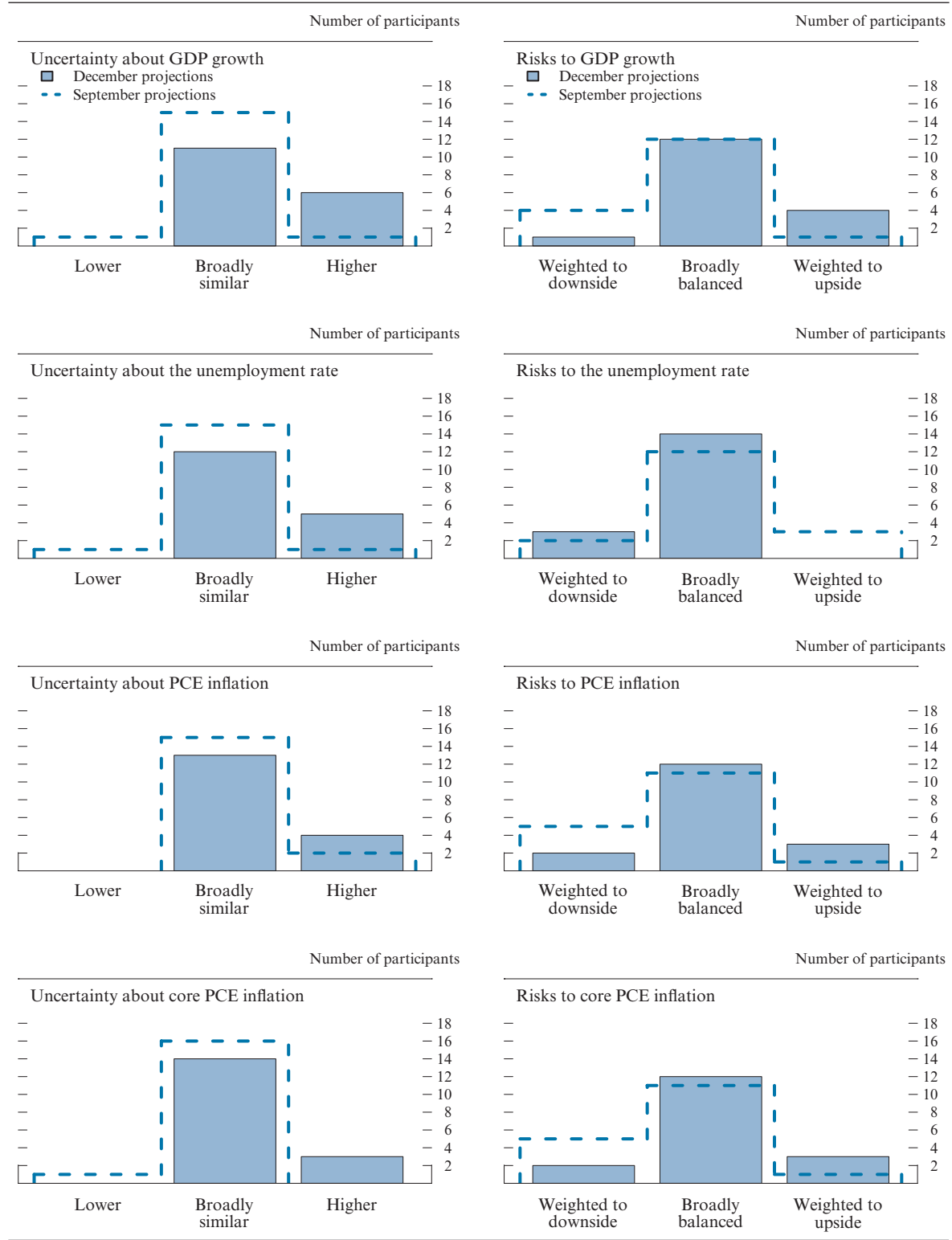
Figure 3.E. Distribution of participants' judgments of the midpoint of the appropriate target range for the federal funds rate or the appropriate target level for the federal funds rate, 2016–19 and over the longer run



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



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 notes to table 1.

inflation, and core inflation to be broadly similar to the average of the past 20 years.<sup>8</sup> However, more participants than in September saw uncertainty surrounding real GDP growth, the unemployment rate, or inflation as higher than average. Many participants mentioned an increase in uncertainty associated with fiscal, trade, immigration, or regulatory policies as a factor influencing their judgments about the degree of uncertainty surrounding their projections. Participants cited the difficulty of predicting the size, composition, and timing of these policy changes as well as the magnitude and timing of their effects on the economy.

As can be seen in the right-hand column of figure 4, a majority of participants continued to see the risks to real GDP growth, the unemployment rate, headline inflation, and core inflation as broadly balanced; however, fewer participants saw risks to economic growth and inflation as weighted to the downside or saw risks to the unemployment rate as weighted to the upside than in September. A number of participants noted that the prospect of expansionary fiscal policy had increased the upside risks to economic activity and inflation, and a few assessed the possibility of a reduction in regulation as posing upside risks to their forecasts of economic activity. Moreover,

8. 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 1996 through 2015. 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.

Table 2. Average historical projection error ranges

Percentage points				
Variable	2016	2017	2018	2019
Change in real GDP <sup>1</sup> . . . . .	±0.9	±1.7	±2.1	±2.1
Unemployment rate <sup>1</sup> . . . . .	±0.1	±0.8	±1.4	±1.9
Total consumer prices <sup>2</sup> . . . . .	±0.2	±1.0	±1.1	±1.1

Note: Error ranges shown are measured as plus or minus the root mean squared error of projections for 1996 through 2015 that were released in the winter by various private and government forecasters. (The note to this table that was included in the Summary of Economic Projections for the meeting of September 20–21, 2016, incorrectly stated that the error ranges were based on projections for 1995 through 2015. The correct time period was 1996 through 2015.) 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/2007/200760/0760abs.html](http://www.federalreserve.gov/pubs/feds/2007/200760/0760abs.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](http://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.

some participants judged that the recent rise in market-based measures of inflation compensation suggested that downside risks to inflation had declined. However, many also pointed to various sources of downside risk to economic activity, such as the limited potential for monetary policy to respond to adverse shocks when the federal funds rate is near the effective lower bound, downside risks in Europe and China, a possible increase in trade barriers, and the possibility of a sharp rise in financial market volatility in the event that fiscal and other policy changes diverged from market expectations. In addition, some participants pointed to factors such as global disinflationary trends and downward pressure on import prices from further strengthening of the dollar as sources of downside risk to inflation.

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## Forecast Uncertainty

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

Table 2 summarizes the average historical accuracy of a range of forecasts, including those reported in past *Monetary Policy Reports* and those prepared by the Federal Reserve Board's staff in advance of meetings of the Federal Open Market Committee. The projection error ranges shown in the table illustrate the considerable uncertainty associated with economic forecasts. For example, suppose a participant projects that real gross domestic product (GDP) and total consumer prices will rise steadily at annual rates of, respectively, 3 percent and 2 percent. If the uncertainty attending those projections is similar to that experienced in the past and the risks around the projections are broadly balanced, the numbers reported in table 2 would imply a probability of about 70 percent that actual GDP would expand within a range of 2.1 to 3.9 percent in the current year, 1.3 to

4.7 percent in the second year, and 0.9 to 5.1 percent in the third and fourth years. The corresponding 70 percent confidence intervals for overall inflation would be 1.8 to 2.2 percent in the current year, 1.0 to 3.0 in the second year, and 0.9 to 3.1 percent in the third and fourth 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.

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## ABBREVIATIONS

AFE	advanced foreign economy
BLS	Bureau of Labor Statistics
DPI	disposable personal income
EME	emerging market economy
FOMC	Federal Open Market Committee; also, the Committee
GDP	gross domestic product
JOLTS	Job Openings and Labor Turnover Survey
LIBOR	London interbank offered rate
MBS	mortgage-backed securities
Michigan survey	University of Michigan Surveys of Consumers
MMF	money market mutual fund
OIS	overnight index swap
ON RRP	overnight reverse repurchase agreement
OPEC	Organization of the Petroleum Exporting Countries
PCE	personal consumption expenditures
SEP	Summary of Economic Projections
SLOOS	Senior Loan Officer Opinion Survey on Bank Lending Practices
SOMA	System Open Market Account
S&P	Standard & Poor's
TIPS	Treasury Inflation-Protected Securities



