

**Prefatory Note**

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Class II FOMC – Restricted (FR)

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# Report to the FOMC on Economic Conditions and Monetary Policy



## Book A Economic and Financial Conditions: Current Situation and Outlook

April 20, 2016

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Prepared for the Federal Open Market Committee  
by the staff of the Board of Governors of the Federal Reserve System

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## Domestic Economic Developments and Outlook

The information we received during the intermeeting period about aggregate spending and production has been disappointing, with the discouraging news coming from most spending categories. We now estimate that real GDP edged up at an annual rate of only  $\frac{1}{2}$  percent in the first quarter, compared with 2 percent in the March Tealbook. In contrast, incoming labor market data have remained solid, suggesting that the labor market has continued to improve at a pace roughly in line with our previous forecast.

As in the two preceding years when we confronted a similar confluence of data, we judge that some of the weakness in the spending indicators reflects influences, such as residual seasonality, that will be reversed in subsequent quarters as well as observation error. Accordingly, we made a downward adjustment to our estimate of potential output in 2016 to reduce the effect of the weak spending data on our estimate of the output gap. Nevertheless, we took some negative signal from the incoming data and now view the current cyclical position of the economy as slightly weaker than we thought in the March Tealbook forecast. In the current quarter, we expect real GDP growth to pick up to a  $2\frac{1}{4}$  percent pace, similar to our previous forecast.

Beyond the near term, real GDP is projected to rise at an average annual rate of  $2\frac{1}{4}$  percent through 2018. This forecast for GDP growth is a little stronger than in the March Tealbook projection primarily because the paths for interest rates, equity prices, and the dollar are more supportive. At the end of 2018, real GDP is expected to be about  $1\frac{1}{2}$  percent above our estimate of its potential and the unemployment rate is expected to be 4.2 percent, 0.1 percentage point below the March Tealbook forecast and  $\frac{3}{4}$  percentage point below our estimate for its natural rate.

Our forecast for PCE price inflation over the first half of this year is the same as in the previous Tealbook, as recent news on inflation appears consistent with our view that the January reading on core PCE inflation was transitorily high. We project that total PCE price inflation will be about 1 percent this year and will move up to 1.8 percent in 2018, as energy and import prices begin to rise moderately later this year and as resource utilization tightens further in an environment of reasonably stable long-run inflation expectations.

## Comparing the Staff Projection with Other Forecasts

The staff's projection for real GDP growth is slightly lower than the median projection from the Survey of Professional Forecasters (SPF) in 2016 but in line with the Blue Chip consensus forecasts in 2016 and 2017. The staff's forecast for unemployment is a little higher than the others in 2016 and the same in 2017. Its inflation projections are a little lower, on balance.

### Comparison of Tealbook and Outside Forecasts

	2016	2017
<b>GDP (Q4/Q4 percent change)</b>		
April Tealbook	2.0	2.4
Blue Chip (04/10/16)	2.1	2.3
SPF median (02/12/16)	2.3	n.a.
<b>Unemployment rate (Q4 level)</b>		
April Tealbook	4.8	4.4
Blue Chip (04/10/16)	4.6	4.5
SPF median (02/12/16)	4.6	n.a.
<b>Consumer price inflation (Q4/Q4 percent change)</b>		
April Tealbook	1.3	2.2
Blue Chip (04/10/16)	1.7	2.3
SPF median (02/12/16)	1.5	2.2
<b>PCE price inflation (Q4/Q4 percent change)</b>		
April Tealbook	1.1	1.7
SPF median (02/12/16)	1.3	1.9
<b>Core PCE price inflation (Q4/Q4 percent change)</b>		
April Tealbook	1.5	1.6
SPF median (02/12/16)	1.6	1.8

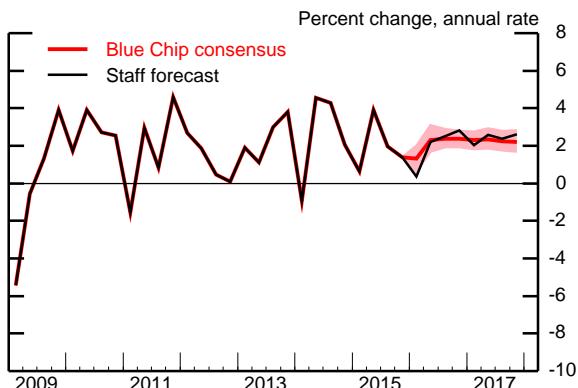
Note: SPF is the Survey of Professional Forecasters. Blue Chip does not provide results for PCE price inflation. The Blue Chip consensus forecast includes input from about 50 panelists, and the SPF about 40. Roughly 20 panelists contribute to both surveys.

n.a. Not available.

Source: Blue Chip Economic Indicators; Federal Reserve Bank of Philadelphia.

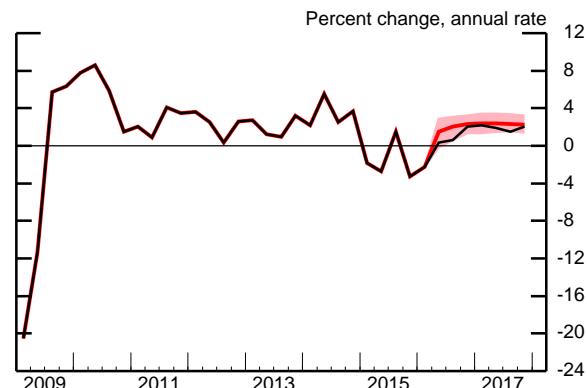
### Tealbook Forecast Compared with Blue Chip (Blue Chip survey released April 10, 2016)

Real GDP

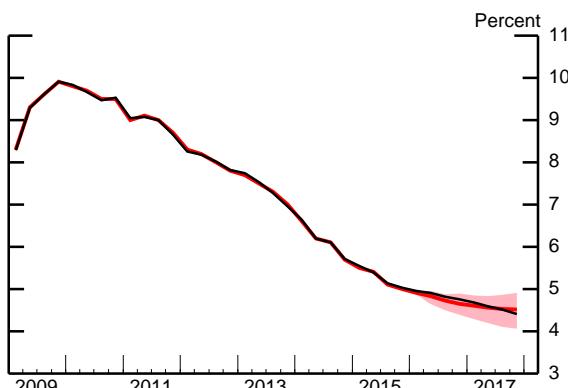


Note: The shaded area represents the area between the Blue Chip top 10 and bottom 10 averages.

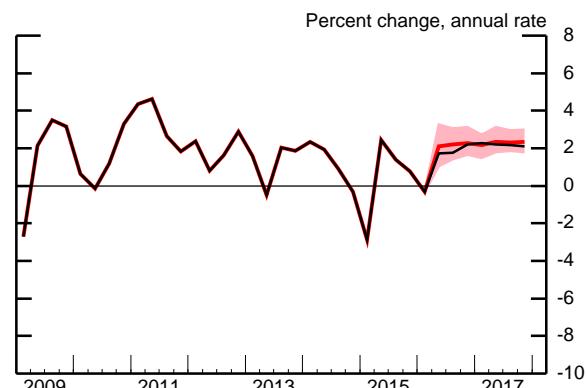
Industrial Production



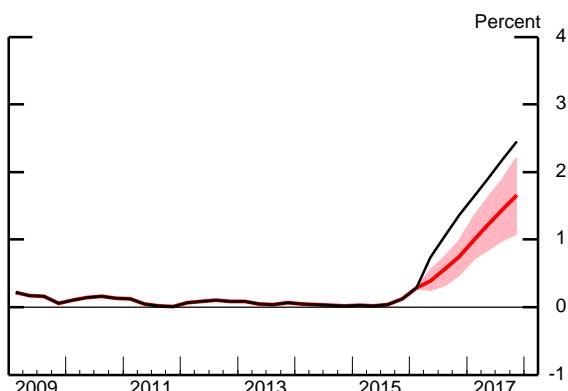
Unemployment Rate



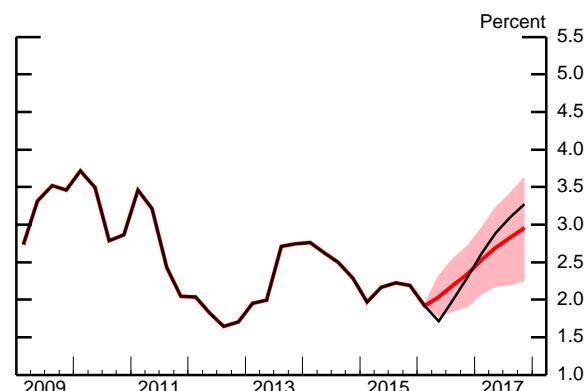
Consumer Price Index



Treasury Bill Rate



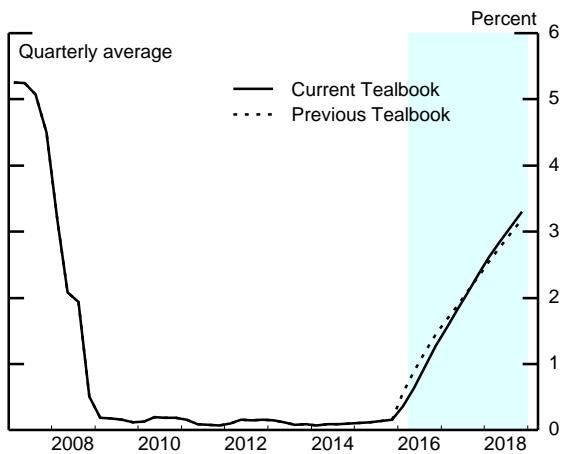
10-Year Treasury Yield



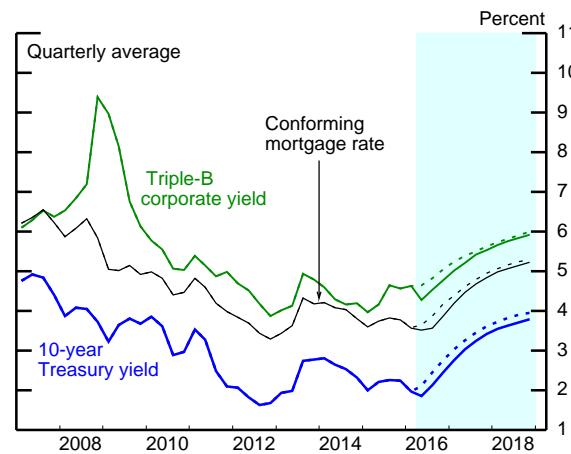
Note: The yield is for on-the-run Treasury securities. Over the forecast period, the staff's projected yield is assumed to be 15 basis points below the off-the-run yield.

## Key Background Factors underlying the Baseline Staff Projection

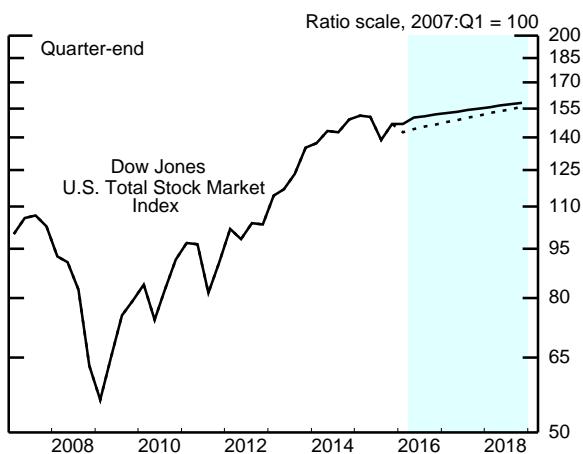
**Federal Funds Rate**



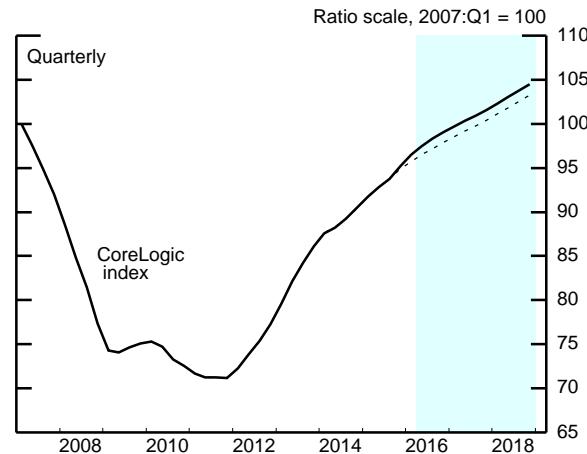
**Long-Term Interest Rates**



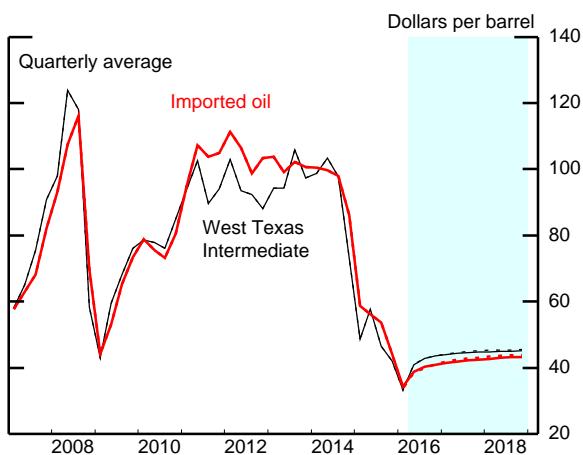
**Equity Prices**



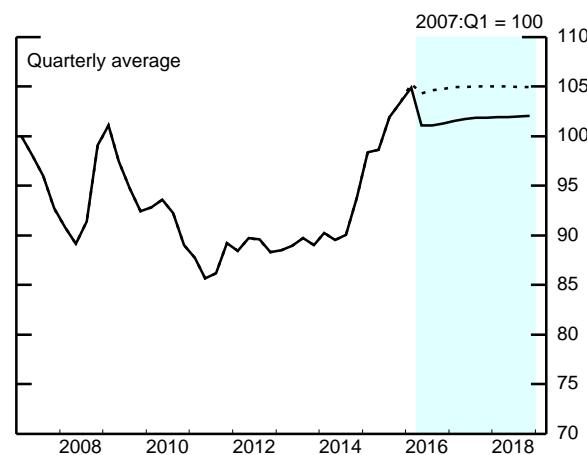
**House Prices**



**Crude Oil Prices**



**Broad Real Dollar**



## KEY BACKGROUND FACTORS

### Monetary Policy

- We continue to use an inertial version of the Taylor (1999) policy rule to set the federal funds rate in the projection.<sup>1</sup> A mechanical implementation of this rule calls for the federal funds rate to rise about 1 percentage point per year over the forecast period and to average 3.3 percent in the fourth quarter of 2018.<sup>2</sup> This level is slightly higher than in the March Tealbook, largely reflecting tighter resource utilization in this projection.
- We continue to assume that the SOMA portfolio will remain at its current size until the fourth quarter of 2016 and then begin to contract as the proceeds from maturing assets are no longer reinvested.

### Other Interest Rates

- Compared with the March Tealbook, we have revised down somewhat the entire projected path of the 10-year Treasury yield. This revision mostly reflects our assessment that the demand for holding U.S. Treasury securities and risks to the global growth outlook will keep term premiums well below historical norms for longer than we had previously thought. The 25 basis point downward revision from this reassessment is partly offset by the higher projected path of future short-term interest rates. Nevertheless, our projection continues to call for the 10-year Treasury yield to rise significantly over the medium term, mostly reflecting the movement of the 10-year valuation window through the period of extremely low short-term interest rates.

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<sup>1</sup> In the near term, the federal funds rate revised down a bit relative to the previous projection, as the realized federal funds rate in the first quarter of 2016 was lower than the value prescribed by the inertial Taylor (1999) rule. To help smooth the transition from one quarter to the next, we have modified our procedure so that we now project the federal funds rate in the current quarter using the inertial Taylor (1999) rule only for the remaining days of the quarter; for the period preceding the close of the forecast, we use actual market quotes.

<sup>2</sup> In light of the fact that the baseline path for the federal funds rate is somewhat above the median projection from the most recent SEP, we are contemplating whether to modify our assumed policy rule for the June Tealbook. In addition, to illustrate the sensitivity of the staff projection to changes in the federal funds rate, we conducted a simulation using the FRB/US model under the assumption that the federal funds rate remains flat through the end of 2016 and then reverts to the baseline rule starting in 2017:Q1. In this scenario, the level of real GDP is 0.1 percent higher than in the baseline by the end of 2017, the unemployment rate is 0.1 percentage point lower, and core inflation is 4 basis points higher; the federal funds rate remains lower, by nearly 40 basis points.

- We revised down the paths for the 10-year triple-B corporate bond rate and the 30-year mortgage rate about in line with the revision to Treasury yields. The spread of rates on 10-year triple-B corporate bonds over those on comparable-maturity Treasury securities, currently at elevated levels, is forecast to narrow slowly and end the projection period somewhat above its historical median level.

## Equity Prices and Home Prices

- Equity prices have increased 6¼ percent since the time of the March Tealbook, but as the outlook for corporate earnings remains downbeat, we have not passed through all of the recent upward movement in equity prices into the forecast. Thus, the projected path for equity prices is only modestly higher than in the March Tealbook, with stock prices projected to rise about 2¾ percent per year on average through 2018.
- We expect house prices to rise about 4 percent in 2016 and about 2¾ percent per year in 2017 and 2018. We have revised up our expectations for the path of house prices relative to the March Tealbook, largely in response to strong incoming data. House prices currently appear slightly overvalued compared to rents, with one measure we track suggesting that house prices are overvalued by about 6 percent (compared with more than 40 percent prior to the housing bust). Our forecast has house prices rising slightly slower than rents over the medium term, which gradually reduces this overvaluation.

## Fiscal Policy

- Our fiscal policy assumptions are unrevised in this forecast. We continue to anticipate that the federal budget legislation that was passed at the end of last year, combined with ongoing modest growth in state and local purchases, will provide a boost of just over ½ percentage point to real GDP growth this year and make smaller contributions in 2017 and 2018.

## Foreign Economic Activity and the Dollar

- The broad nominal dollar has depreciated almost 3 percent, on net, since the time of the March Tealbook, primarily on expectations of more accommodative monetary policy in the United States. We expect the nominal dollar to edge up about 1 percent over the remainder of this year and then to

rise a total of  $2\frac{1}{4}$  percent over the following two years, lifted by monetary policy divergence between the United States and abroad. Our projection for the level of the broad real dollar averages about 3 percent lower than in the March Tealbook.

- We estimate that foreign real GDP grew at an annual rate of  $2\frac{1}{4}$  percent in the first quarter,  $\frac{1}{4}$  percentage point stronger than in the March Tealbook and above the  $1\frac{3}{4}$  percent pace of both the fourth quarter and 2015 as a whole. This step-up was largely driven by a rebound in Canadian activity, although growth in emerging Asia (excluding China) and the euro area also improved on the back of stronger domestic demand. As expected, economic growth in China slowed in the first quarter, although we project that growth will pick up in the remainder of the year, supported by further policy stimulus. Overall, we see the pace of growth abroad edging up to  $2\frac{3}{4}$  percent by the end of 2016 and then staying at about that rate through 2018, supported by accommodative monetary policies and the depreciation of foreign currencies relative to the dollar over the past two years.

## **Oil Prices and Other Commodity Prices**

- The spot price of Brent crude oil closed at \$44 per barrel on April 19, \$4 above its level at the time of the previous Tealbook. Although the spot price was volatile over the period, further-dated futures quotes were unchanged relative to those in the March Tealbook. Overall, oil supply continues to exceed oil demand, and global inventories are anticipated to continue to accumulate in the near term. Thereafter, we expect the supply imbalance to close. We therefore expect the price of imported oil to increase only slightly, from \$39 per barrel in the current quarter to \$43 per barrel by the end of 2018.
- Other commodity prices were mixed. Metals prices are little changed on balance since the time of the previous Tealbook, remaining somewhat above their trough in early 2016. Agricultural prices moved up on average, with soybean prices boosted in part by stronger foreign demand.

**Federal Reserve System Nowcasts of 2016:Q1 Real GDP Growth**  
 (Percent change at annual rate from previous quarter)

Federal Reserve entity <sup>2</sup>	Type of model	Nowcast as of April 19, 2016
Federal Reserve Bank New York	<ul style="list-style-type: none"> <li>Factor-augmented autoregressive model combination</li> <li>Factor-augmented autoregressive model combination, financial factors only</li> <li>Dynamic factor model</li> </ul>	1.4 1.6 0.7
Cleveland	<ul style="list-style-type: none"> <li>Bayesian regressions with stochastic volatility</li> <li>Tracking model</li> </ul>	1.4 0.1
Atlanta	<ul style="list-style-type: none"> <li>Tracking model combined with Bayesian vector autoregressions (VARs), dynamic factor models, and factor-augmented autoregressions (known as GDPNow)</li> </ul>	0.3
Chicago	<ul style="list-style-type: none"> <li>Dynamic factor models</li> <li>Bayesian VARs</li> </ul>	0.5 0.9
St. Louis	<ul style="list-style-type: none"> <li>Dynamic factor models</li> <li>News index model</li> <li>Let-the-data-decide regressions</li> </ul>	1.9 1.0 1.8
Kansas City	<ul style="list-style-type: none"> <li>Accounting-based tracking estimate</li> </ul>	-0.5
Board of Governors	<ul style="list-style-type: none"> <li>Board staff's forecast (judgmental tracking model)<sup>1</sup></li> <li>Dynamic factor models</li> </ul>	0.4 0.6
Memo: Median of Federal Reserve System nowcasts		0.8

- The April Tealbook forecast, finalized on April 20, is also 0.4 percent.
- The Bayesian VARs model from Minneapolis has been discontinued.

## THE OUTLOOK FOR REAL GDP

The incoming data on spending and production in the first quarter were substantially weaker than we had expected, leading us to mark down our estimate of real GDP growth last quarter to  $\frac{1}{2}$  percent at an annual rate— $1\frac{1}{2}$  percentage points less than in the March Tealbook.<sup>3</sup> The downward revision was broad based across spending categories, although weaker consumer spending accounted for more than half of the revision.<sup>4</sup> When considering our forecast for the current quarter, we discounted much of this disappointing news because of the inherent variability in the quarterly GDP data and because it seems at odds with the ongoing improvement in the labor market, solid measures of consumer sentiment, and the recent improvement in many forward-looking indicators of business investment and production. Nonetheless, we marked down our projection for growth in private domestic final purchases a little, although the effect on GDP growth was more than offset by an upward revision from the contributions of net exports and inventory investment. All told, we expect real GDP to rise  $2\frac{1}{4}$  percent in the second quarter, a little higher than in the March Tealbook.

- Real PCE growth appears to have slowed from an annual rate of  $2\frac{1}{2}$  percent in the fourth quarter to  $1\frac{3}{4}$  percent in the first quarter, in contrast with the slight step-up in growth we projected in the March Tealbook. However, given recent gains in household incomes and wealth, still-favorable readings on consumer sentiment, and earlier declines in energy prices, we expect real PCE growth to move up to a 3 percent pace in the current quarter, the same as in our March Tealbook forecast. (See the box “Energy Prices and Consumer Spending” for a related discussion.)

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<sup>3</sup> This depressed GDP growth in the first quarter continues the pattern observed in 2014 and 2015. Although it is difficult to judge with any precision how much of this repeated weakness is due to incomplete seasonal adjustment, the staff estimates that residual seasonality, which primarily affects data for net exports and for state and local government construction spending, subtracted about  $\frac{1}{2}$  percentage point from first-quarter GDP growth in 2016. Outside estimates of residual seasonality in the first quarter span a fairly wide range, from essentially zero to a subtraction of more than  $1\frac{1}{2}$  percentage points. The BEA’s initial estimate of GDP for the first quarter will be released the day after the FOMC meeting ends.

<sup>4</sup> As displayed in the table “Federal Reserve System Nowcasts of 2016:Q1 Real GDP Growth,” the median of the projections generated by the near-term forecasting approaches used within the System, at 0.8 percent, is about 1 percentage point lower than at the time of the March Tealbook; the staff’s judgmental forecast is well within the range of nowcasts, which run from negative 0.5 percent to 1.9 percent.

## Energy Prices and Consumer Spending

The drop in gasoline prices by nearly half since June 2014 resulted in households saving an estimated \$120 billion on gasoline expenditures over this period, or nearly \$1,000 per household on average. In addition, the decline in oil prices has likely led to slightly lower prices of non-energy goods, further boosting purchasing power. Traditional macroeconomic analyses suggest that these savings should have generated a material boost to real consumer spending. For example, using the marginal propensity to consume (MPC) out of income from one of the staff's benchmark PCE models, this windfall gain implies a  $\frac{1}{4}$  percentage point boost to real PCE growth in 2015 and a similar contribution to growth this year.

Falling gasoline prices also appear to boost consumer sentiment, although the magnitude of the effect may depend on households' perceptions about the permanence of the decline.<sup>1</sup> Expectations that a price decline is persistent could amplify its near-term effects as some households react immediately to anticipated future savings on gasoline. Indeed, we estimate that much of the step-up in sentiment in the Michigan survey since mid-2014 was due to falling gasoline prices, and that this sentiment channel contributed positively to PCE growth in 2015.

Combining the income and sentiment channels, we estimate that the direct effect of the decline in energy prices since mid-2014 (excluding the multiplier) added  $\frac{1}{2}$  percentage point to real PCE growth in 2015 and will contribute an additional  $\frac{1}{4}$  percentage point to growth in 2016.<sup>2</sup> Although these estimates are on the low end of the estimates in the time-series literature, those studies are primarily informed by only a handful of large historical fluctuations in oil prices.<sup>3</sup> Moreover, recent spending data have appeared weak relative to fundamentals, raising the question as to whether even our estimates of the energy price effects might be too large.

**Effect of Lower Energy Prices since June 2014**

	2014	2015	2016	2017
Contribution to Real PCE Growth	.2	.5	.2	.0
<u>Contribution by Channel</u>				
Current Real Income	.1	.2	.3	.2
Consumer Sentiment	.1	.3	-.1	-.2

Source: Staff estimates.

<sup>1</sup> Aditya Aladangady and Claudia R. Sahm (2015), "Do Lower Gasoline Prices Boost Confidence?" FEDS Notes (Washington: Board of Governors of the Federal Reserve System, March 6), <https://www.federalreserve.gov/econresdata/notes/feds-notes/2015/do-lower-gasoline-prices-boost-confidence-20150306.html>.

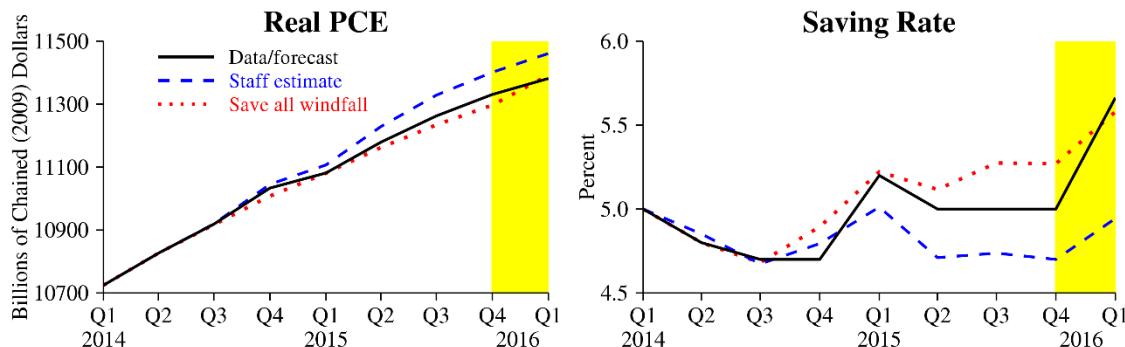
<sup>2</sup> Low energy prices may boost profits for firms that use energy and cut profits for energy producing firms, affecting employment, dividend income, and wealth. We believe the net consumption response from these channels is small.

<sup>3</sup> For reviews of the literature, see Paul Edelstein and Lutz Kilian (2009), "How Sensitive Are Consumer Expenditures to Retail Energy Prices?" *Journal of Monetary Economics*, vol. 56 (September), pp. 766–79; Lutz Kilian and Robert J. Vigfusson (2014), "The Role of Oil Price Shocks in Causing U.S. Recessions," International Finance Discussion Papers 1114 (Washington: Board of Governors of the Federal Reserve System, August), [www.federalreserve.gov/pubs/ifdp/2014/1114/ifdp1114.pdf](http://www.federalreserve.gov/pubs/ifdp/2014/1114/ifdp1114.pdf).

To help shed light on how energy prices have affected aggregate consumption, the following figures contrast the actual evolution of real PCE and the saving rate since mid-2014 (the solid black lines) with two hypothetical scenarios based on a staff model of PCE growth. One scenario (the red dotted line) shows a hypothetical path of real PCE assuming households saved all of the windfall from both lower energy prices and their pass-through to core PCE prices. The other scenario (the dashed blue line) shows the trajectory of spending based on our estimate of the effect of falling energy prices on consumption from the table on the previous page.

Based on these scenarios, the spending data since mid-2014 might suggest that the drop in energy prices boosted household spending by less than we had estimated. However, PCE growth is somewhat volatile and subject to revision, and a larger spending response may have been obscured by other factors.<sup>4</sup> In fact, studies using microdata, such as a widely cited analysis of household-level credit card transaction data by the JPMorgan Chase Institute, conclude that individuals may have spent a much larger portion of the windfall income, at least initially.<sup>5</sup>

Taken together, the macro and micro evidence suggest that households did spend out of the windfall savings from falling energy prices. Thus, the fact that the saving rate has stepped up since energy prices began to fall and consumer spending remains well below the level implied by fundamentals suggest that factors not well captured in our models—such as precautionary savings—may be holding down spending. We expect these precautionary motives to ease over the medium term in response to continued improvements in the labor market. However, as we think that most of the spending gains from falling energy prices have been realized already, we expect only a modest additional boost in 2016 from this channel.



Source: BEA and staff estimates.

<sup>4</sup> Beyond the general point that data are measured with error, there is also a specific measurement problem associated with how the BEA's methodology maps sales at retailers such as Costco into spending categories that exclude gasoline. Because many of these retailers also sell gasoline, their nominal sales are depressed when gasoline prices fall, leading BEA's estimate of non-gasoline retail sales to be biased downward. We estimate this error cumulates to ¼ percentage point on the level of PCE since June 2014.

<sup>5</sup> Diana Farrell and Fiona Greig (2015), *How Falling Gas Prices Fuel the Consumer: Evidence from 25 Million People*, JPMorgan Chase Institute (Washington: JPMCI, October).

## Summary of the Near-Term Outlook

(Percent change at annual rate except as noted)

Measure	2015:Q4		2016:Q1		2016:Q2	
	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook
<b>Real GDP</b>	<b>1.2</b>	<b>1.4</b>	<b>1.9</b>	<b>.4</b>	<b>2.0</b>	<b>2.2</b>
Private domestic final purchases	1.7	2.0	2.8	1.4	3.2	2.7
Personal consumption expenditures	2.0	2.4	3.1	1.8	3.1	3.0
Residential investment	10.2	10.1	11.0	12.8	5.5	2.5
Nonres. private fixed investment	-1.9	-2.1	-1.1	-3.7	3.1	1.4
Government purchases	.1	.1	3.3	1.7	1.9	2.3
<i>Contributions to change in real GDP</i>						
Inventory investment <sup>1</sup>	-.2	-.2	-.3	-.4	-.3	-.1
Net exports <sup>1</sup>	-.1	-.1	-.7	-.7	-.7	-.4
<b>Unemployment rate</b>	<b>5.0</b>	<b>5.0</b>	<b>4.9</b>	<b>4.9</b>	<b>4.9</b>	<b>4.9</b>
<b>PCE chain price index</b>	<b>.4</b>	<b>.3</b>	<b>.1</b>	<b>.2</b>	<b>1.3</b>	<b>1.3</b>
Ex. food and energy	1.3	1.3	1.9	1.9	1.5	1.5

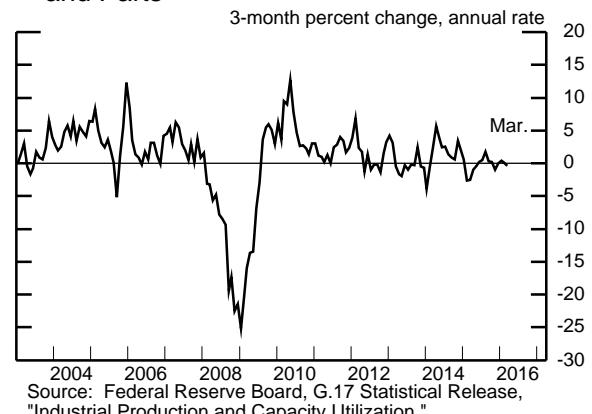
1. Percentage points.

### Recent Nonfinancial Developments (1)

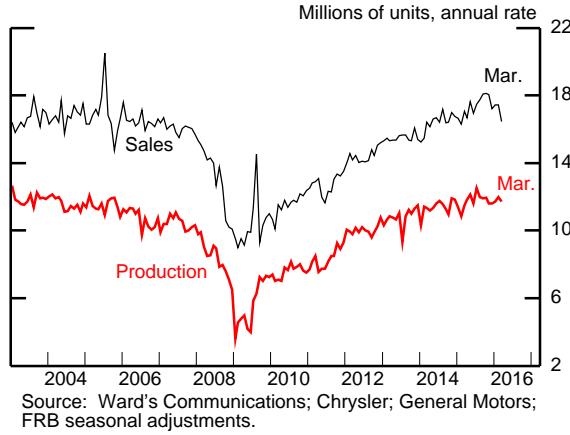
Real GDP and GDI



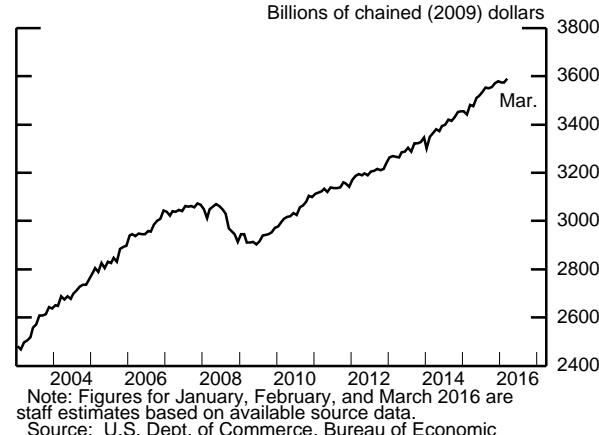
Manufacturing IP ex. Motor Vehicles and Parts



Sales and Production of Light Motor Vehicles

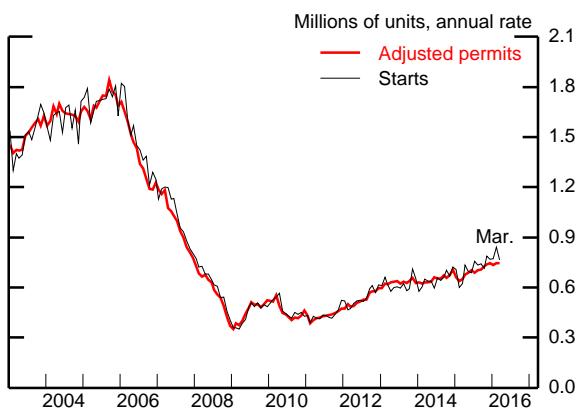


Real PCE Goods ex. Motor Vehicles



## Recent Nonfinancial Developments (2)

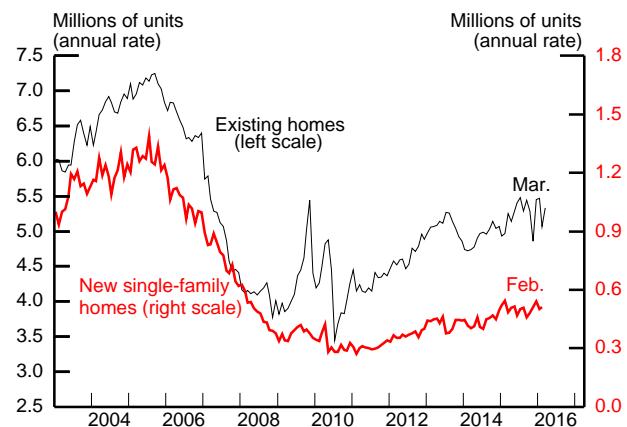
### Single-Family Housing Starts and Permits



Note: Adjusted permits equal permit issuance plus total starts outside of permit-issuing areas.

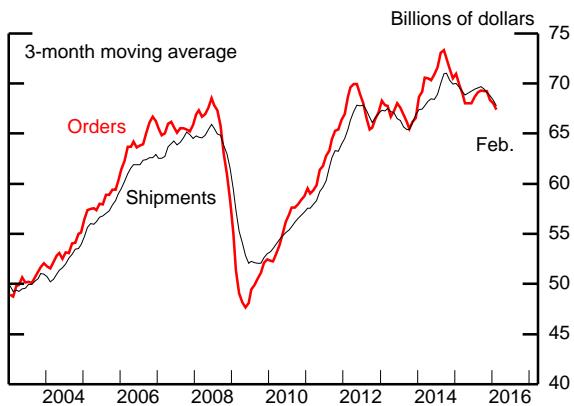
Source: U.S. Census Bureau.

### Home Sales



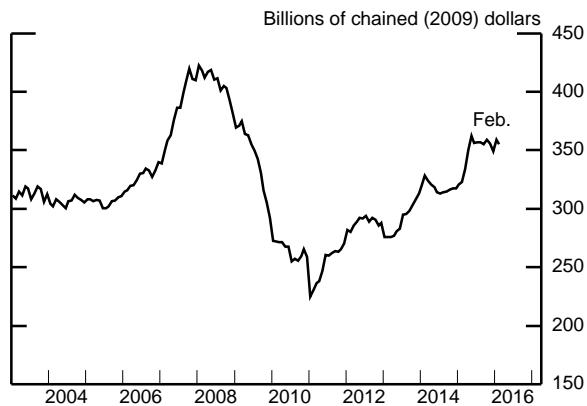
Source: For existing, National Association of Realtors; for new, U.S. Census Bureau.

### Nondefense Capital Goods ex. Aircraft



Source: U.S. Census Bureau.

### Nonresidential Construction Put in Place

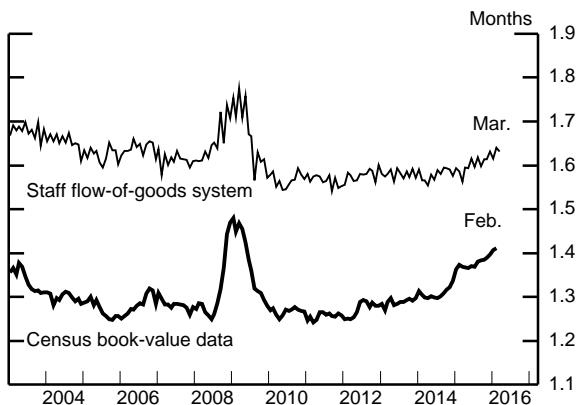


Note: Nominal CPIP deflated by BEA prices through

2015:Q4 and by the staff's estimated deflator thereafter.

Source: U.S. Census Bureau.

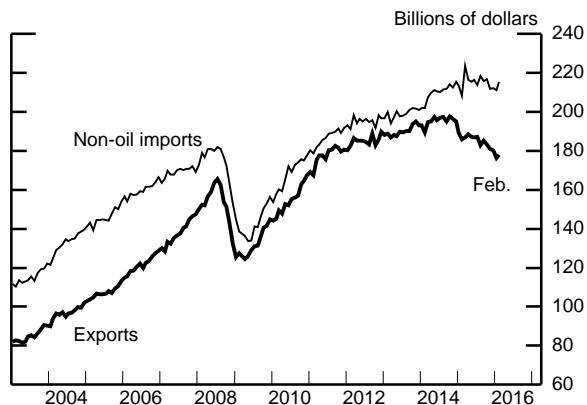
### Inventory Ratios



Note: Flow-of-goods system inventories include manufacturing and mining industries and are relative to consumption. Census data cover manufacturing and trade, and inventories are relative to sales.

Source: U.S. Census Bureau; staff calculations.

### Exports and Non-oil Imports



Source: U.S. Dept. of Commerce, Bureau of Economic Analysis; U.S. Census Bureau.

- Incoming data on housing activity are consistent with continued gains in residential construction. We project that real residential investment spending will increase at an annual rate of 7½ percent in the first half of this year, a touch slower than in the previous Tealbook.
- We estimate that total business fixed investment fell at a 3¾ percent pace in the first quarter—2½ percentage points more than in the March Tealbook forecast—as data now suggest that spending on transportation and other equipment contracted and outlays for drilling and mining structures plunged. In the current quarter, we expect that spending on equipment and intangibles will rise modestly—a view supported by recent improvements in forward-looking indicators of business spending—but that drilling and mining investment will fall further.
- We continue to expect that a mild correction in inventory investment will subtract ¼ percentage point from GDP growth over the first half of this year, though with the drag more concentrated in the first quarter. Specifically, the data now suggest that inventory investment subtracted ½ percentage point from real GDP growth in the first quarter, but we expect it to be a nearly neutral influence on GDP growth in the second quarter.
- Net exports are estimated to have held down real GDP growth nearly ¾ percentage point in the first quarter as the strong run-up in the dollar from the middle of 2014 through the end of last year continued to weigh on exports. In the current quarter, we expect the drag from net exports to diminish to about ½ percentage point, as exports begin increasing again—albeit only at a tepid 1½ percent rate—and import growth continues at about a 4 percent pace. Although we continue to project net exports will subtract from GDP growth over the forecast period, the lower path of the dollar relative to the March Tealbook has led us to lessen the expected drag a touch.
- Industrial production decreased in the first quarter, as utilities and mining output fell and manufacturing output was little changed. Looking forward, the weakness in the energy sector will likely continue to weigh considerably on the industrial sector. Nevertheless, we expect industrial production to rise over the next few months, as manufacturing output picks up—consistent with the recent improvement in both the national and regional new orders

indexes—and as utilities output rebounds with a return of temperatures to more seasonable norms.

Beyond the near term, real GDP is expected to expand faster than its potential, supported by a still-accommodative stance of monetary policy and by mildly expansionary fiscal policy. Nonetheless, real GDP growth slows over the medium term—from 2 $\frac{3}{4}$  percent in the second half of 2016 to 2 $\frac{1}{2}$  percent in 2017 and 2 percent in 2018—as waning monetary policy accommodation and fading fiscal impetus outweigh a lessening drag from the effects of past dollar appreciation.

- The level of real GDP at the end of the forecast is slightly higher than in the previous Tealbook, reflecting several partially offsetting factors. We expect only a little of the recent softness in the spending data to be made up this year, leading us to revise down GDP growth in 2016. However, as described earlier, we revised down our forecast for the term premiums in Treasury yields, lowering our projection for long-term interest rates and providing a boost to GDP growth throughout the forecast.<sup>5</sup> In addition, the lower dollar and higher equity prices in this projection also support somewhat stronger growth in 2016 and 2017.
- The box “Tealbook Forecast Errors: An Update through 2015” reviews the recent errors in the staff’s forecasts for GDP, unemployment, and inflation.

## THE OUTLOOK FOR THE LABOR MARKET AND AGGREGATE SUPPLY

The March employment report was broadly in line with our projection and indicated that the labor market has continued to strengthen.

- For the first quarter as a whole, nonfarm payroll employment averaged about 210,000 per month, the same as in our March forecast. We continue to project job gains of about 200,000 per month in the current quarter.

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<sup>5</sup> We allowed this revision to the term premium to affect our forecast for real activity following our usual rules of thumb for interest rate effects. We considered the possibility that the lower term premium was driven by factors that had not already been incorporated into the projection, in which case accounting for these factors would have offset some or all of the boost from the lower interest rates. In the end, however, we thought it more likely that the factors driving the lower term premium, including increased risk to the global growth outlook, had already been built into the projection.

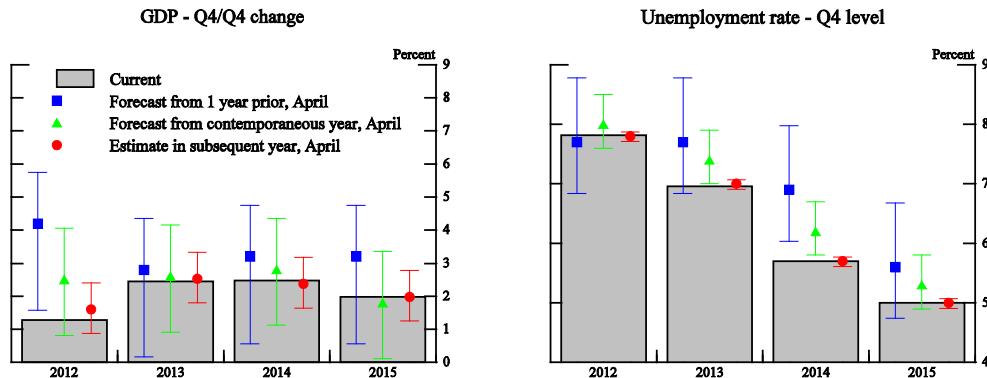
## Tealbook Forecast Errors: An Update through 2015

As was the case in 2013 and 2014, the most recent estimate of real GDP growth in 2015 is close to prior staff forecasts, but the unemployment rate is lower than the staff expected. Price inflation in 2015 is in line with staff forecasts made last spring but well below forecasts from the previous year. Here we present and discuss these recent forecast errors.

The gray bars in the left panel of figure 1 show the currently published Q4/Q4 percent changes in real GDP from 2012 to 2015; the blue squares show the forecasts for GDP growth made in the April Tealbook one year prior, and the green triangles show the forecast from the April Tealbook in the contemporaneous year. The whisker bands around the squares and triangles demarcate 70 percent forecast-error bands, with unusually large forecast errors represented by cases where the top of a gray bar falls outside one of the whisker bands. Because the bars themselves represent the latest revised data, the red dots show the Bureau of Economic Analysis (BEA) estimate of GDP growth for each year from mid-April of the subsequent year (known as the third estimates), along with 70 percent bands computed from past revisions.

Staff errors in forecasting 2015 real GDP growth do not appear particularly large compared with past staff forecast errors. Moreover, the red whisker bands show that the current BEA estimates are prone to sizable revisions, making discussion of these forecast errors tentative. Having said that, the prior-year forecast appears to have been too high because of a greater-than-expected drag from net exports, likely associated with the surprisingly large appreciation of the dollar exchange rate. Lower-than-expected investment and personal consumption expenditures appear to have contributed to the forecast error as well. Current estimates of real disposable personal income are close to the year-ahead projections; consequently, the BEA's current estimate of the saving rate is higher than the staff anticipated.

**Figure 1: Real Activity Forecast Errors**



Source: Staff forecast and U.S. Dept. of Commerce, Bureau of Economic Analysis, Bureau of Labor Statistics.

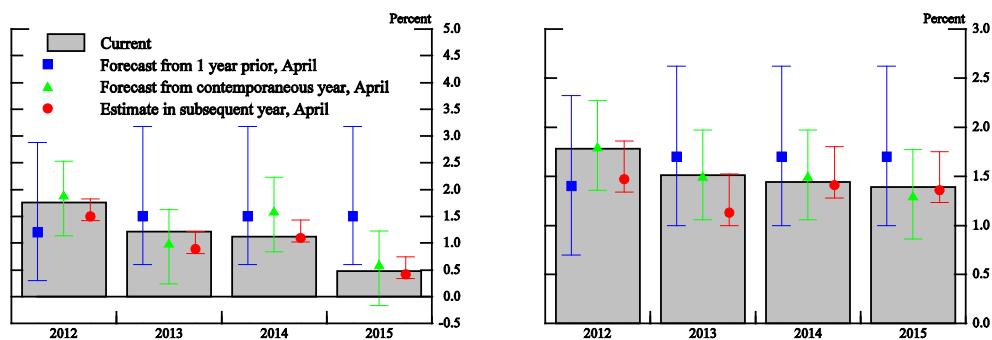
As in earlier years, lower-than-expected GDP growth in 2015 was not accompanied by a weaker-than-expected labor market. As the right panel of figure 1 shows, the staff forecasts of the unemployment rate in 2015:Q4 were too high, continuing the pattern of one-sided errors in forecasts made since August 2011. However, the misses for 2015 were somewhat smaller than the unusually large misses observed for the previous two years. In addition, the prior-year forecast of monthly payroll employment gains in 2015 was very close to the published figure of 229,000 (which is still subject to revision).<sup>1</sup>

Figure 2 shows the same information for total and core PCE price inflation. Despite the downside surprises to the unemployment rate, the current-year forecasts (the green triangles) have been relatively accurate in recent years, particularly for core PCE price inflation. The accuracy of the forecasts relative to the current estimates partially reflects upward revisions to nonmarket prices in last summer's annual revision that brought core PCE price inflation in 2012 and 2013 up to be in line with staff forecasts that initially appeared somewhat too high.

The staff made an unusually large error in its prior-year forecast of 2015 total PCE price inflation, which was concentrated in the energy category and reflected the unexpected plunge in crude oil prices. The error in forecasting 2015 core PCE price inflation one year ahead was smaller, and, in part, reflects the surprisingly large dollar appreciation restraining core goods price inflation. Non-energy, nonhousing services prices were also lower than projected, likely pushed down by a variety of factors that included the unexpected expiration of a temporary increase in Medicaid reimbursement rates to doctors that held down administered medical service price inflation in 2015. Some of these factors were idiosyncratic to the core PCE price index, and the staff's prior-year forecast of 2 percent core CPI inflation in 2015 (not shown) proved accurate despite the unexpected appreciation of the dollar.

**Figure 2: Price Inflation Forecast Errors**

PCE price inflation - Q4/Q4 change      Core PCE price inflation - Q4/Q4 change



Source: Staff forecast and U.S. Dept. of Commerce, Bureau of Economic Analysis.

<sup>1</sup> Looking at a broader set of Tealbook forecasts of the 2015:Q4 unemployment rate, the eight forecasts made during 2014 ranged between 0.1 and 0.6 percentage point too high, with the error from April 2014 shown in the chart at the high end of this range. For payrolls, these eight prior-year forecasts were too low, by an average of 18,000 jobs per month, and ranged from being too low (by 68,000 jobs per month) to too high (by 7,000 jobs per month).

- The unemployment rate edged up to 5.0 percent in March, whereas we had expected it to remain flat at 4.9 percent. However, the labor force participation rate and the employment-to-population ratio both moved higher and were above our expectations, and in response we nudged up our projection of the participation rate in the coming months. We expect the unemployment rate to drop back to 4.9 percent in April and remain there through the middle of this year.
- Given our current assessment of trend participation and the natural rate of unemployment, we estimate that there is now essentially no slack left in the labor market. In the current quarter, the projection puts the unemployment rate slightly below our estimate of its natural rate, the participation rate at its trend level, and the employment-to-population ratio a touch above its trend. That said, we continue to view the share of employees working part time for economic reasons as a little elevated.
- The staff's labor market conditions index, or LMCI—a strictly mechanical method of filtering the data—decreased again in March and has now declined for each of the past three months. The model's assessment is at odds with the staff's view that the recent rise in labor force participation and the strong pace of job gains point to continued improvement in labor market conditions despite little change in the unemployment rate in recent months.
- We revised down sharply our forecast for labor productivity in the near term. As noted earlier, output gains have been disappointing. In addition, although job gains in March came in as projected, business-sector hours surprised us to the upside because of a larger-than-expected increase in the hours of workers who are outside the scope of the payroll survey.<sup>6</sup> We now expect that productivity will be unchanged over the first half of this year, in contrast to the 1¾ percent increase we projected in the March Tealbook.

We adjusted downward our estimates of structural productivity and potential output in this projection. By the end of 2016, the level of structural productivity is

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<sup>6</sup> Business-sector workers outside the scope of the payroll survey primarily comprise self-employed persons, farm workers, and unpaid family workers.

### Decomposition of Potential GDP

(Percent change, Q4 to Q4, except as noted)

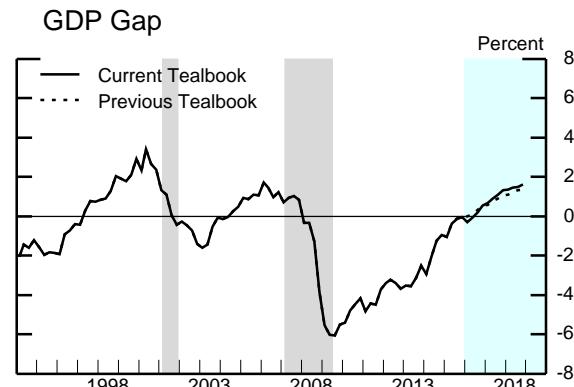
Measure	1974-95	1996-2000	2001-07	2008-10	2011-14	2015	2016	2017	2018
Potential real GDP	3.1	3.4	2.6	1.6	1.1	1.1	1.4	1.6	1.7
Previous Tealbook	3.1	3.4	2.6	1.6	1.1	1.1	1.6	1.6	1.7
<i>Selected contributions<sup>1</sup></i>									
Structural labor productivity <sup>2</sup>	1.6	2.9	2.8	1.4	.8	.7	.9	1.4	1.6
Previous Tealbook	1.6	2.9	2.8	1.4	.9	.8	1.3	1.4	1.6
Capital deepening	.7	1.5	1.0	.3	.5	.7	.5	.6	.6
Multifactor productivity	.7	1.0	1.5	.9	.1	-.2	.2	.6	.8
Structural hours	1.6	1.2	.8	.1	.5	.7	.5	.4	.3
Previous Tealbook	1.6	1.2	.8	.1	.5	.7	.5	.4	.3
Labor force participation	.4	-.1	-.2	-.5	-.6	-.5	-.5	-.5	-.5
Previous Tealbook	.4	-.1	-.2	-.5	-.6	-.5	-.5	-.5	-.5
Memo:									
GDP gap <sup>3</sup>	-1.9	2.4	.8	-4.2	-.9	.0	.5	1.3	1.6
Previous Tealbook	-1.9	2.4	.8	-4.2	-.9	-.1	.5	1.1	1.4

Note: For multiyear periods, the percent change is the annual average from Q4 of the year preceding the first year shown to Q4 of the last year shown.

1. Percentage points.

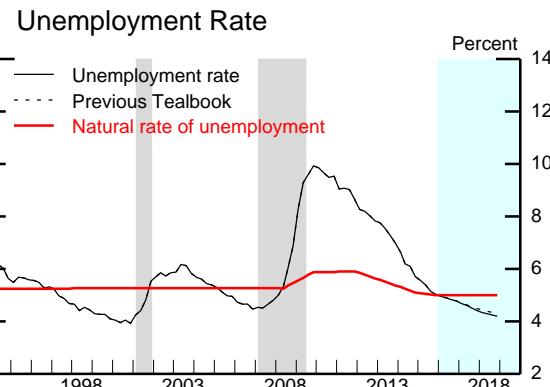
2. Total business sector.

3. Percent difference between actual and potential GDP in the final quarter of the period indicated. A negative number indicates that the economy is operating below potential.

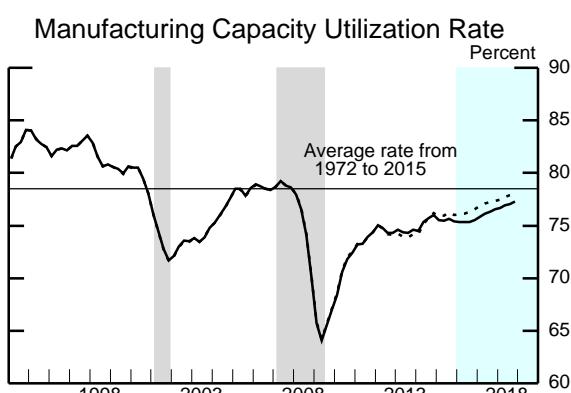


Note: The GDP gap is the percent difference between actual and potential GDP; a negative number indicates that the economy is operating below potential.

Source: U.S. Department of Commerce, Bureau of Economic Analysis; staff assumptions.

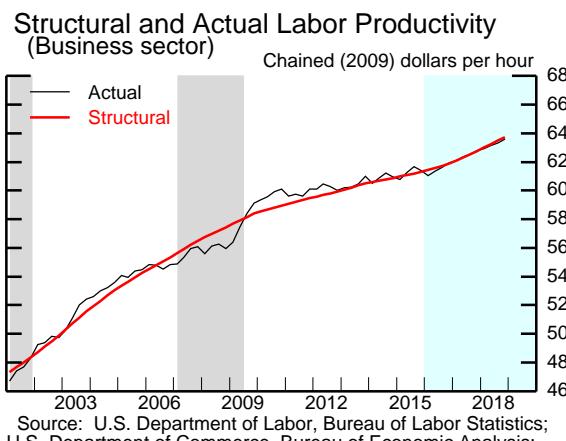


Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.



Source: Federal Reserve Board, G.17 Statistical Release, "Industrial Production and Capacity Utilization."

Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.



Source: U.S. Department of Labor, Bureau of Labor Statistics; U.S. Department of Commerce, Bureau of Economic Analysis; staff assumptions.

$\frac{3}{4}$  percent lower than in the March Tealbook, and the level of potential output is  $\frac{1}{4}$  percent lower.

- As previously indicated, we attribute some of the weakness in first-quarter GDP growth to observation error. To insulate our estimate of the output gap from this error, we lowered our estimates of potential output growth and structural productivity growth  $\frac{1}{4}$  percentage point in 2016.
- We lowered structural productivity an additional  $\frac{1}{2}$  percent and revised up the trend level of business-sector hours by the same amount in light of a string of stronger-than-expected readings for the component of hours that is outside the scope of the payroll survey.<sup>7</sup> On net, these adjustments had no effect on our estimate of potential output.

The medium-term outlook for the labor market is slightly stronger than the March Tealbook projection.

- We now project that the unemployment rate will fall to 4.2 percent by the end of 2018, a touch below our forecast in the March Tealbook, consistent with the slightly faster pace of growth of real GDP beyond the near term. This path for the unemployment rate, which ends the medium-term forecast 0.8 percentage point below our estimate of the natural rate, corresponds to our projection that GDP will be  $1\frac{1}{2}$  percent above our estimate of its potential level at the end of 2018.
- We project that the participation rate will decline at a pace slightly slower than its trend as cyclical improvements in the economy draw additional people into the labor force.<sup>8</sup> The participation rate falls from 62.9 percent in the current quarter to 62.3 percent at the end of 2018, 0.2 percentage point above its trend.
- Productivity growth is projected to be  $1\frac{1}{4}$  percent per year in 2017 and 2018, well above the experience of the past few years. See the box “Productivity

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<sup>7</sup> Specifically, because our surprises in this category of hours stretch back to 2014, we lowered the growth rate of structural productivity roughly 0.2 percentage point per year, on average, in 2014, 2015, and 2016.

<sup>8</sup> The trend participation rate declines 0.3 percentage point per year, driven by the aging of the population and ongoing declines in participation for particular demographic groups.

Acceleration Will Be More Gradual” for an alternative view that labor productivity growth will be weaker than projected by the staff.

- The pace of payroll job gains has remained surprisingly strong relative to GDP growth. We expect job growth to remain near its current pace through the middle of 2017 and then to slow to about 140,000 per month by 2018, as output growth moderates and productivity rises just a little less than its trend rate.

## THE OUTLOOK FOR INFLATION

Recent data on inflation have, on balance, been in line with our March Tealbook projection and support our expectation that core PCE price inflation will step down in the second quarter.

- Much of the acceleration in core PCE prices in the first quarter, to nearly 2 percent at an annual rate, reflected high readings in January for categories from which we take little signal. Consistent with this view, the core PCE price index decelerated in February, and, with CPI and PPI data in hand, we estimate that it only edged up in March.<sup>9</sup> Accordingly, we expect that core PCE inflation will step down to 1½ percent in the current quarter—essentially unrevised from the March Tealbook. Our monthly projection implies that the 12-month change in core PCE prices will be at 1.5 percent from March through June.
- With the fall in energy prices now largely behind us, we expect total PCE inflation to be 1¼ percent in the second quarter.
- Core import prices are expected to increase at a modest 1 percent annual rate in the current quarter, ending a string of six consecutive quarterly declines, as the recent depreciation of the dollar pushes up prices. We expect core import price inflation to pick up to a 2¼ percent pace in the second half of this year and then to average only 1 percent in 2017 and 2018, consistent with our projection for foreign inflation, the dollar, and commodity prices.

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<sup>9</sup> The core CPI posted a relatively large increase of 0.3 percent for February, which we reported at the March FOMC meeting, but the increase in the core PCE index in February turned out to be modest, rounding to 0.1 percent, in part because nonmarket prices reversed a large share of the January increase.

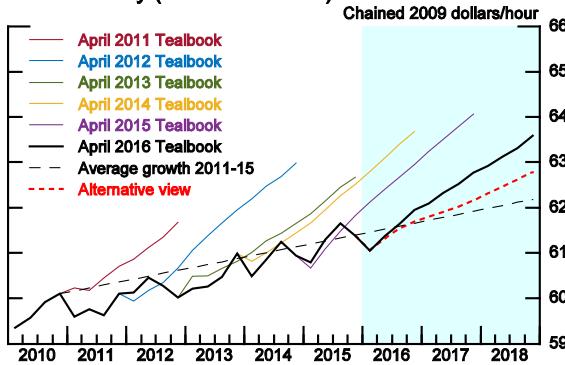
## Alternative View: Productivity Acceleration Will Be More Gradual

In contrast to the staff's baseline projection that business-sector labor productivity will grow, on average,  $1\frac{1}{4}$  percent annually over the next three years, this discussion presents the view that productivity growth will recover more slowly from its recent meager pace. Since 2011, productivity growth has averaged less than  $\frac{1}{2}$  percent per year, which represents a substantial slowdown relative to the 2 percent average between 1973 and 2007. Like most other forecasters, the staff did not anticipate this slowdown and has been repeatedly surprised by the disappointing productivity gains (figure 1). Although the importance of different explanations for the recent paltry pace of productivity growth is still being debated, some of the factors that are holding back productivity improvements will likely persist for a while longer.

It is worth noting that the productivity slowdown is not unique to the United States but instead has been experienced by most developed countries. Indeed, among OECD countries with available data, 29 of 30 countries experienced a reduction in productivity gains after 2005, with productivity growth  $1\frac{1}{4}$  percentage points lower per year, on average, between 2005 and 2014 than during the preceding 10-year period. The ubiquity of the productivity deceleration suggests that the underlying forces are likely to be common as well.

One set of possible explanations for the productivity slowdown in the United States relates to the lingering effects of the Great Recession. Most importantly, growth of capital stock has been anemic in the aftermath of the financial crisis, and, as a result, capital deepening—historically an important driver of productivity growth—has been unusually and persistently subdued (figure 2). At the same time, the severe distress in the labor market has likely impeded the reallocation of labor toward its most productive uses. Moreover, firm formation dropped precipitously during the Great Recession and remained depressed thereafter, and this “missing generation” of firms may have diminished growth in the productive capacity of the economy.<sup>1</sup> Although the effects of these factors should dissipate over time, the experience so far suggests that this process will be gradual.

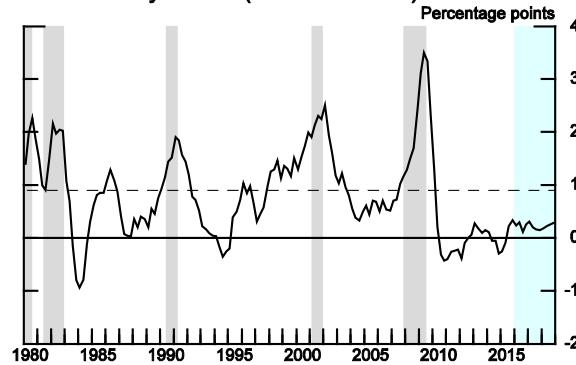
**Figure 1. Staff Projections for the Level of Labor Productivity (Business Sector)**



Note: Until September 2014, the staff was projecting labor productivity in the nonfarm business (NFB) sector, and thus, projections from 2011-14 Tealbooks were adjusted for the observed productivity growth differential between the NFB and the business sector; the differential was small and averaged zero during the period. To abstract from effects of revisions to historical data, projections jump off current-vintage data.

Source: U.S. Department of Labor, Bureau of Labor Statistics; U.S. Department of Commerce, Bureau of Economic Analysis; staff projections.

**Figure 2. Contribution of Capital Deepening to Productivity Growth (Business Sector)**



Note: Contribution to four-quarter percent growth in productivity. The dashed line depicts 1980-2007 average. The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

Source: John G. Fernald (2014), "A Quarterly, Utilization-Adjusted Series on Total Factor Productivity," Working Paper Series 2012-19 (San Francisco: Federal Reserve Bank of San Francisco, April; revised March 2014); staff calculations and projection.

Note: Prepared by Tomaz Cajner.

<sup>1</sup> See François Gourio, Todd Messer, and Michael Siemer (forthcoming), “Firm Entry and Macroeconomic Dynamics: A State-Level Analysis,” *American Economic Review, Papers and Proceedings*.

According to a second set of explanations, the productivity slowdown actually preceded the Great Recession. Factors that resulted in unusually strong multifactor productivity growth in the 1990s—most notably, factors related to rapid advances in information and communication technologies—had run their course by the mid-2000s.<sup>2</sup> Relatedly, falling job reallocation associated with declining business dynamism appears to be pushing down productivity growth in the post-2000 period as well.<sup>3</sup> As a consequence of these influences, we might have entered a period of slow productivity growth beginning in the mid-2000s, perhaps reminiscent of the one that started in the 1970s.<sup>4</sup>

All told, with several different underlying forces likely contributing to the subpar productivity growth over the past five years, it seems unlikely that all of these forces will swiftly disappear in coming quarters. Moreover, since the mid-1980s, productivity appears to be countercyclical, and thus one should expect below-trend productivity growth at this stage in the business cycle. Therefore, it seems more likely that productivity will accelerate only gradually, moving up perhaps  $\frac{1}{2}$  percent in 2016,  $\frac{3}{4}$  percent in 2017, and 1 percent in 2018. If so, the level of productivity at the end of 2018 would be  $1\frac{1}{4}$  percent lower than currently projected by the staff.

A downward adjustment to the productivity forecast would also potentially have important implications for other aspects of the staff's projection. If the lower productivity growth were assumed to reduce consumers' and investors' expectations of income, this reduction would result in weaker aggregate demand but would have little implication for the labor market forecast. Alternatively, and more consistent with the experience of the past few years, this lower productivity growth could coincide with real GDP growth similar to the staff's current outlook for aggregate demand, in which case lower productivity growth would lead to a faster-than-projected improvement in labor market conditions (see the Risks and Uncertainty section for a model-based perspective on possible macroeconomic outcomes). Moreover, equilibrium wage growth—the sum of trend inflation and underlying productivity growth—would be lower by almost  $\frac{1}{2}$  percentage point per year, implying that even a modest step-up in wage growth could lead to inflationary pressures.

Finally, it is worth considering the case in which productivity growth remains historically low for a prolonged period of time. A protracted productivity slowdown would have much more serious macroeconomic consequences, including continued downward pressure on the equilibrium real interest rate, reduced incentives for labor force participation, rising fiscal imbalances, and slower improvements in living standards.

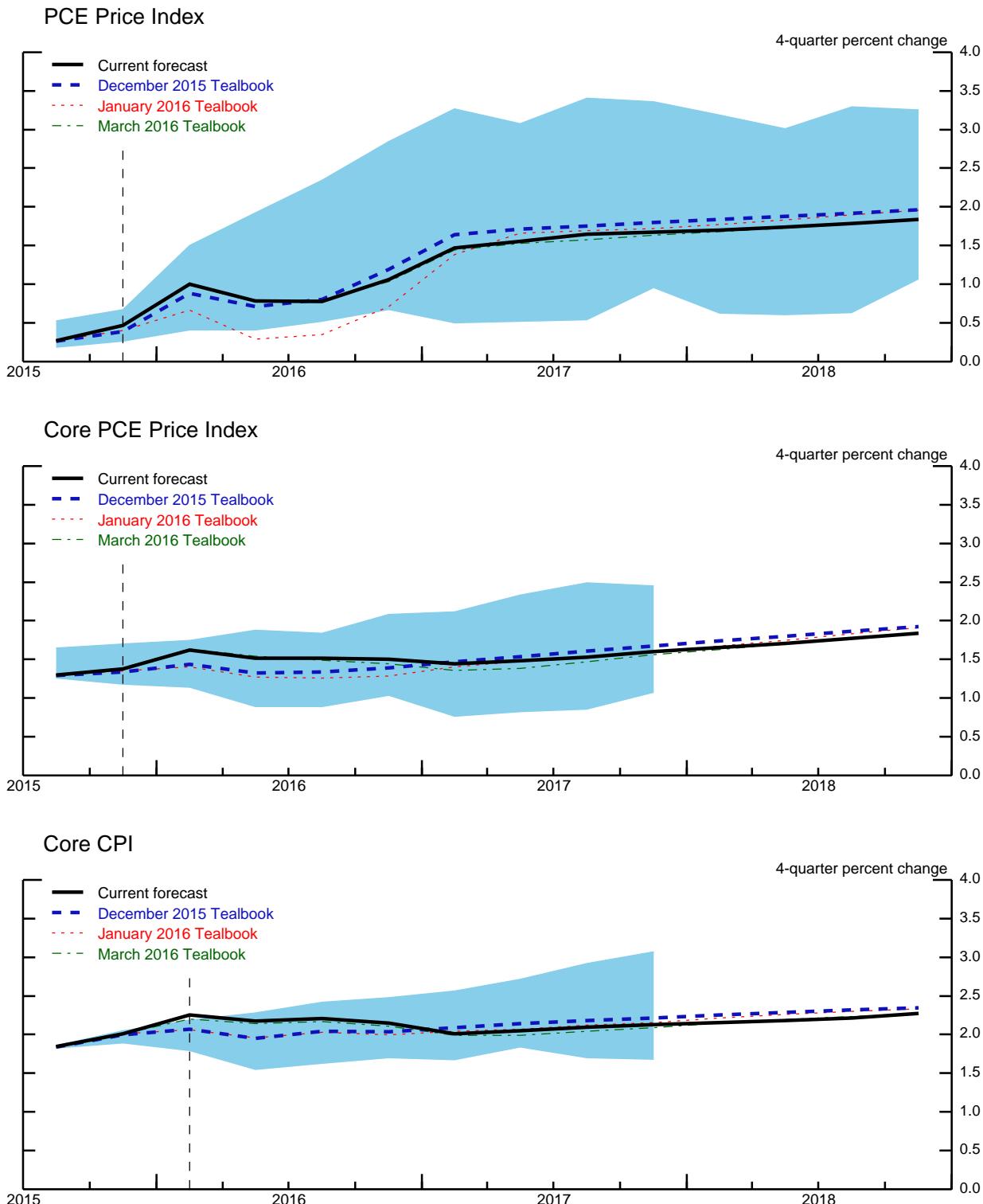
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<sup>2</sup> See John Fernald (2015), "Productivity and Potential Output before, during, and after the Great Recession," *NBER Macroeconomics Annual 2014*, vol. 29, pp. 1–51.

<sup>3</sup> For evidence from the manufacturing sector, see Ryan A. Decker, John Haltiwanger, Ron S. Jarmin, and Javier Miranda (2016), "Changing Business Dynamism: Volatility of Shocks vs. Responsiveness to Shocks?" unpublished paper, <https://goo.gl/M5oDvW>.

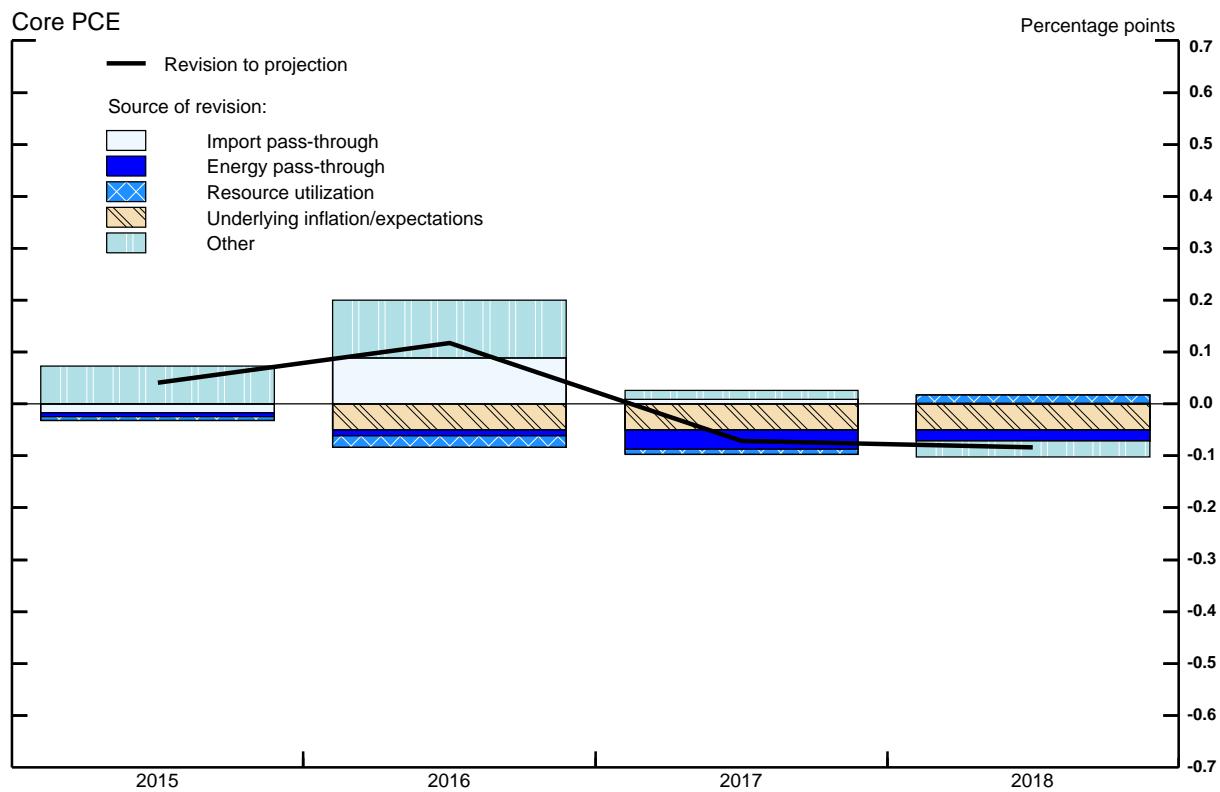
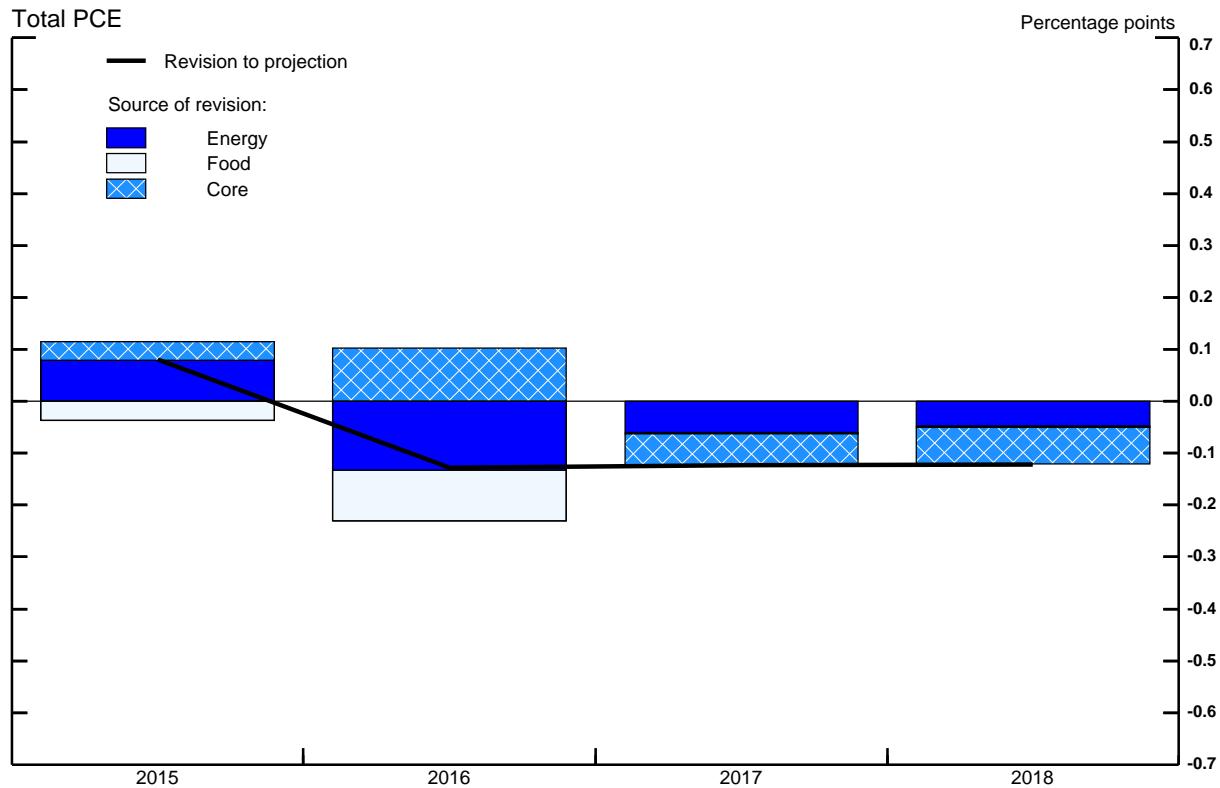
<sup>4</sup> Another possibility is that the productivity slowdown reflects measurement issues. However, existing research has found little support for this hypothesis; see David M. Byrne, John G. Fernald, and Marshall B. Reinsdorf (forthcoming), "Does the United States Have a Productivity Slowdown or a Measurement Problem?" *Brookings Papers on Economic Activity*.

## Inflation Forecasts since the December 2015 Tealbook



Note: Blue shading represents the 70 percent confidence interval for the December 2015 projection. Confidence intervals are computed using historical errors from December staff forecasts since 1998. See appendix, "Technical Note on Prediction Intervals Derived from Historical Tealbook Forecast Errors," in the Risks and Uncertainty section. The dotted vertical lines denote the most recent quarter of data.

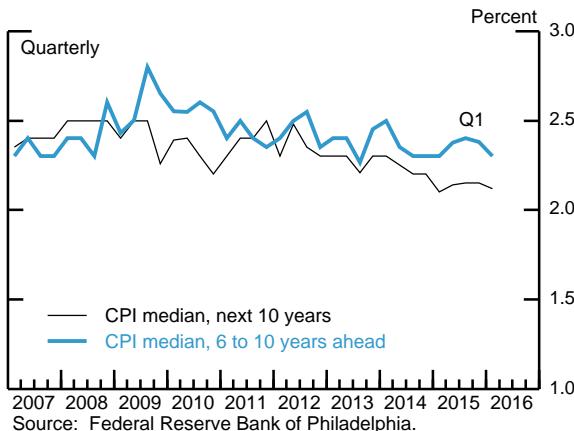
Source: Staff projections and judgmental rules of thumb.

**Sources of Inflation Forecast Revisions since the December 2015 Tealbook**

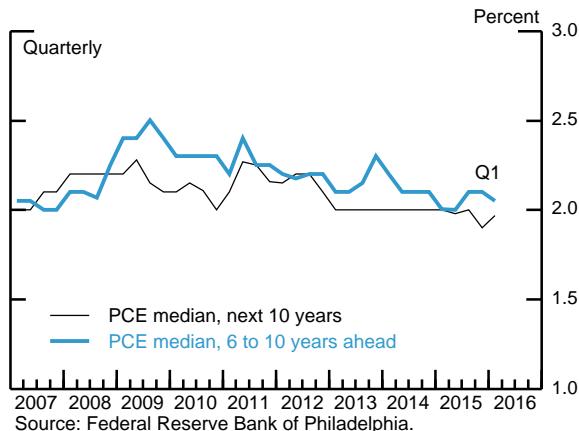
Source: Staff projections and judgmental rules of thumb.

## Survey Measures of Longer-Term Inflation Expectations

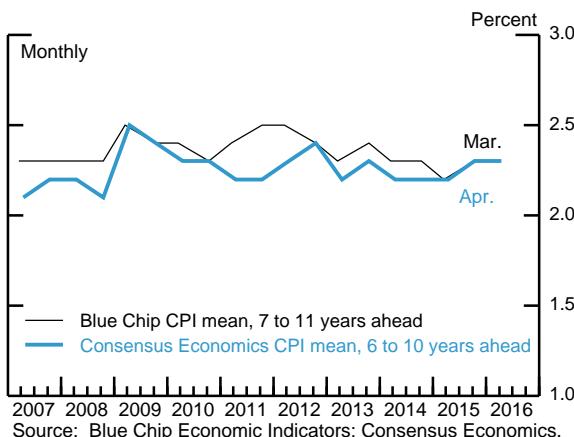
Survey of Professional Forecasters (CPI)



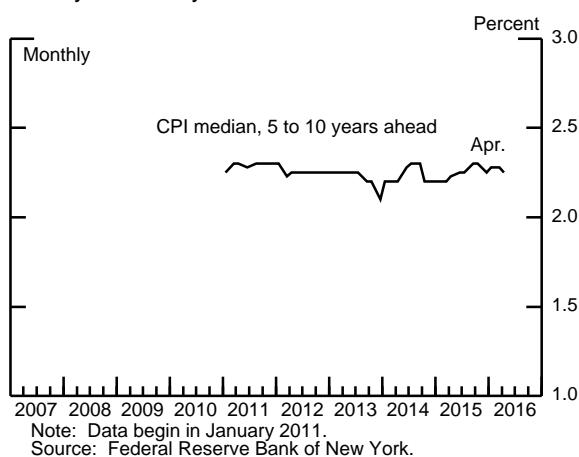
Survey of Professional Forecasters (PCE)



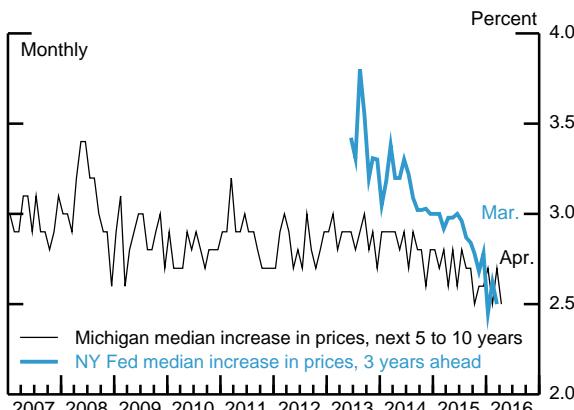
Blue Chip and Consensus Outlook



Survey of Primary Dealers

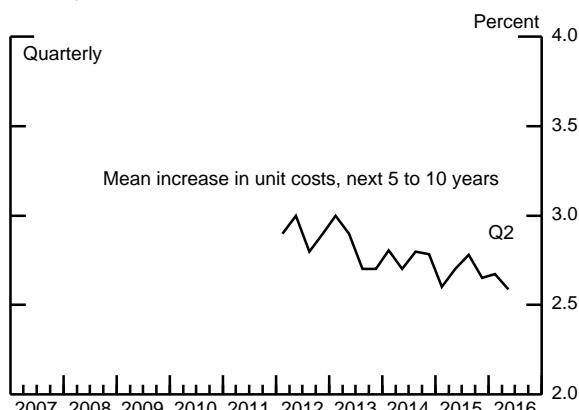


Surveys of Consumers



Note: Federal Reserve Bank of New York Survey of Consumer Expectations reports expected 12-month inflation rate 3 years from the current survey date.

Survey of Business Inflation Expectations



- The Michigan survey measure of longer-run inflation expectations fell 0.2 percentage point to 2.5 percent in the preliminary April release, matching the very low reading we had in hand at the time of the March Tealbook. Meanwhile, market-based measures of longer-term inflation compensation have edged up somewhat but still remain at the low end of their historical range.

We project core PCE inflation to be 1.5 percent this year but to move gradually higher over the remainder of the projection period, reaching 1.8 percent in 2018.

- Waning restraint from energy and import price pass-through accounts for nearly all of the rise in core inflation that we are projecting over the medium term. Other influences on the inflation projection, including the projected tightening of resource utilization over the medium term, are relatively small.
- Beyond the near term, both food and energy prices are projected to rise just a little faster than core prices on average. As a result, total PCE price inflation moves back up to the same rate as core inflation in 2017 and 2018.
- Compared with the March Tealbook, both overall and core PCE price inflation are 0.1 percentage point higher in 2016, as the lower path for the dollar shows through to higher import prices. Thereafter, the inflation forecast is essentially unrevised. Revisions to the inflation projection since the December 2015 Tealbook are also relatively small.

We have received little data on labor compensation since the March Tealbook.

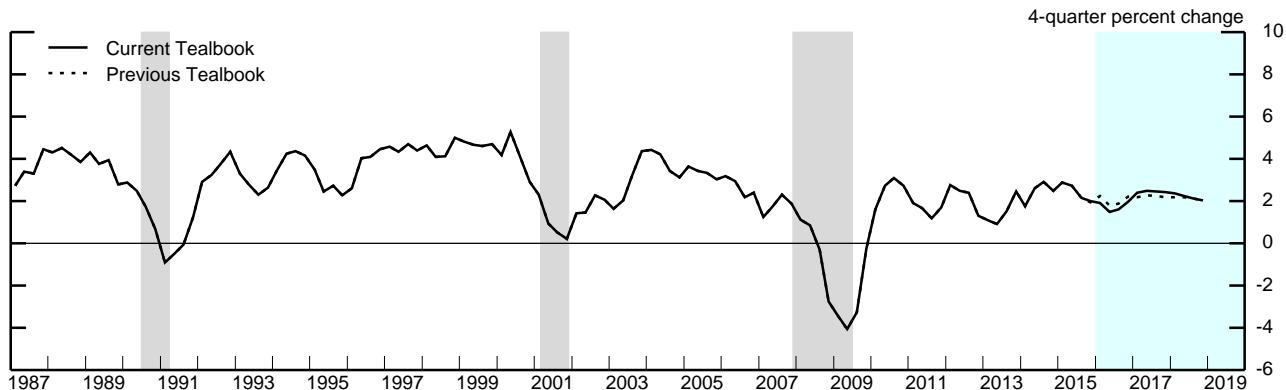
- In the 12 months through March, average hourly earnings increased 2 $\frac{1}{4}$  percent, in line with our expectation. In the near term, we expect the 12-month change in this measure to edge up slightly to 2 $\frac{1}{2}$  percent.
- We now estimate that business-sector compensation per hour rose at an annual rate of 2 $\frac{1}{2}$  percent in the first quarter and will increase 2 $\frac{3}{4}$  percent over the year as a whole. We continue to expect that gains in hourly compensation will move up further, to 3 $\frac{1}{4}$  percent, by 2018.

## THE LONG-TERM OUTLOOK

- The Federal Reserve's holdings of securities continue to put downward pressure on longer-term interest rates, albeit to a diminishing extent over time. The SOMA portfolio is projected to have returned to a normal size by the end of 2021.
- The federal funds rate rises further after 2018. With the economy running above its potential level and inflation having reached the Committee's 2 percent objective, the federal funds rate reaches 4 percent in 2020 and 2021 and moves back toward its long-run value of 3¼ percent thereafter.
- The natural rate of unemployment remains at 5.0 percent, and potential GDP growth reaches its long-run value of 1.9 percent in 2020.
- As monetary policy continues to tighten, real GDP decelerates further and rises at an annual rate of 1½ percent in 2020 and 2021. The unemployment rate is 4¼ percent in 2019 and then starts rising gradually toward its assumed natural rate in subsequent years.
- PCE price inflation moves up from 1.8 percent in 2018 to the Committee's long-run objective of 2 percent in 2020.

**Projections of Real GDP and Related Components**  
 (Percent change at annual rate from final quarter  
 of preceding period except as noted)

Measure	2015	2016		2016	2017	2018
		H1	H2			
<b>Real GDP</b>		<b>2.0</b>	<b>1.3</b>	<b>2.7</b>	<b>2.0</b>	<b>2.0</b>
Previous Tealbook		1.9	2.0	2.4	2.2	2.0
Final sales	2.0	1.6	2.6	2.1	2.5	2.2
Previous Tealbook	1.9	2.3	2.2	2.3	2.2	2.3
Personal consumption expenditures	2.7	2.4	2.9	2.7	2.9	2.5
Previous Tealbook	2.6	3.1	2.7	2.9	2.9	2.5
Residential investment	9.4	7.6	12.0	9.8	6.2	5.0
Previous Tealbook	9.5	8.2	10.8	9.5	5.5	6.0
Nonresidential structures	-3.5	-11.3	2.2	-4.8	3.1	1.7
Previous Tealbook	-4.1	-6.5	1.0	-2.8	2.7	1.3
Equipment and intangibles	3.0	1.6	4.1	2.8	3.7	2.9
Previous Tealbook	3.2	3.0	4.1	3.5	3.5	3.0
Federal purchases	.9	1.8	3.2	2.5	.1	-.8
Previous Tealbook	.9	4.3	1.3	2.7	-.4	-.8
State and local purchases	1.2	2.1	1.0	1.5	1.7	1.7
Previous Tealbook	1.2	1.6	1.2	1.4	1.7	1.7
Exports	-.6	.3	2.6	1.5	2.7	3.8
Previous Tealbook	-.7	-.5	1.7	.6	1.7	3.6
Imports	2.9	3.9	6.0	4.9	4.8	3.9
Previous Tealbook	2.9	4.5	6.0	5.3	5.0	3.9
Contributions to change in real GDP (percentage points)						
Inventory change	.0	-.3	.0	-.1	-.1	-.2
Previous Tealbook	.0	-.3	.2	.0	.0	-.2
Net exports	-.5	-.5	-.6	-.6	-.4	-.2
Previous Tealbook	-.5	-.7	-.7	-.7	-.6	-.2

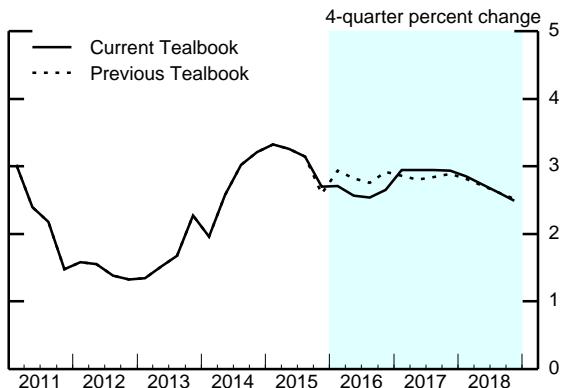
**Real GDP**

Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

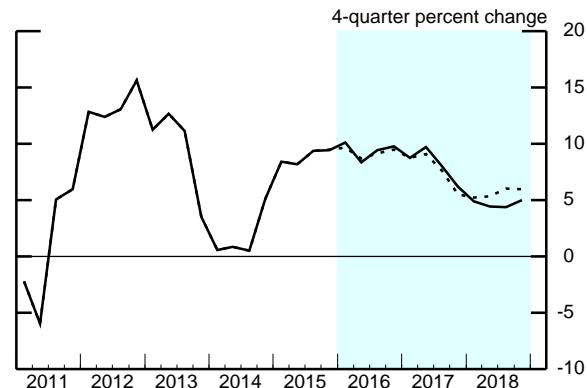
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

## Components of Final Demand

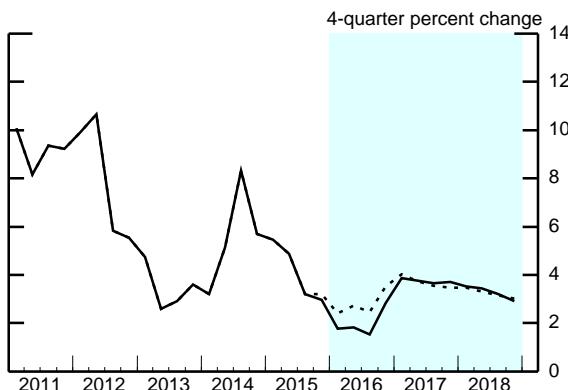
**Personal Consumption Expenditures**



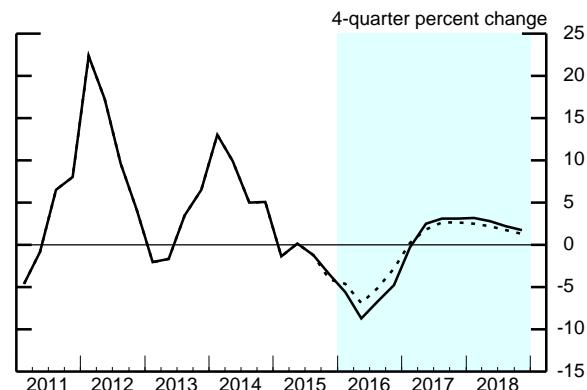
**Residential Investment**



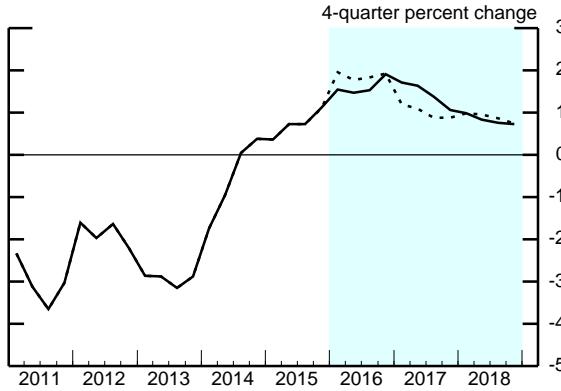
**Equipment and Intangibles**



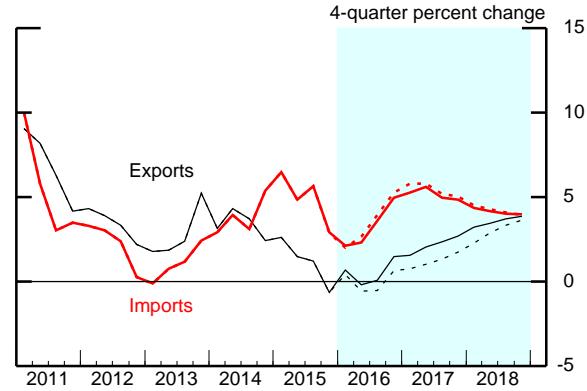
**Nonresidential Structures**



**Government Consumption & Investment**



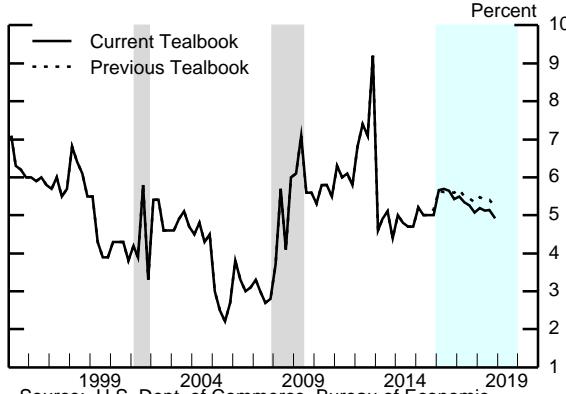
**Exports and Imports**



Source: U.S. Department of Commerce, Bureau of Economic Analysis.

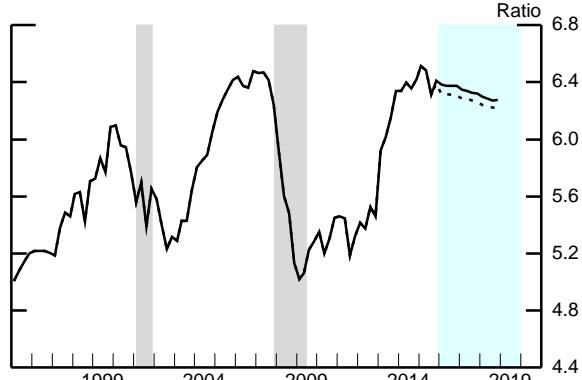
## Aspects of the Medium-Term Projection

**Personal Saving Rate**



Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

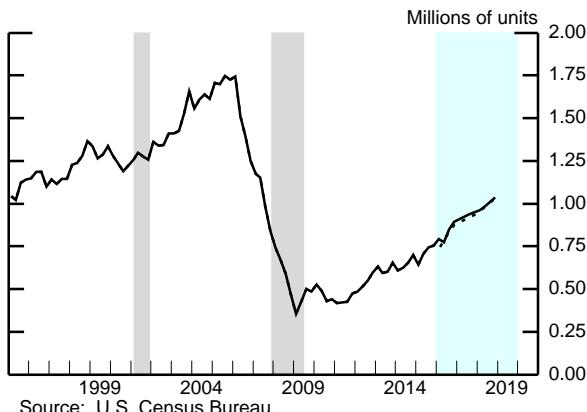
**Wealth-to-Income Ratio**



Note: Ratio of household net worth to disposable personal income.

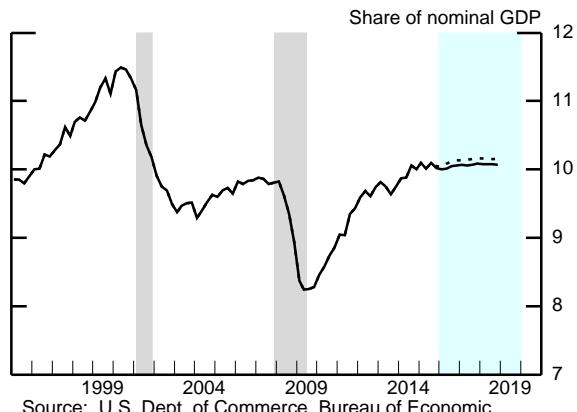
Source: For net worth, Federal Reserve Board, Financial Accounts of the United States; for income, U.S. Dept. of Commerce, Bureau of Economic Analysis.

**Single-Family Housing Starts**



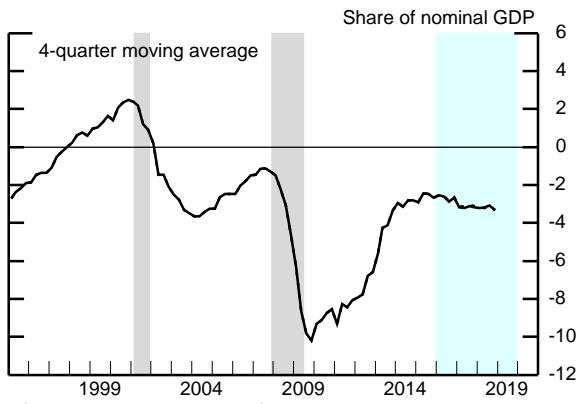
Source: U.S. Census Bureau.

**Equipment and Intangibles Spending**



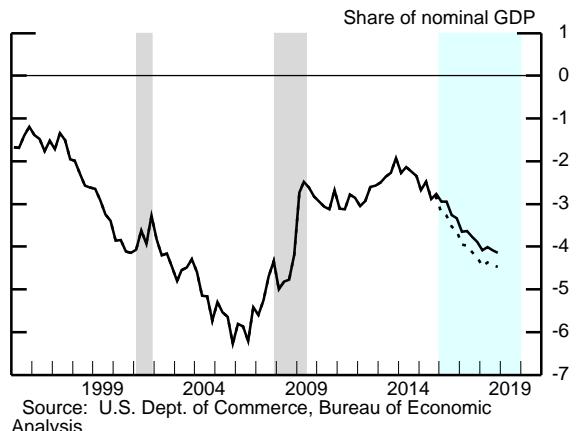
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

**Federal Surplus/Deficit**



Source: Monthly Treasury Statement.

**Current Account Surplus/Deficit**



Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

**The Outlook for the Labor Market**

Measure	2015	2016		2016	2017	2018
		H1	H2			
Output per hour, business <sup>1</sup> Previous Tealbook	.7 .6	-.1 1.7	1.9 1.8	.9 1.7	1.3 1.3	1.3 1.4
Nonfarm payroll employment <sup>2</sup> Previous Tealbook	229 229	206 206	194 189	200 197	186 171	141 138
Private employment <sup>2</sup> Previous Tealbook	221 221	193 197	180 175	186 186	171 156	126 123
Labor force participation rate <sup>3</sup> Previous Tealbook	62.5 62.5	62.9 62.8	62.7 62.7	62.7 62.7	62.5 62.5	62.3 62.2
Civilian unemployment rate <sup>3</sup> Previous Tealbook	5.0 5.0	4.9 4.9	4.8 4.8	4.8 4.8	4.4 4.5	4.2 4.3

1. Percent change from final quarter of preceding period at annual rate.

2. Thousands, average monthly changes.

3. Percent, average for the final quarter in the period.

Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.

**Inflation Projections**  
(Percent change at annual rate from final quarter of preceding period)

Measure	2015	2016		2016	2017	2018
		H1	H2			
PCE chain-weighted price index Previous Tealbook	.5 .5	.8 .7	1.4 1.4	1.1 1.0	1.7 1.6	1.8 1.8
Food and beverages Previous Tealbook	.2 .2	-1.0 .0	1.8 1.8	.4 .9	2.0 2.0	2.0 2.0
Energy Previous Tealbook	-15.1 -15.1	-15.8 -19.2	2.0 5.4	-7.3 -7.7	2.7 2.7	1.6 1.4
Excluding food and energy Previous Tealbook	1.4 1.4	1.7 1.7	1.3 1.2	1.5 1.4	1.6 1.6	1.8 1.8
Prices of core goods imports <sup>1</sup> Previous Tealbook	-3.4 -3.3	-.4 -1.4	2.2 1.1	.9 -.1	1.0 1.0	1.1 1.1

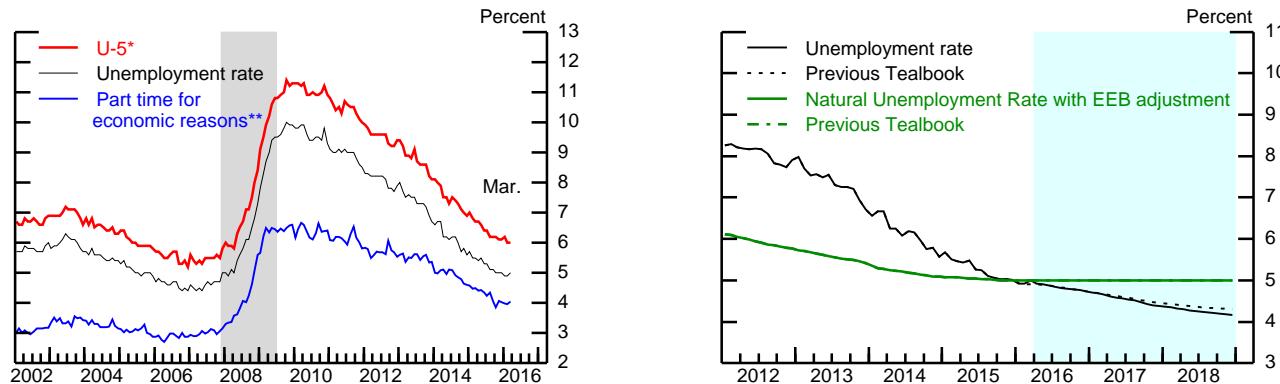
1. Core goods imports exclude computers, semiconductors, oil, and natural gas.

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

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## Labor Market Developments and Outlook (1)

### Measures of Labor Underutilization



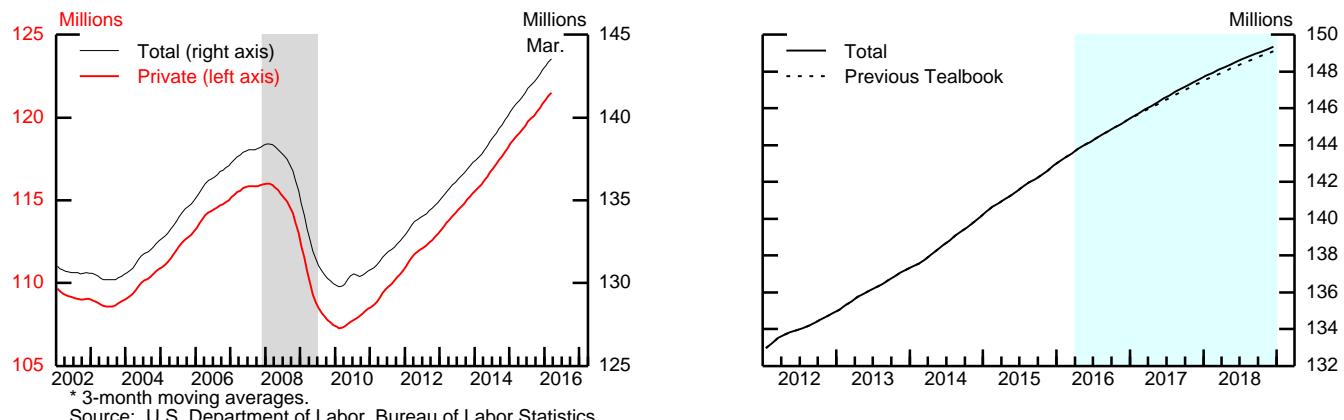
\* U-5 measures total unemployed persons plus all marginally attached to the labor force, as a percent of the labor force plus persons marginally attached to the labor force.

\*\* Percent of Current Population Survey employment.

EEB Extended and emergency unemployment benefits.

Source: U.S. Department of Labor, Bureau of Labor Statistics.

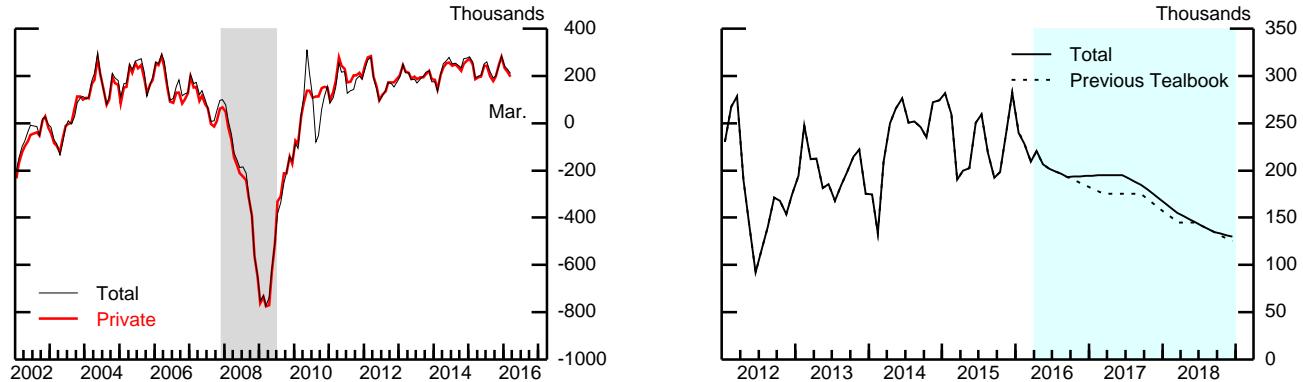
### Level of Payroll Employment\*



\* 3-month moving averages.

Source: U.S. Department of Labor, Bureau of Labor Statistics.

### Change in Payroll Employment\*



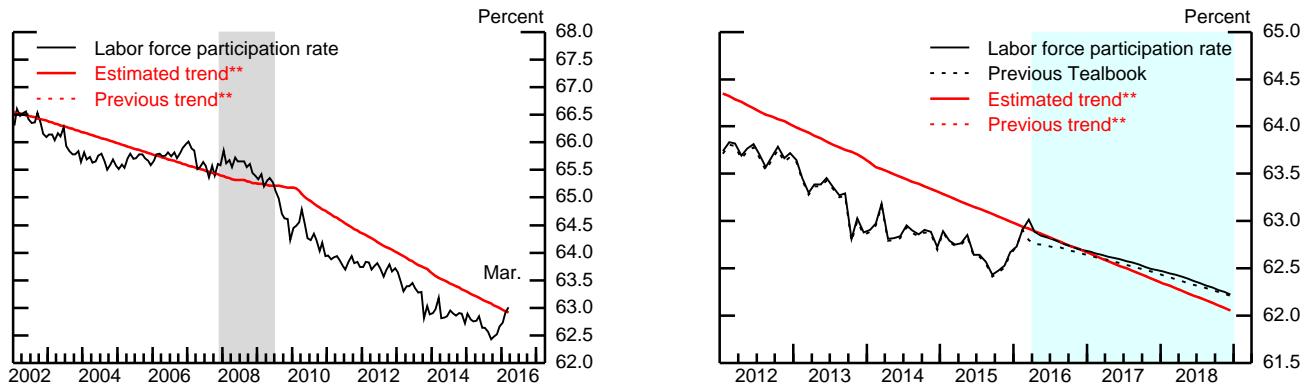
\* 3-month moving averages.

Source: U.S. Department of Labor, Bureau of Labor Statistics.

Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

## Labor Market Developments and Outlook (2)

### Labor Force Participation Rate\*

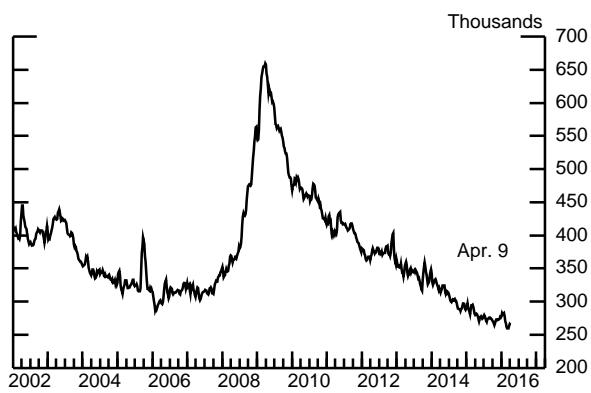


\* Published data adjusted by staff to account for changes in population weights.

\*\* Includes staff estimate of the effect of extended and emergency unemployment benefits.

Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.

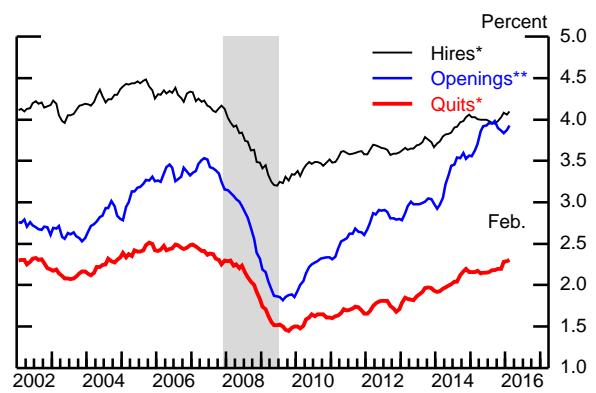
### Initial Unemployment Insurance Claims\*



\* 4-week moving average.

Source: U.S. Department of Labor, Employment and Training Administration.

### Private Hires, Quits, and Job Openings

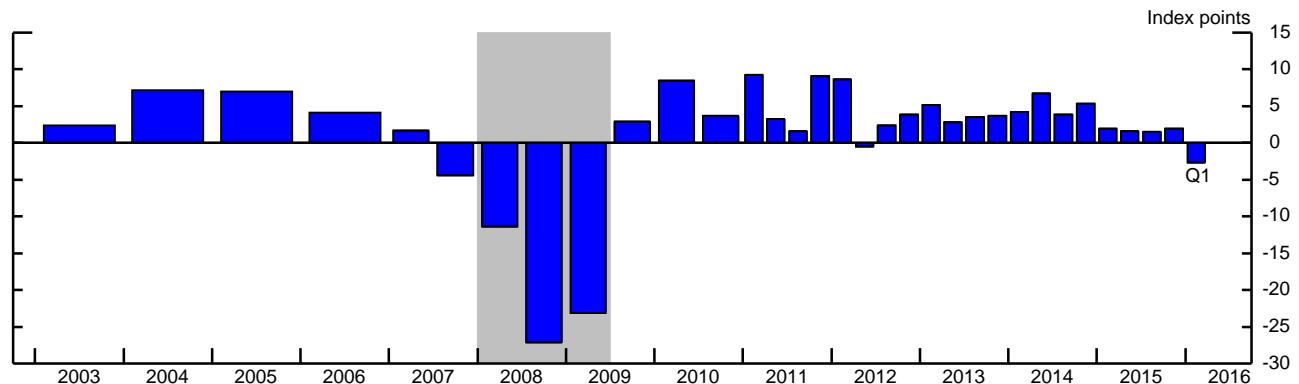


\* Percent of private nonfarm payroll employment, 3-month moving average.

\*\* Percent of private nonfarm payroll employment plus unfilled jobs, 3-month moving average.

Source: Job Openings and Labor Turnover Survey.

### Average Monthly Change in Labor Market Conditions Index



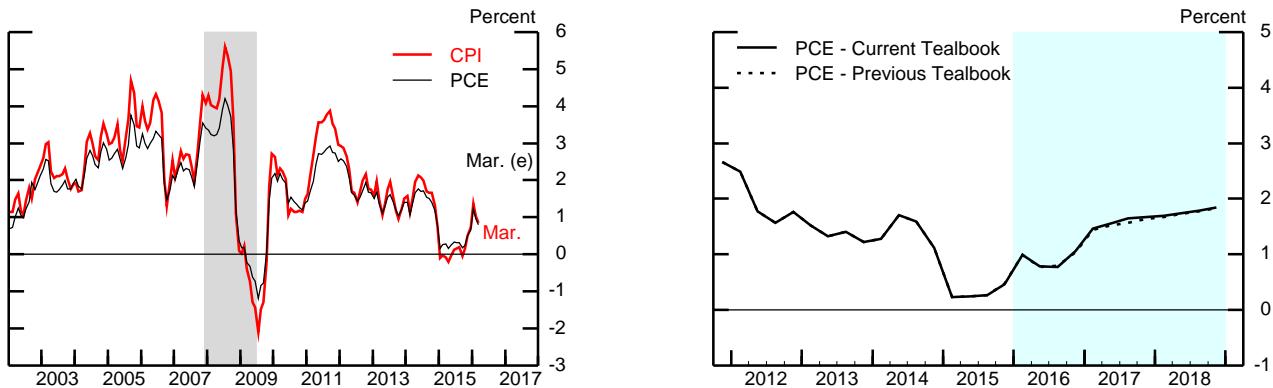
Source: Labor market conditions index estimated by staff.

Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

## Inflation Developments and Outlook (1)

(Percent change from year-earlier period)

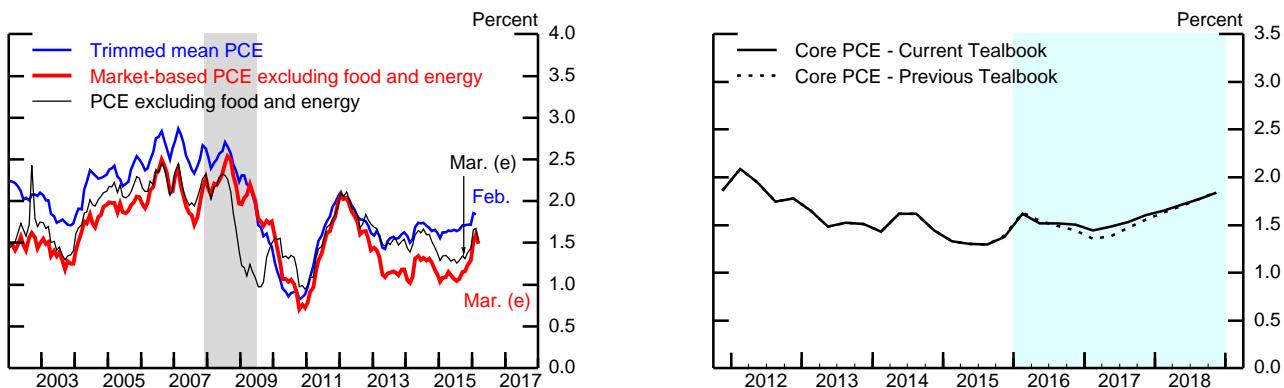
### Headline Consumer Price Inflation



Note: PCE prices from January to March 2016 are staff estimates (e).

Source: For CPI, U.S. Department of Labor, Bureau of Labor Statistics; for PCE, U.S. Department of Commerce, Bureau of Economic Analysis.

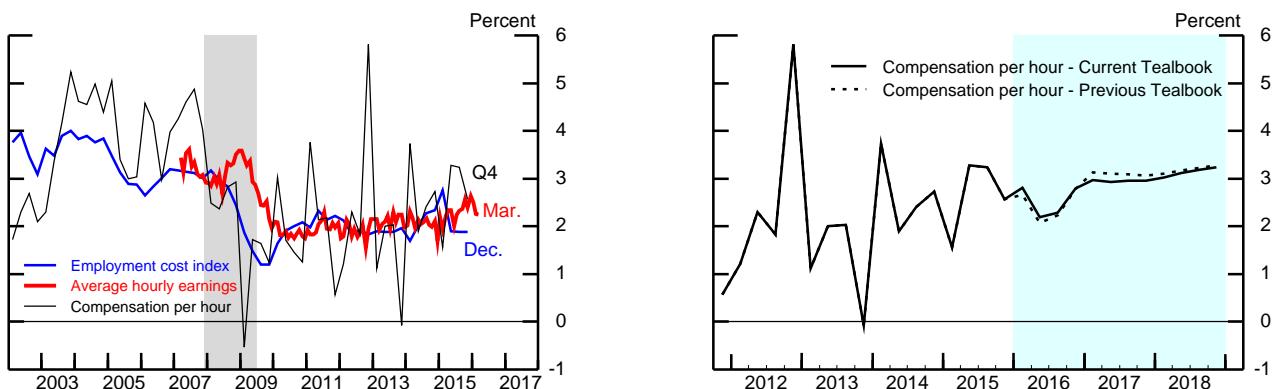
### Measures of Underlying PCE Price Inflation



Note: Core PCE prices from January to March 2016 are staff estimates (e).

Source: For trimmed mean PCE, Federal Reserve Bank of Dallas; otherwise, U.S. Department of Commerce, Bureau of Economic Analysis.

### Labor Cost Growth



Note: Compensation per hour is for the business sector. Average hourly earnings are for the private nonfarm sector. The employment cost index is for the private sector.

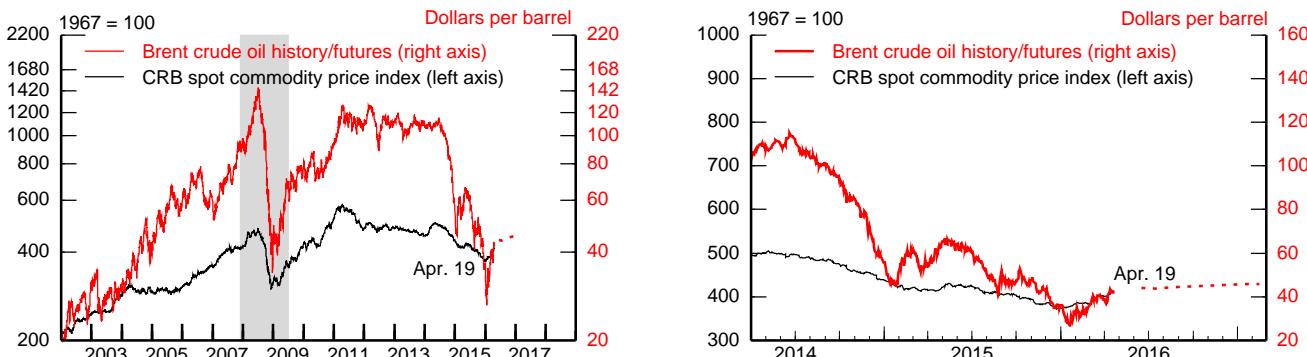
Source: U.S. Department of Labor, Bureau of Labor Statistics.

Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

## Inflation Developments and Outlook (2)

(Percent change from year-earlier period, except as noted)

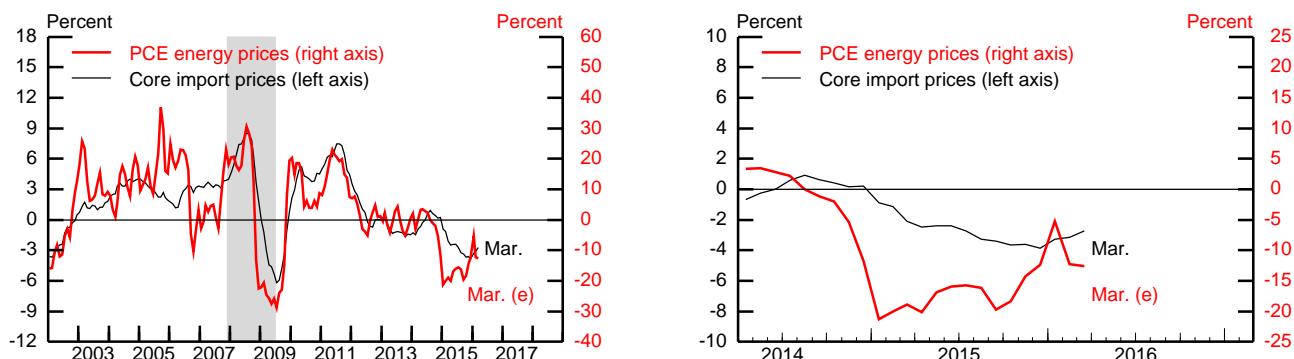
### Commodity and Oil Price Levels



Note: Futures prices (dotted lines) are the latest observations on monthly futures contracts.

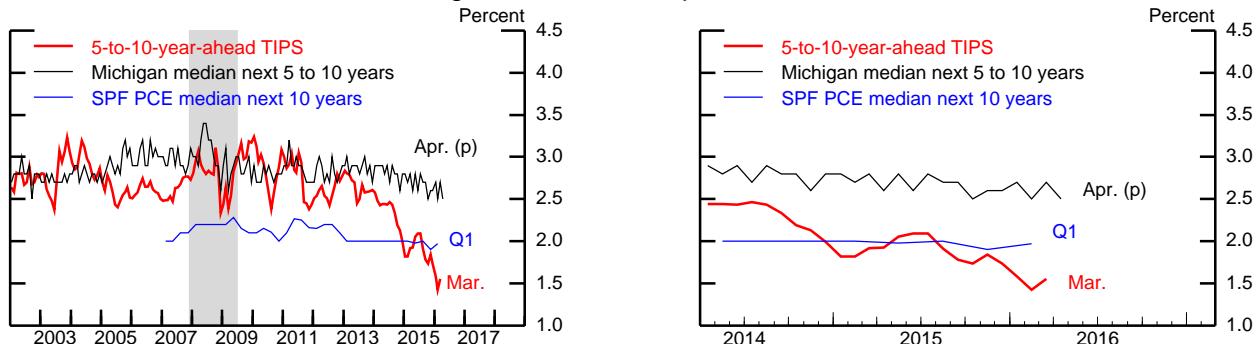
Source: For oil prices, U.S. Department of Energy, Energy Information Agency; for commodity prices, Commodity Research Bureau (CRB).

### Energy and Import Price Inflation



Source: For core import prices, U.S. Dept. of Labor, Bureau of Labor Statistics; for PCE, U.S. Dept. of Commerce, Bureau of Economic Analysis.

### Long-Term Inflation Expectations



Note: Based on a comparison of an estimated TIPS (Treasury Inflation-Protected Securities) yield curve with an estimated nominal off-the-run Treasury yield curve, with an adjustment for the indexation-lag effect.

p Preliminary.

SPF Survey of Professional Forecasters.

Source: For Michigan, University of Michigan Surveys of Consumers; for SPF, Federal Reserve Bank of Philadelphia; for TIPS, Federal Reserve Board staff calculations.

Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

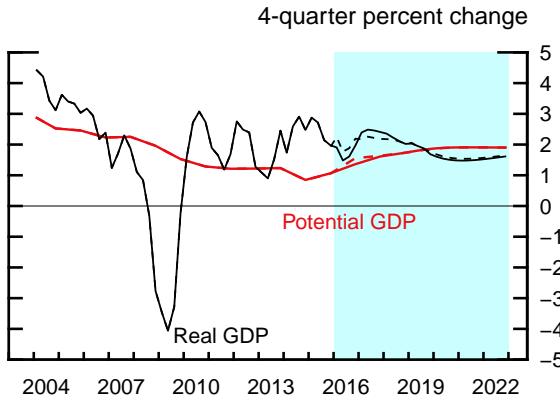
**The Long-Term Outlook**

(Percent change, Q4 to Q4, except as noted)

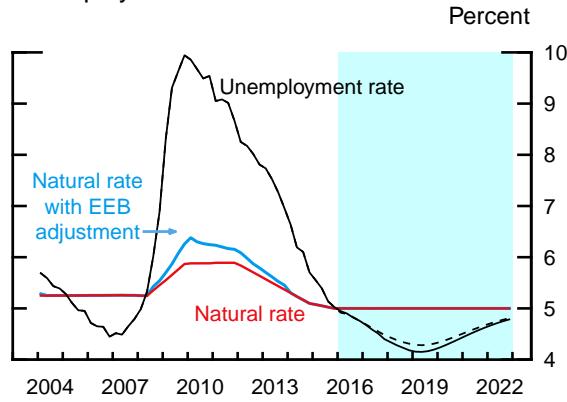
Measure	2016	2017	2018	2019	2020	2021	Longer run
Real GDP Previous Tealbook	2.0 2.2	2.4 2.2	2.0 2.0	1.7 1.8	1.5 1.5	1.5 1.6	1.9 1.9
Civilian unemployment rate <sup>1</sup> Previous Tealbook	4.8 4.8	4.4 4.5	4.2 4.3	4.2 4.3	4.4 4.5	4.6 4.7	5.0 5.0
PCE prices, total Previous Tealbook	1.1 1.0	1.7 1.6	1.8 1.8	1.9 1.9	2.0 2.0	2.1 2.0	2.0 2.0
Core PCE prices Previous Tealbook	1.5 1.4	1.6 1.6	1.8 1.8	1.9 1.9	2.0 2.0	2.1 2.0	2.0 2.0
Federal funds rate <sup>1</sup> Previous Tealbook	1.27 1.45	2.37 2.34	3.30 3.18	3.89 3.73	4.11 3.96	4.07 3.95	3.25 3.25
10-year Treasury yield <sup>1</sup> Previous Tealbook	2.5 2.8	3.4 3.6	3.8 4.0	4.0 4.1	4.1 4.2	4.2 4.2	4.1 4.1

1. Percent, average for the final quarter of the period.

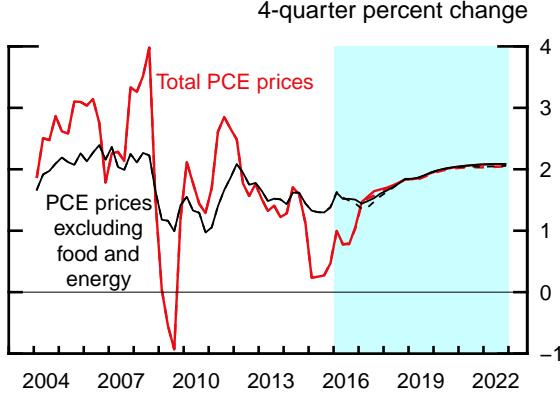
Real GDP



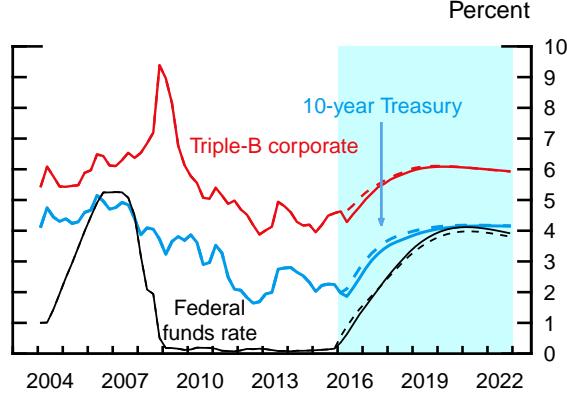
Unemployment Rate



PCE Prices



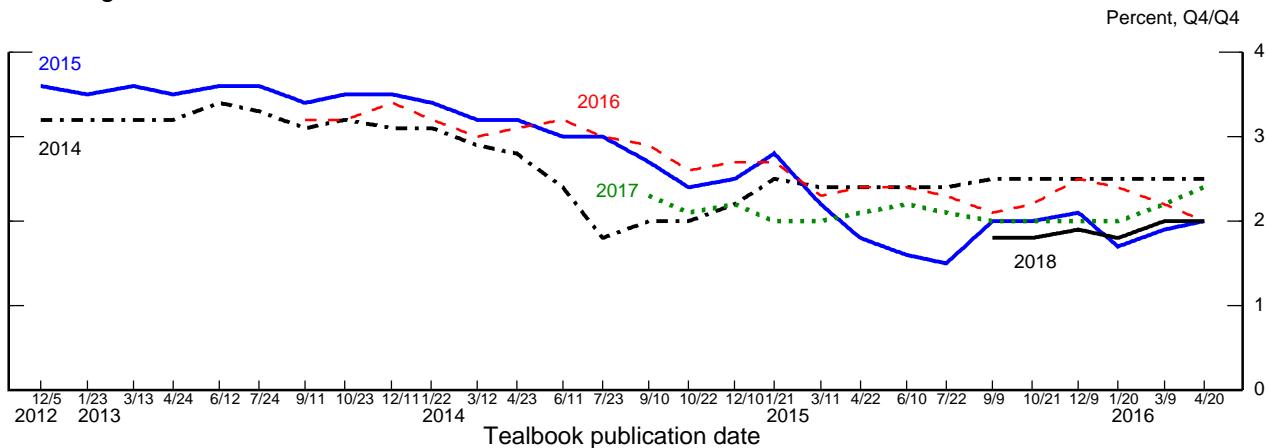
Interest Rates



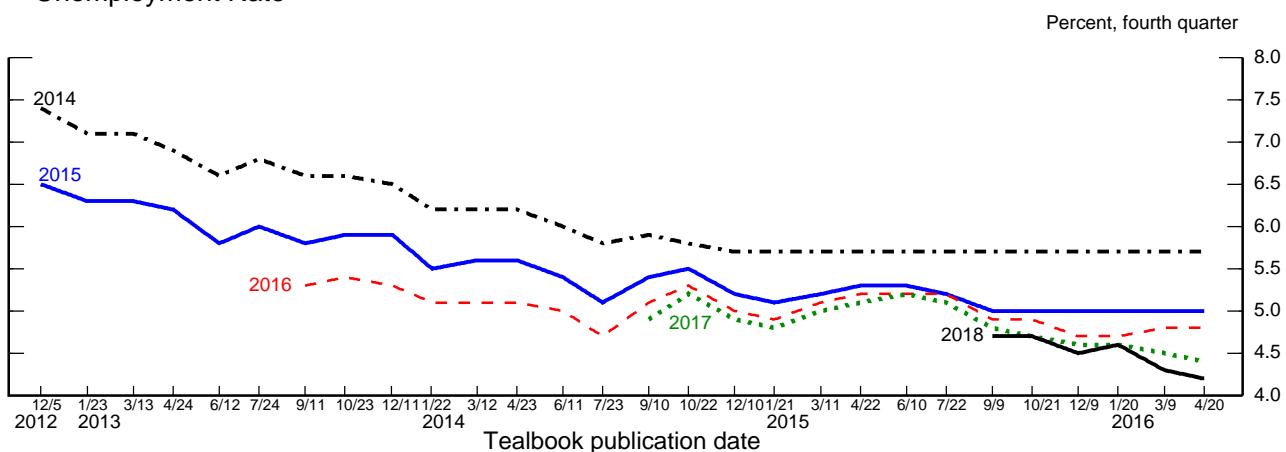
Note: In each panel, shading represents the projection period, and dashed lines are the previous Tealbook.

## Evolution of the Staff Forecast

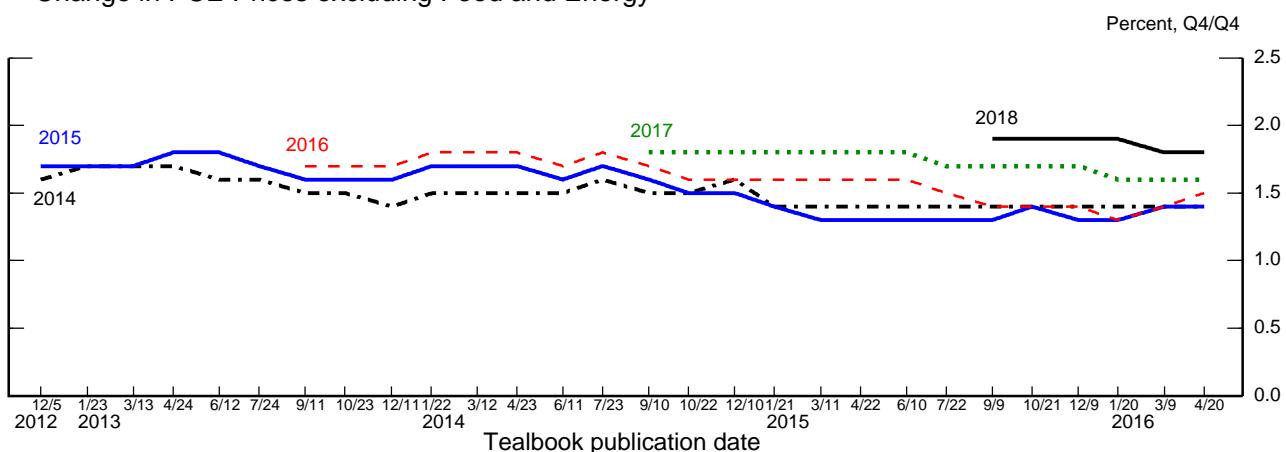
Change in Real GDP



Unemployment Rate



Change in PCE Prices excluding Food and Energy



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## International Economic Developments and Outlook

After a very weak economic performance abroad last year, we have been relieved to see indicators pointing to a pickup in foreign real GDP growth, to  $2\frac{1}{4}$  percent, in the first quarter. We see foreign growth edging up over the rest of this year and next to a near-trend pace. Outside of a slight upward revision in the first quarter, our outlook is little changed—but even that is a welcome departure from several rounds of forecast downgrades.

Much of the unexpectedly large rise in foreign growth during the first quarter was concentrated in Canada, which rebounded from a weak fourth quarter and has a heavy weight in our aggregate for foreign GDP. Output in the euro area and emerging Asia excluding China also picked up. And although indicators for Japan were disappointing, they nevertheless point to flat growth in the first quarter compared with a contraction in the fourth. To be sure, Chinese growth slowed—to 5.4 percent from 7 percent in the previous quarter—but we had largely anticipated this decline. And March indicators for China were more upbeat, supporting our view that a stimulus-induced rebound is under way.

We see foreign growth moving up to  $2\frac{1}{2}$  percent in the second half of this year and to  $2\frac{3}{4}$  percent in 2017. Foreign growth should be supported by the improvement in global financial market conditions after a turbulent start to the year and by accommodative macroeconomic policies. In the emerging market economies (EMEs), where financial markets were hit hard by the turmoil early this year, credit spreads have narrowed, stock prices have risen, and net capital inflows have resumed.

The improved tone of financial markets and the recent pickup in growth makes us more confident about our baseline forecast. Nevertheless, downside risks remain, which

are all the more worrisome in an environment where several major central banks may have limited latitude to respond to adverse shocks:

- Expectations of a more accommodative U.S. monetary policy stance seem to have helped quell market tensions recently, but an eventual U.S. tightening could still roil markets.
- The continued opacity of Chinese exchange rate policy creates the potential for renewed financial turmoil, especially if Chinese authorities reacted to a sharp generalized appreciation of the dollar by allowing the RMB to depreciate significantly.
- Also in China, large financial imbalances, exacerbated by recent credit stimulus, could amplify an unexpected slowing of growth into a hard landing.
- A further fall in oil prices could intensify financial strains among oil producers.
- U.K. voters might surprise market participants and us by opting to leave the European Union (EU), which could have disruptive effects. (See the box “Effect of a U.K. Vote to Leave the European Union” and the alternative scenario “Disorderly Brexit.”)

In the advanced foreign economies (AFEs), headline inflation slipped into negative territory in the first quarter, weighed down by past declines in energy prices. We see inflation in the AFEs rising as domestic energy prices move back up and the degree of economic slack diminishes. By the end of 2018, we project that inflation will have reached 2 percent in Canada and the United Kingdom and 1½ percent in the euro area. By contrast, in Japan, low inflation is still well entrenched in wage- and price-setting behavior, and we expect inflation to only reach 1 percent. Throughout the AFEs, weak inflationary pressures and the modest economic recovery should keep monetary policy accommodative. The European Central Bank (ECB) eased policy further last month (after the Tealbook closed), and the Bank of Japan (BOJ) is expected to ease further at its next meeting. The Bank of England is not expected to lift off until the fourth quarter, and the Bank of Canada will likely not tighten policy until mid-2017.

By contrast, our EME inflation aggregate jumped in the first quarter, largely reflecting a food-driven increase in inflation in China and increases in much of Latin America. With inflationary pressures in other emerging Asian economies at bay, the central banks of India, Indonesia, Singapore, and Taiwan loosened monetary policy to support demand. Conversely, Colombia's central bank raised its policy rate to fight inflationary pressures.

## ADVANCED FOREIGN ECONOMIES

- ***Canada.*** Recent indicators, including retail sales and monthly GDP for January, suggest that real GDP growth rebounded to 2½ percent in the first quarter after slumping late last year. The surge in growth was driven, in part, by a pickup in inventory investment that we expect to be temporary. We project that growth over the next three years will average 2 percent, up from 0.5 percent in 2015, as investment recovers, exports are supported by past currency depreciation, monetary policy remains accommodative, and fiscal stimulus announced in the March federal budget is implemented.
- ***Euro Area.*** Recent indicators suggest that growth picked up from 1¼ percent in the fourth quarter to 1¾ percent in the first, partly reflecting transitory factors such as a recovery of retail sales from disruptions late last year associated with the terrorist attack in Paris. Looking ahead, the ECB's recent expansion of asset purchases and targeted longer-term refinancing operations should support growth, but the recent appreciation of the euro will partly offset this boost. All told, we expect GDP to grow at a 2 percent rate in 2017 and 2018—unchanged from our March Tealbook projection, which had already anticipated some ECB easing.
- ***United Kingdom.*** We assume that uncertainty around the vote to leave the EU will weigh on U.K. growth in the first half of the year, despite some boost from the weaker pound. We expect growth to average about 2 percent, down from 2.4 percent in the fourth quarter. Recent indicators, such as industrial production, PMIs, and consumer confidence, are consistent with this loss in

## Effect of a U.K. Vote to Leave the European Union

In a referendum scheduled for June 23, U.K. citizens will be asked to vote on the following question: “Should the United Kingdom remain a member of the European Union or leave the European Union?”<sup>1</sup> The latest polls have the outcome as a virtual toss-up, with about 20 percent of voters still undecided. In our baseline forecast, we assume voters will choose to remain in the European Union (EU). But the risk of exit is material. This discussion assesses the potential consequences of a “leave” vote for the U.K. economy as well as attendant spillovers.

If the leave vote succeeds, the U.K. government has pledged to notify the European Council of the country’s intention to leave the EU, thus beginning negotiations regarding future U.K.–EU relations. The Treaty of Lisbon sets a two-year negotiation period during which all EU laws still apply and the United Kingdom retains access to the single market. Many people expect that the complexity of negotiations will require an extension of the two-year period that would require unanimous approval of the remaining EU member states.

The key elements to be agreed upon are the terms of the United Kingdom’s access to the single market and, given the dominant role of London in EU financial markets, bank passporting rights (the ability to provide financial services in a different EU country without a need to set up a subsidiary). Two models stand out as possible frameworks: Norway, which has full access to the single market (with passporting rights) but does not have influence on the EU legislative process; and Switzerland, which, through a set of bilateral agreements with the EU, has limited access to the single market that excludes, in particular, financial services and thus passporting rights. Of note, once it is no longer in the EU, the United Kingdom would also need to renegotiate its trade agreements with the rest of the world.

The economic, financial, and political consequences of a leave vote could be significant for the United Kingdom and the rest of the EU, given their tight trade and financial links. The United Kingdom exports 45 percent of its goods and services to EU countries, and roughly 50 percent of its imports come from these countries. In addition, London serves as the most important financial center in the EU, accounting for almost 25 percent of all EU financial services income and roughly 40 percent of EU financial services exports.

Although a leave vote would not immediately change the status of the United Kingdom in the EU, uncertainty over the outcome of negotiations could be disruptive. On the financial side, uncertainty about the future role of London in EU financial markets could lead to stress in various markets. The pound sterling would likely come under pressure, and gilt yields could move up because of higher risk premiums as

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<sup>1</sup> Her Majesty’s Government [United Kingdom] (2016), “EU Referendum: Questions and Answers,” webpage (London: HM Government), <https://www.eureferendum.gov.uk/q-and-a>.

foreign investors exit the U.K. market. Some U.K. banks and firms could face liquidity problems as nonresident foreign-currency-denominated deposits are pulled back. On the real side, uncertainty may depress economic growth by inducing companies to postpone investment and households to save more.

Spillovers would likely be apparent in other European countries. A leave vote could lead to increased uncertainty about the future of European integration, which could have global consequences. Capital outflows from Europe would weigh on peripheral spreads and lead to depreciation of the euro and appreciation of safe-haven currencies. Lower U.K. growth would negatively affect the rest of the EU through financial spillovers and, to a lesser extent, trade. In particular, euro-area banks may suffer from their large exposure (65 percent of Tier 1 capital) to the nonbank U.K. private sector.

Two factors are likely to determine the severity of these effects on the U.K. economy and the magnitude of international spillovers. The first is whether U.K. and EU policymakers are committed to smooth negotiations that aim to preserve strong trade and financial links. The second factor relates to the adequacy of contingency planning by the Bank of England (BOE)—and possibly by other European institutions, such as the European Central Bank—in the event of financial stress following a leave vote. Recently, the BOE announced that it will hold additional liquidity auctions around the date of the referendum.

We envision two possible scenarios in the case of a leave vote. Our moderate scenario assumes that negotiations, though difficult, will be relatively uncontentious and financial stresses will remain contained. We judge that uncertainty would still have a negative effect on the U.K. economy (1 to 1½ percent decline in the level of GDP relative to baseline through 2018) but with limited spillover to the rest of the EU (¼ to ½ percent decline in GDP). However, we can also envision a more adverse scenario (further discussed in the Risks and Uncertainty section) in which a leave vote leads to heightened political tensions between the United Kingdom and the EU. In such a case, concerns about the future of the European project could emerge and undermine confidence in financial backstops for vulnerable peripheral euro-area countries, triggering a sharp and persistent increase in financial distress. In this scenario, we estimate that the U.K. economy would experience a much larger output loss (2 to 2½ percent decline in GDP relative to baseline), with greater spillovers to the EU (1 to 1½ percent decline in GDP) and material effects on the rest of the world.

We also see the long-term effect of a leave vote for the United Kingdom as negative. The exact size of the negative effect will be determined by the specifics of the withdrawal agreement. In particular, any new arrangement with the EU will likely result in a reduction in trade for the United Kingdom, which could weigh on productivity and thus lead to a permanent loss in GDP level.

momentum. Given our assumption that voters will choose to stay in the EU, we have growth picking up later this year to 2½ percent and holding just below that rate over the remainder of the forecast period.

- **Japan.** On the heels of a fourth-quarter decline in GDP, recent data have been unexpectedly weak—industrial production plunged in February, and the Tankan survey of business expectations was downbeat. Moreover, recent yen appreciation should damp exports, disappointing spring wage negotiations will weigh on consumption, and the recent earthquake in southern Japan will likely cause some disruption in corporate supply chains. We now estimate that GDP was flat in the first quarter and project only a modest rebound in growth starting this quarter. Given weak growth and sliding inflation expectations, we expect the BOJ to ease policy at its April 28 meeting by both increasing the pace of asset purchases and making its policy interest rate slightly more negative. In addition, we expect the government to postpone by one year the consumption tax hike currently scheduled for April 2017.

## EMERGING MARKET ECONOMIES

- **China.** Real GDP growth fell to 5.4 percent in the first quarter, largely in line with our expectations, as China's manufacturing sector slowed sharply and services growth moderated. Despite the weak start to the year, near-term risks have receded a bit as policymakers have signaled a somewhat easier policy stance. Indeed, a pickup in credit and investment growth, which appears to be contributing to a turnaround in the housing market, suggests that policy accommodation in recent quarters has begun to feed through to the real economy. We expect growth to pick up to about 7 percent in the current quarter and next before declining gradually to 6 percent by 2018. Intervention sales of dollars have declined of late, likely reflecting reduced selling pressure on the Chinese renminbi.
- **Other Emerging Asia.** We estimate that real GDP rose 3½ percent in the first quarter, up from a 3 percent pace in the fourth. The step-up was concentrated

in **Hong Kong, Korea, and Taiwan** and was due to expansionary fiscal policies as well as robust private investment. Throughout the region, recent high-frequency indicators such as PMIs and industrial production suggest that activity picked up late in the first quarter even as exports continued to disappoint. Overall, as in the March Tealbook, we expect the region's growth to step up to 4 percent this year and beyond, supported by stronger domestic demand and some firming of growth in the advanced economies.

- **Mexico.** Incoming data suggest that growth remained at a subdued  $2\frac{1}{4}$  percent pace in the first quarter. U.S. demand for Mexican manufactured goods remained weak except for automotive exports, which grew briskly. The low price of oil has weighed on growth through tighter fiscal policies, particularly cuts in public-sector investment. We see growth remaining subdued in the current quarter, restrained by weak U.S. manufacturing growth, before edging up to its trend pace of 3 percent by late 2018. Monetary policy continues to be accommodative, and both the large depreciation of the peso and past economic reforms should provide some impetus to growth.
- **Brazil.** Policy paralysis amid the political crisis continued to drag down activity, with real GDP estimated to have declined by 3 percent in the first quarter. Consumer and business confidence have been stuck at very low levels, and industrial output continued to plunge. Activity is being further depressed by the central bank's tight monetary policy stance to combat high inflation, which registered 9.4 percent on a 12-month basis in March. On April 17, the House of Deputies voted to recommend that President Dilma Rousseff be impeached. The impeachment process now moves to the Senate, which is expected to vote in mid-May to start the impeachment trial. Once this step is taken, President Rousseff will need to step aside and Vice President Michel Temer will likely become the interim president. The trial could take several months. Amid such an unsettled political environment, we do not see Brazil returning to positive growth until 2017 and even then expect only a very slow recovery.

## The Foreign GDP Outlook

**Real GDP\***

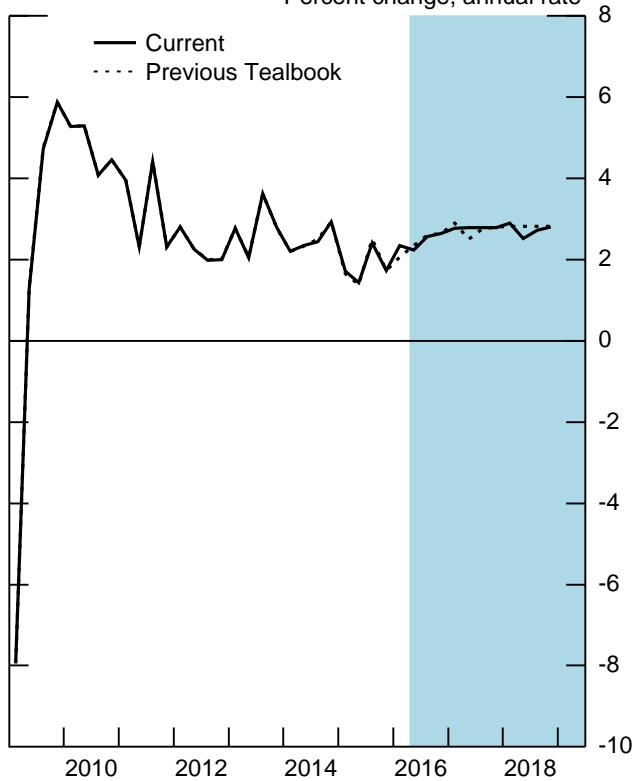
Percent change, annual rate

	2015			2016			2017	2018
	H1	Q3	Q4	Q1	Q2	H2		
<b>1. Total Foreign</b>	<b>1.6</b>	<b>2.4</b>	<b>1.7</b>	<b>2.4</b>	<b>2.2</b>	<b>2.6</b>	<b>2.8</b>	<b>2.7</b>
<i>Previous Tealbook</i>	1.5	2.5	1.7	2.1	2.3	2.6	2.7	2.8
<b>2. Advanced Foreign Economies</b>	<b>0.7</b>	<b>1.9</b>	<b>1.0</b>	<b>2.1</b>	<b>1.5</b>	<b>1.9</b>	<b>2.0</b>	<b>1.7</b>
<i>Previous Tealbook</i>	0.7	1.9	0.9	1.3	1.5	1.9	1.8	1.9
3. Canada	-0.6	2.4	0.8	2.8	1.6	2.0	2.0	1.8
4. Euro Area	1.9	1.2	1.3	1.8	1.5	1.8	2.0	2.0
5. Japan	1.5	1.4	-1.1	0.0	0.3	0.9	0.9	-0.5
6. United Kingdom	2.1	1.8	2.4	1.9	2.0	2.3	2.4	2.2
<b>7. Emerging Market Economies</b>	<b>2.4</b>	<b>2.9</b>	<b>2.5</b>	<b>2.6</b>	<b>3.0</b>	<b>3.3</b>	<b>3.6</b>	<b>3.7</b>
<i>Previous Tealbook</i>	2.3	3.1	2.5	2.8	3.2	3.4	3.6	3.8
8. China	6.5	7.2	7.0	5.4	6.8	6.7	6.1	6.0
9. Emerging Asia ex. China	2.8	3.5	2.9	3.5	4.0	4.0	4.1	4.1
10. Mexico	2.3	3.3	2.2	2.2	2.3	2.5	2.8	2.9
11. Brazil	-5.7	-6.7	-5.7	-3.0	-3.0	-0.3	1.6	2.1

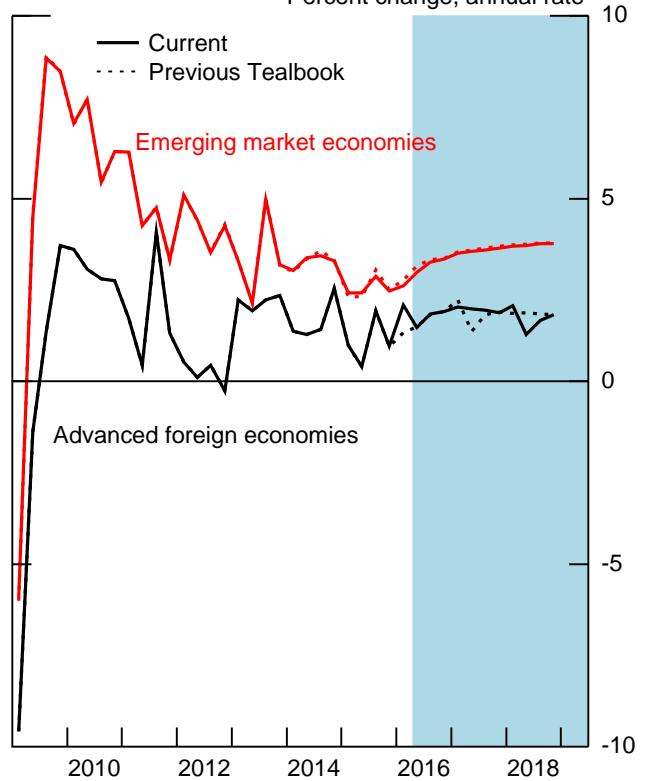
\* GDP aggregates weighted by shares of U.S. merchandise exports.

**Total Foreign GDP**

Percent change, annual rate

**Foreign GDP**

Percent change, annual rate



## The Foreign Inflation Outlook

### Consumer Prices\*

Percent change, annual rate

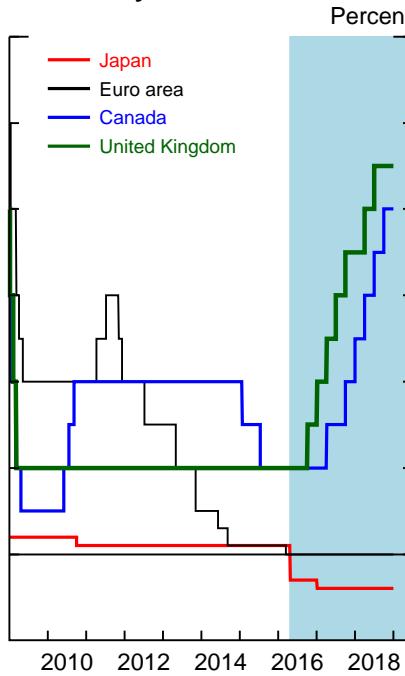
	2015			2016			2017		2018
	H1	Q3	Q4	Q1	Q2	H2			
<b>1. Total Foreign</b>	<b>1.4</b>	<b>1.9</b>	<b>1.1</b>	<b>1.6</b>	<b>2.3</b>	<b>2.4</b>	<b>2.5</b>	<b>2.6</b>	
<i>Previous Tealbook</i>	1.4	2.0	1.1	1.2	2.1	2.3	2.5	2.4	
<b>2. Advanced Foreign Economies</b>	<b>0.6</b>	<b>0.6</b>	<b>0.2</b>	<b>-0.4</b>	<b>1.0</b>	<b>1.3</b>	<b>1.5</b>	<b>1.8</b>	
<i>Previous Tealbook</i>	0.6	0.6	0.2	-0.0	0.9	1.3	1.8	1.7	
3. Canada	1.1	2.0	0.9	1.0	1.5	1.6	2.0	2.0	
4. Euro Area	0.5	-0.2	-0.1	-1.4	1.0	1.3	1.4	1.5	
5. Japan	0.6	0.0	-0.1	-0.7	0.1	0.4	0.6	2.1	
6. United Kingdom	-0.3	1.0	-0.3	-0.1	1.7	2.0	2.0	2.0	
<b>7. Emerging Market Economies</b>	<b>2.1</b>	<b>2.9</b>	<b>1.7</b>	<b>3.0</b>	<b>3.3</b>	<b>3.2</b>	<b>3.2</b>	<b>3.2</b>	
<i>Previous Tealbook</i>	2.0	3.0	1.7	2.1	3.0	3.1	3.0	3.0	
8. China	1.4	3.1	-0.2	3.1	3.6	2.7	2.6	2.5	
9. Emerging Asia ex. China	1.4	1.4	2.5	1.3	2.0	3.0	3.1	3.2	
10. Mexico	1.9	2.8	2.4	2.9	2.8	3.2	3.2	3.2	
11. Brazil	12.1	8.0	9.3	11.8	6.4	6.2	5.5	5.4	

\* CPI aggregates weighted by shares of U.S. non-oil imports.

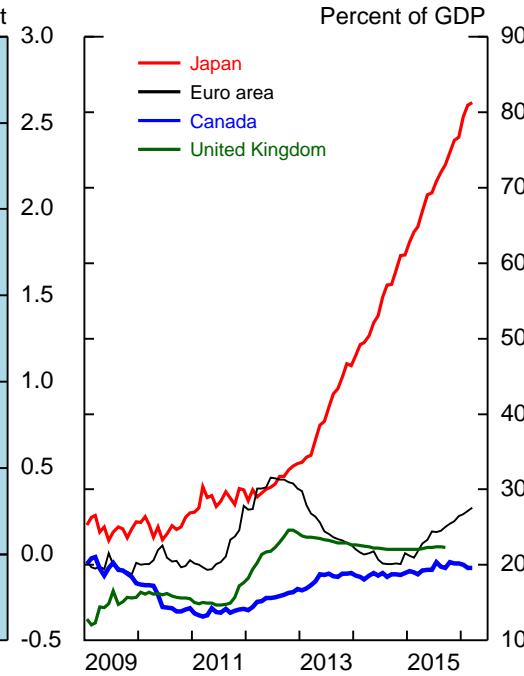
Int'l Econ Devel & Outlook

## Foreign Monetary Policy

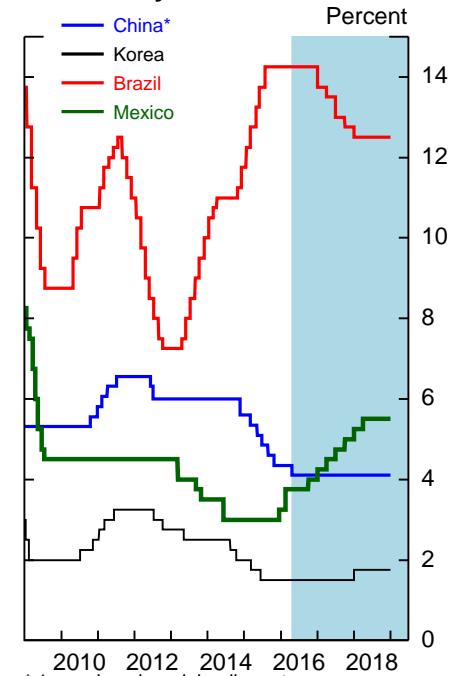
### AFE Policy Rates



### AFE Central Bank Balance Sheets



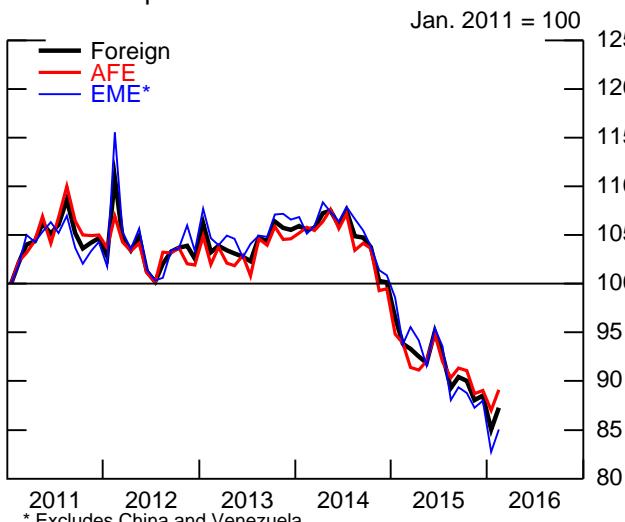
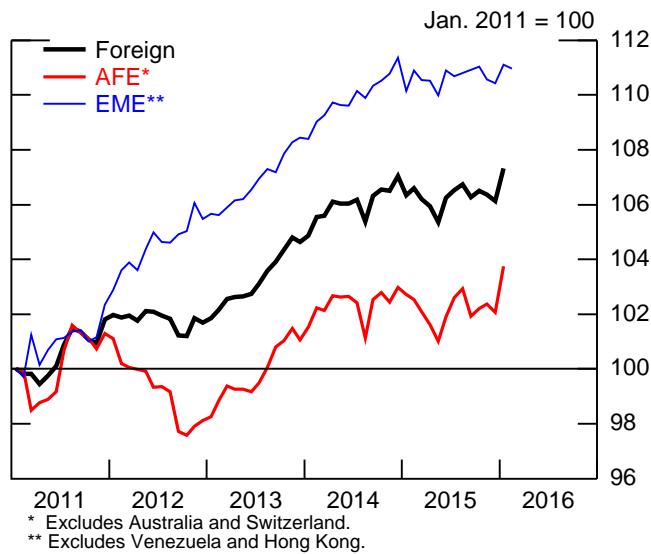
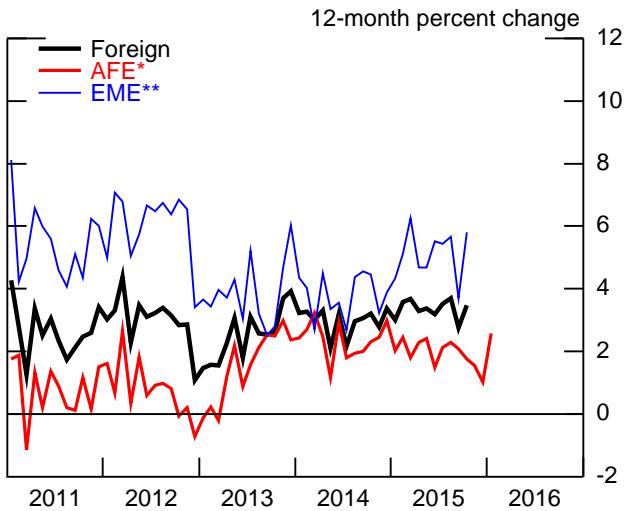
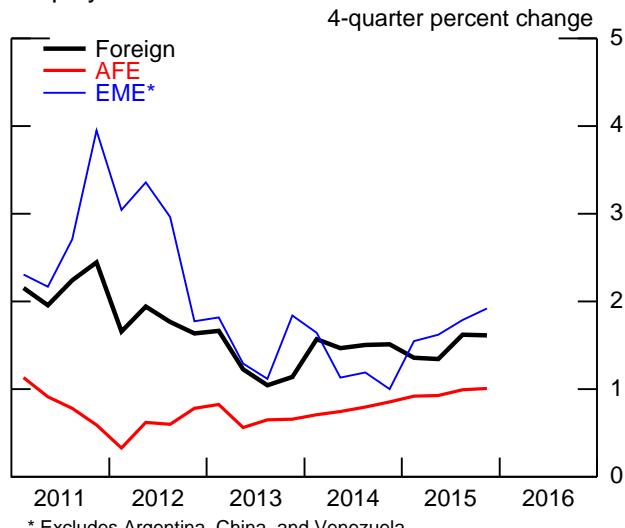
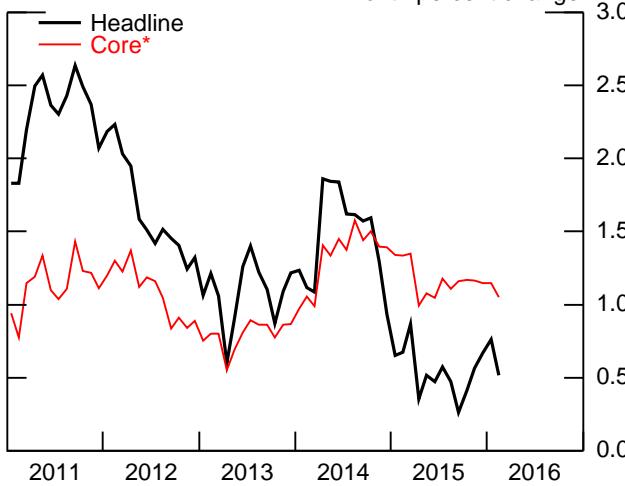
### EME Policy Rates



\* 1-year benchmark lending rate.

## Recent Foreign Indicators

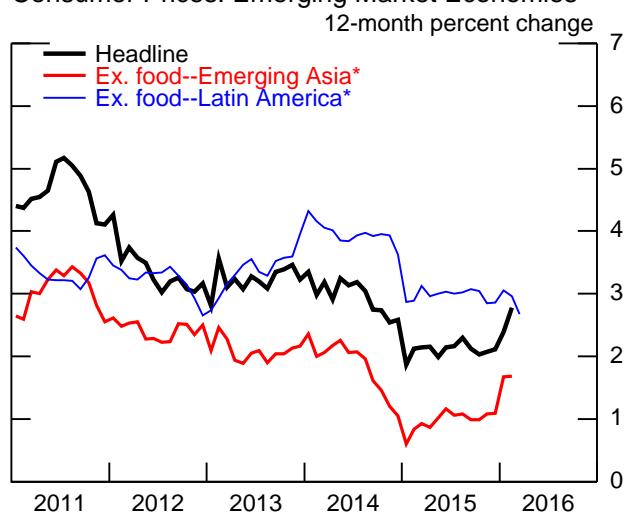
Intl Econ Devel &amp; Outlook

**Nominal Exports****Industrial Production****Retail Sales****Employment****Consumer Prices: Advanced Foreign Economies**

Note: Excludes Australia, Sweden, and Switzerland.

\* Excludes all food and energy; staff calculation.

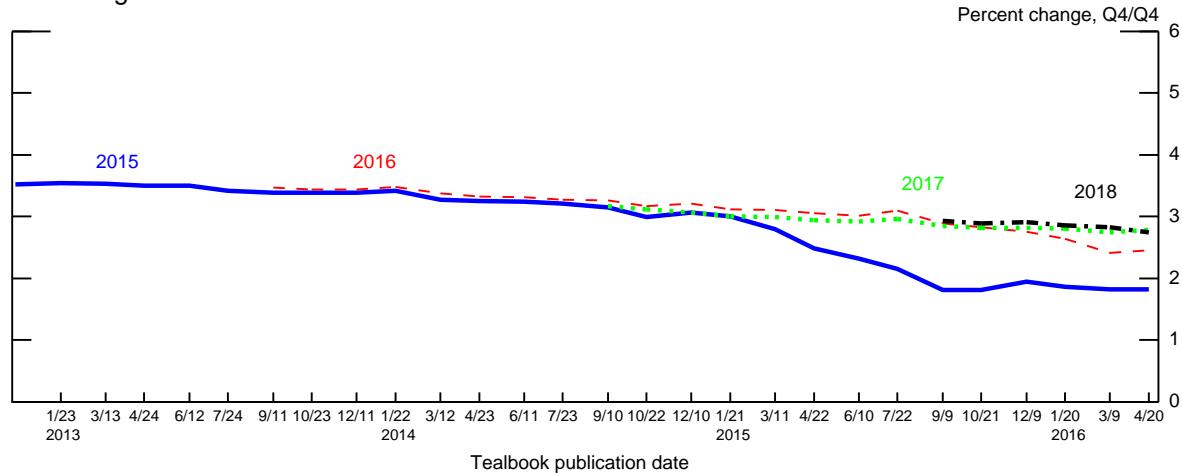
Source: Haver Analytics and CEIC.

**Consumer Prices: Emerging Market Economies**

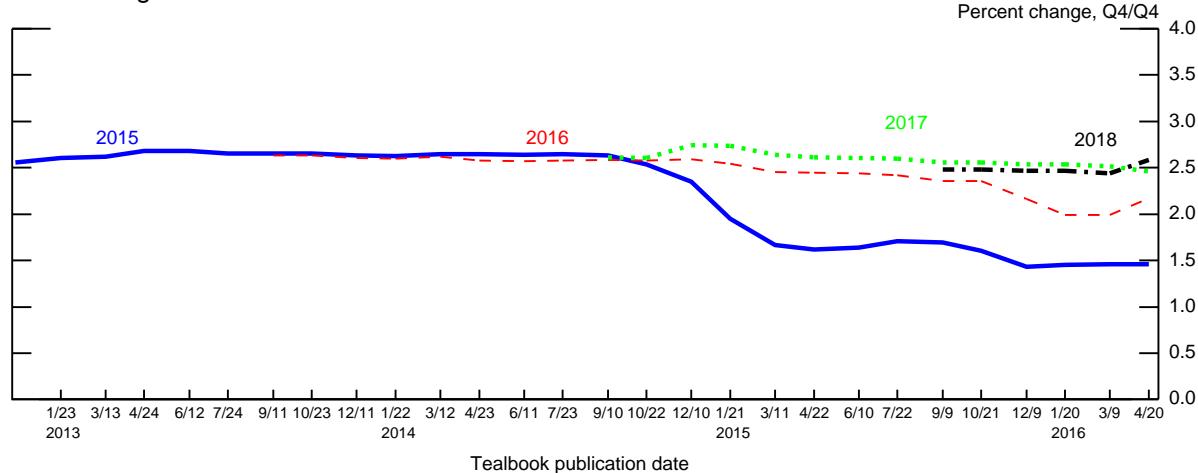
\* Excludes all food; staff calculation. Excludes Argentina and Venezuela.

## Evolution of Staff's International Forecast

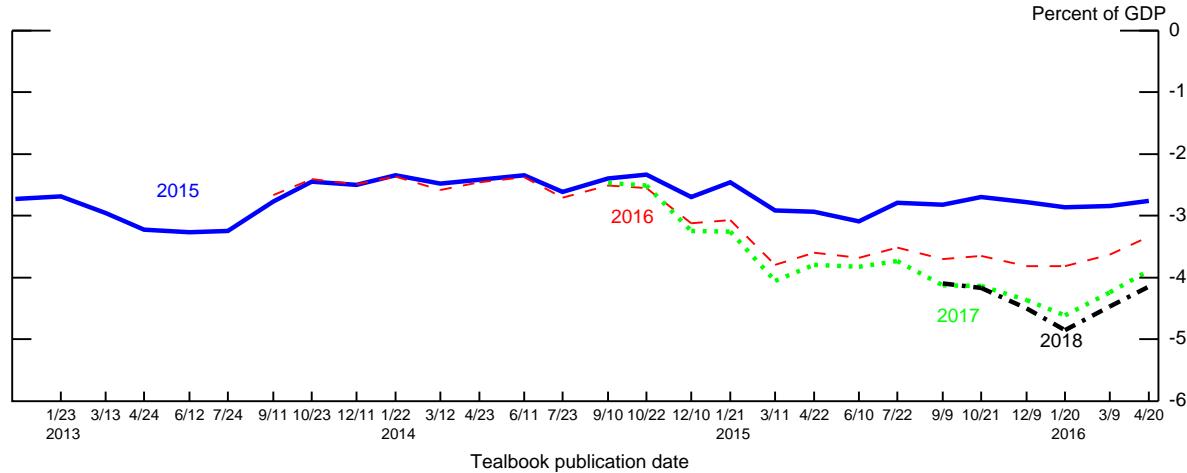
Total Foreign GDP



Total Foreign CPI



U.S. Current Account Balance



Int'l Econ Devel &amp; Outlook

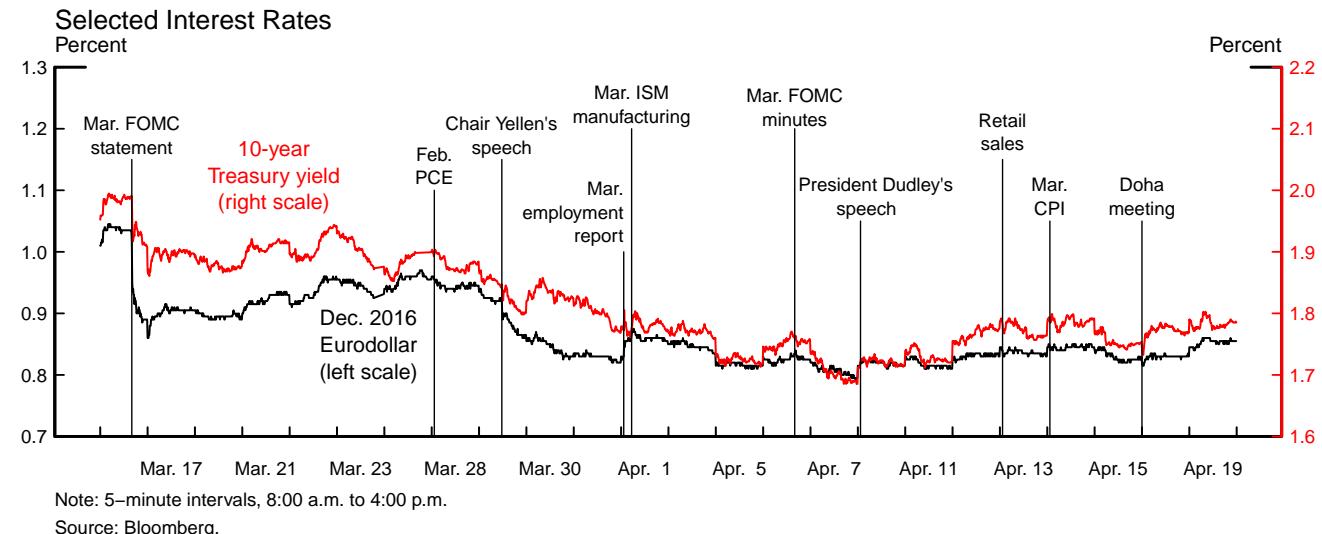
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## Financial Developments

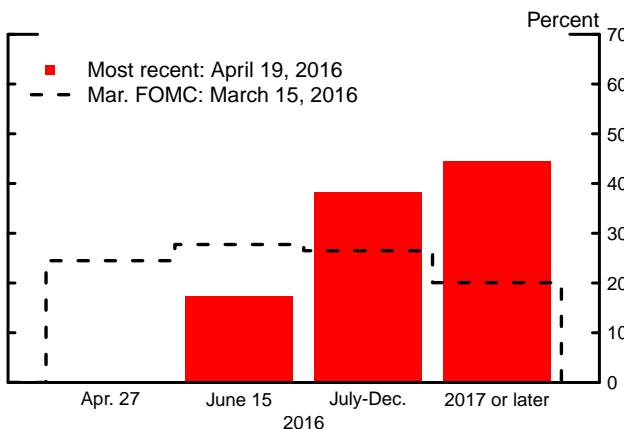
Financial market conditions improved further, on balance, over the intermeeting period, with investors appearing to respond to Federal Reserve communications that were viewed as more accommodative than expected and somewhat better incoming data on foreign economic activity. Risk sentiment appeared to improve further, on net, accompanied by a decline in financial market volatility and higher oil prices. Domestic economic data releases over the period had, on balance, a limited effect on asset prices.

- According to a straight read of futures contracts, the path of the federal funds rate flattened significantly, with the rate at the end of 2017 down about 23 basis points, and the odds placed on an increase in the federal funds rate at the June meeting were reduced further. In the Open Market Desk's surveys of primary dealers and market participants, the median dealer's modal policy path was little changed, while the median investor's modal path moved down substantially.
- Yields on 2-, 5-, and 10-year nominal securities declined between about 19 basis points and 25 basis points, while market-based measures of longer-term inflation compensation increased modestly but remained low.
- Spreads on investment- and speculative-grade corporate bonds moved down, on net, but continued to be near the top of their ranges of recent years.
- The S&P 500 index rose about 4 percent, and the VIX moved down to a level below its historical median.
- The broad index of the dollar declined about 2 $\frac{3}{4}$  percent on net. AFE sovereign yields fell notably. Consistent with a continued rebound in risk sentiment, stock indexes rose across EMEs and most AFEs.
- According to the SLOOS, over the first quarter, banks tightened lending standards on most categories of business loans and eased lending standards on most categories of household loans. Demand for bank loans generally

## Policy Expectations and Treasury Yields



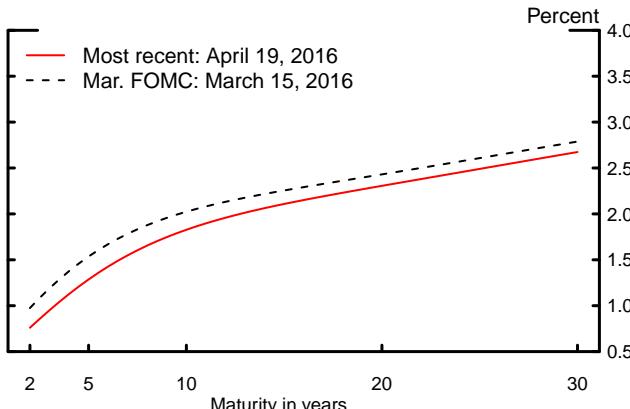
### Implied Probability Distribution of Timing of the Next Rate Increase



Note: Implied by federal funds futures. Assumes that investors expect the federal funds rate to trade at the expected rate implied by futures contracts until the next FOMC meeting.

Source: CME Group; Federal Reserve Board staff estimates.

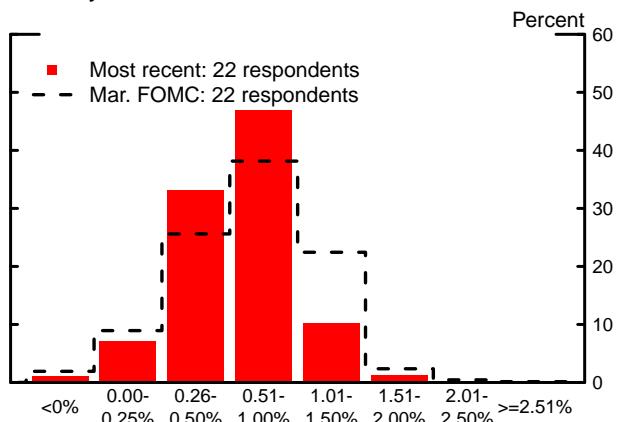
### Treasury Yield Curve



Note: Smoothed yield curve estimated from off-the-run Treasury coupon securities. Yields shown are those on notional par Treasury securities with semiannual coupons.

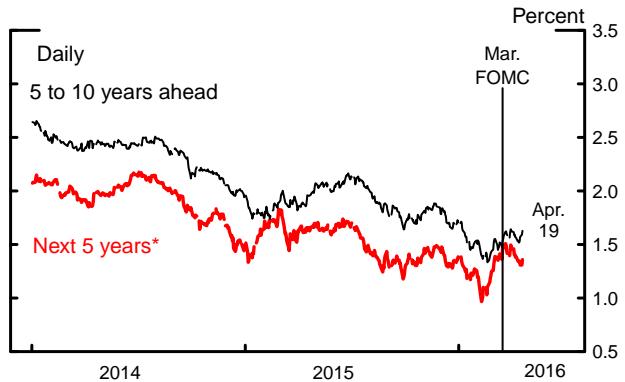
Source: Federal Reserve Bank of New York; Federal Reserve Board staff estimates.

### Survey Responses on Target Federal Funds Rate by Year-End 2016



Note: Unconditional distribution of the federal funds rate.  
Source: Desk's primary dealer survey from April 19, 2016.

### Inflation Compensation



Note: Estimates based on smoothed nominal and inflation-indexed Treasury yield curves.

\* Adjusted for lagged indexation of Treasury Inflation-Protected Securities (carry effect).

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

strengthened, except for C&I loans, for which demand by larger firms reportedly diminished.<sup>1</sup>

- Financing conditions for nonfinancial corporations appeared to ease somewhat relative to earlier this year: Bond issuance by speculative-grade firms rebounded and CMBS spreads narrowed markedly, although they remain elevated.
- Recent patterns of household financing conditions continued: Mortgage markets remained tight for lower-quality borrowers, while consumer credit markets stayed accommodative.

## POLICY EXPECTATIONS AND TREASURY YIELDS

Federal Reserve communications accompanying the March FOMC meeting were interpreted by market participants as more accommodative than expected. In particular, investors were attentive to the larger-than-expected downward revision to the projected path of the federal funds rate in the Summary of Economic Projections and to references to risks to the U.S economic outlook stemming from global economic and financial developments. Subsequently, Chair Yellen's remarks to the Economic Club of New York on March 29 appeared to reinforce market expectations of a gradual pace of policy rate increases. Meanwhile, domestic data releases came in mixed and elicited only a modest market reaction.

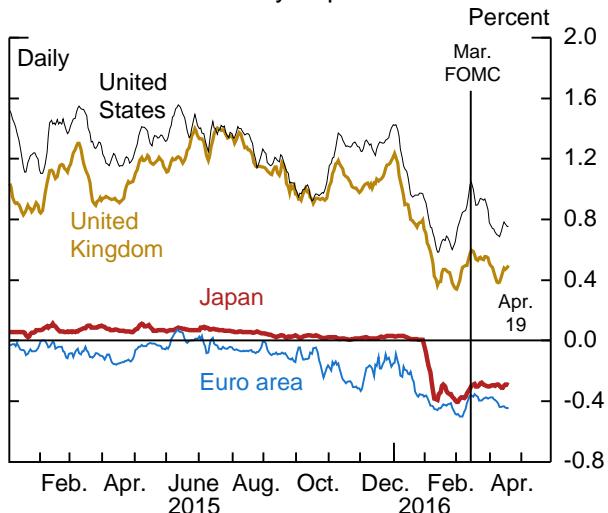
On net, the policy path implied by OIS quotes flattened notably since the March FOMC meeting, with the fed funds rate at the end of 2016 and at the end of 2017 moving down 17 basis points and 23 basis points, respectively. Based on a straight read of federal funds futures rates, market participants now place essentially no odds on a rate increase at the April meeting. The odds of a rate hike by the June meeting estimated from futures quotes declined significantly over the intermeeting period from around 28 percent to 17 percent. The results from the Desk's April surveys of primary dealers and market participants gave somewhat conflicting results. Whereas the median dealer's modal policy path was little changed, the median investor's modal path moved down substantially. Consistent with this divergence, the median investor also pushed out the

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<sup>1</sup> See Maya Shaton (2016), "The April 2016 Senior Loan Officer Opinion Survey on Bank Lending Practices," memorandum to the FOMC, April 21.

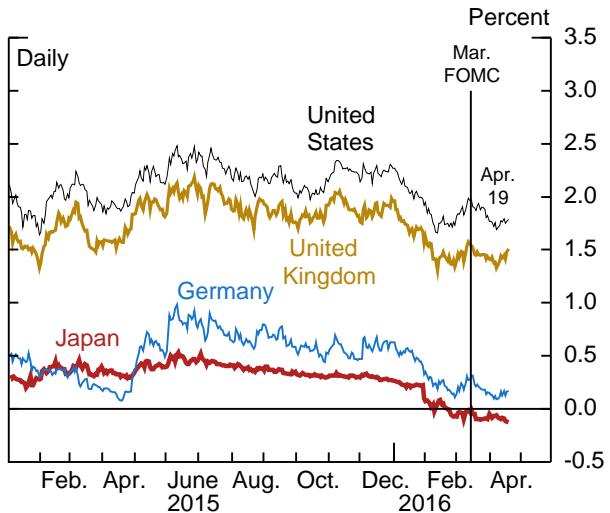
## Foreign Developments

### 24-Month-Ahead Policy Expectations



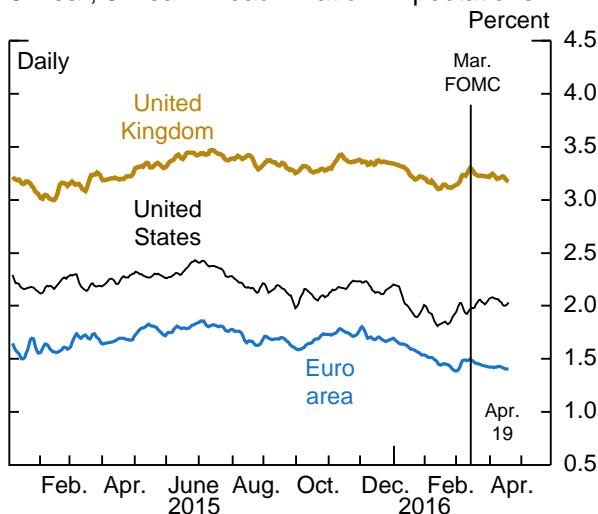
Note: 1-month forward rates from OIS quotes, 3-day moving average.  
Source: Bloomberg.

### AFE and U.S. 10-Year Nominal Benchmark Yields



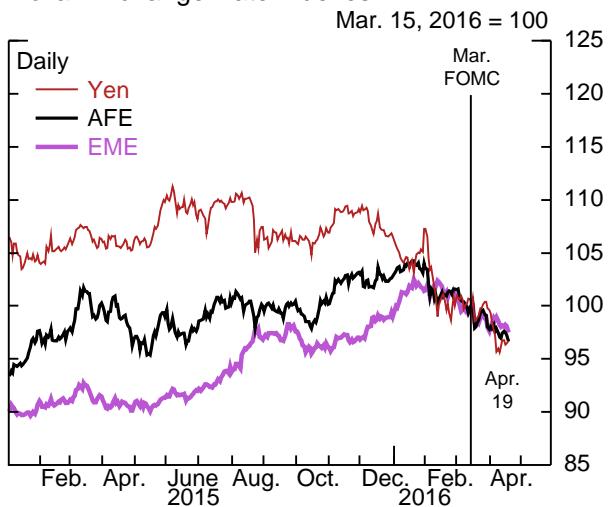
Source: Bloomberg.

### 5-Year, 5-Year-Ahead Inflation Expectations



Note: 3-day moving average.  
Source: Barclays.

### Dollar Exchange Rate Indexes



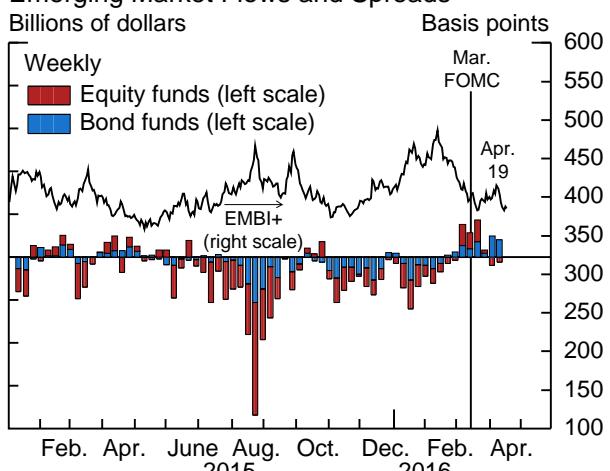
Source: Federal Reserve Board; Bloomberg.

### Stock Price Indexes



\* Local currency returns.  
Source: Bloomberg.

### Emerging Market Flows and Spreads



Note: Emerging market bond spreads over zero-coupon Treasury securities. Excludes intra-China flows.

Source: Emerging Portfolio Fund Research.

most likely timing of a change to the Committee's policy on reinvestments by about a quarter.

Nominal Treasury yields decreased noticeably since the March FOMC meeting. On net, yields on 2-, 5-, and 10-year nominal Treasury securities moved down 21, 25, and 19 basis points, respectively.<sup>2</sup> According to staff models, the decline in medium- and longer-term Treasury yields reflected declines in both the expected policy path and term premiums. The 5-year inflation compensation based on TIPS was about unchanged, and 5-to-10-year inflation compensation increased modestly but remained at low levels.

## FOREIGN DEVELOPMENTS

Since the March FOMC meeting, global financial market conditions have eased modestly. Overall risk sentiment appears to have improved, with expectations of more accommodative monetary policy in the United States playing a role. Sentiment was also boosted by foreign data suggesting growth picked up in the first quarter, somewhat alleviating market fears of a sharp slowdown in global growth.

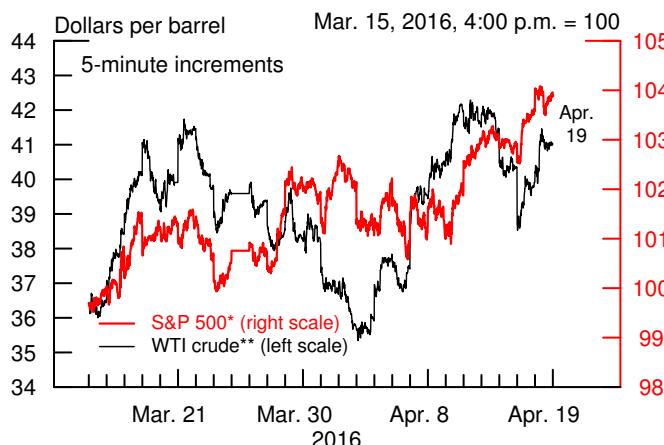
Along with U.S. interest rates, AFE sovereign yields declined notably following the March FOMC meeting and the speech by Chair Yellen in late March. Over the period, 10-year sovereign yields declined 15 basis points in Germany, 3 basis points in the United Kingdom, and 11 basis points in Japan, reaching near all-time lows in these countries. After a slight rebound earlier this year, 5-to-10-year inflation compensation continued to trend down in the euro area and the United Kingdom.

The broad dollar depreciated  $2\frac{3}{4}$  percent, including  $3\frac{1}{4}$  percent against AFE currencies and  $2\frac{1}{4}$  percent against EME currencies. A number of factors contributed to the weakening. First, the dollar moved down noticeably on days when U.S. policy expectations shifted, importantly after the FOMC meeting and the Chair's speech. In addition, upward moves in the price of oil appeared to support commodity currencies. The British pound appreciated less than most other AFE currencies, reflecting concerns about "Brexit." Somewhat paradoxically, the Japanese yen appreciated a bit more against the dollar— $3\frac{1}{2}$  percent—even as data strongly disappointed. Market participants partly

<sup>2</sup> Since the March FOMC meeting, the Treasury has auctioned \$144 billion of Treasury nominal fixed-rate securities, \$11 billion of Treasury Inflation-Protected Securities, and \$13 billion of two-year Floating Rate Notes.

## Corporate Asset Prices and Earnings

### Intraday S&P 500 Futures and WTI Near-Month Futures

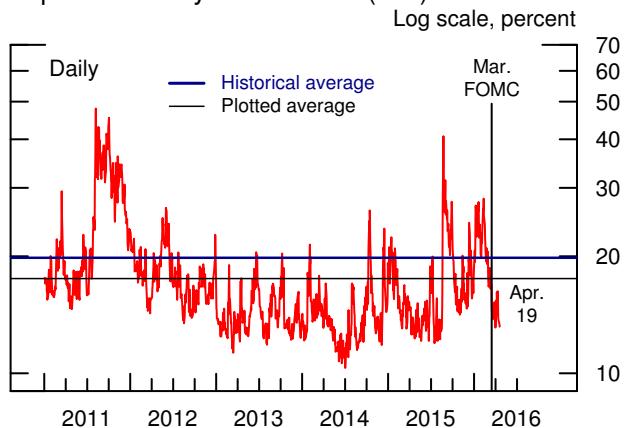


\* E-mini S&P 500 futures.

\*\* Near-month West Texas intermediate (WTI) futures.

Source: Thomson Reuters Tick History.

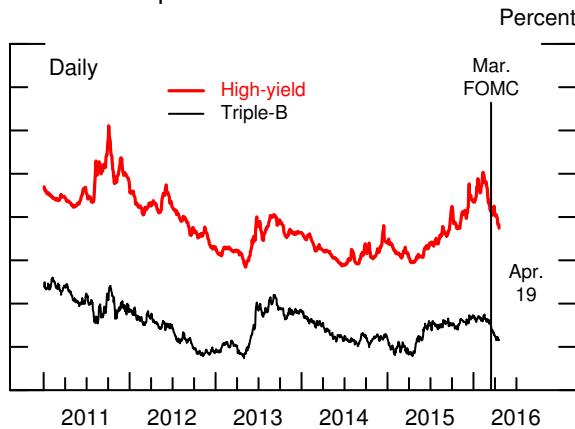
### Implied Volatility on S&P 500 (VIX)



Note: Historical average is taken from 1990 onward; plotted average is taken from 2011 onward.

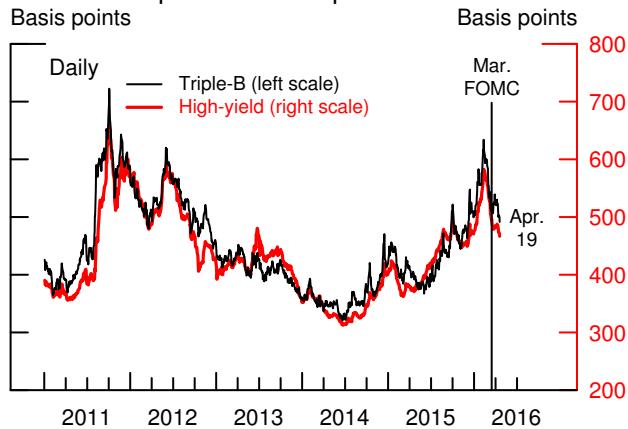
Source: Chicago Board Options Exchange.

### 10-Year Corporate Bond Yields



Source: Staff estimates of smoothed yield curves based on Merrill Lynch bond data.

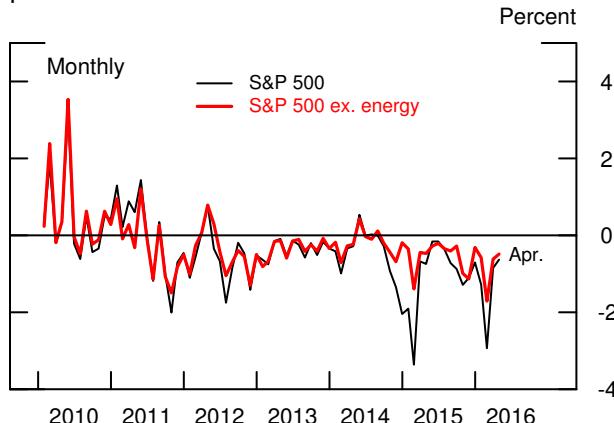
### 10-Year Corporate Bond Spreads



Note: Spreads over 10-year Treasury yield.

Source: Staff estimates of smoothed yield curves based on Merrill Lynch bond data and smoothed Treasury yield curve.

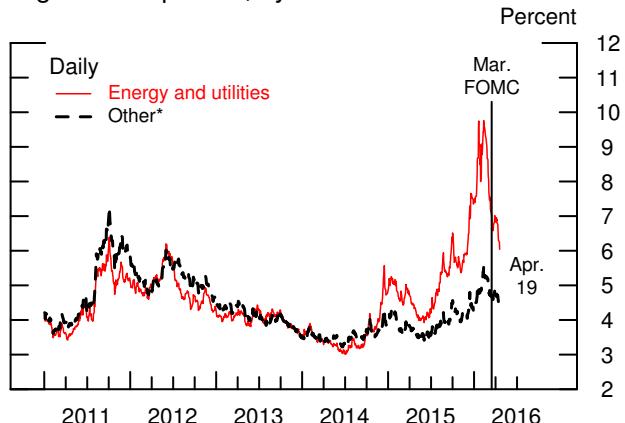
### Revisions to S&P 500 Year-Ahead Earnings per Share



Note: Weighted average of the percent change in the consensus forecasts of current-year and following-year earnings per share.

Source: Thomson Reuters Financial.

### High-Yield Spreads, by Sector



Note: Spreads over 10-year Treasury yield.

\* Includes high-yield firms that are not in the energy, utility, or telecommunications sectors.

Source: Staff estimates of smoothed corporate yield curves based on Merrill Lynch data and smoothed Treasury yield curve.

attribute this development to technical factors, such as the covering of short positions, which put upward pressure on the yen.

The demand for dollar funding by financial institutions remained elevated, which was apparent in the “dollar funding premium,” the additional cost of obtaining dollar funding via the foreign exchange swap market relative to the cost of direct dollar funding. (For more discussion on the dollar funding premium, see the box “Recent Developments in Offshore Dollar Funding Markets.”)

Over the intermeeting period, foreign equity market performance was generally positive. AFE broad equity indexes were up slightly, although bank stocks continued to underperform. Supported by expectations of more accommodative U.S. monetary policy and higher oil prices, EME equities gained about 4 percent, EME sovereign spreads narrowed on net, and money flowed into EME funds.

## CORPORATE ASSET PRICES AND EARNINGS

Over the intermeeting period, broad U.S. equity price indexes moved up, on net, likely owing to more-accommodative-than-expected monetary policy and an improvement in risk sentiment. Stock prices increased across all industries, including the energy sector. One-month-ahead implied volatility on the S&P 500 index—the VIX—moved down and ended the period below its historical median.

Spreads of 10-year corporate bond yields over those of comparable-maturity Treasury securities for both triple-B-rated and speculative-grade issuers declined somewhat on balance. Nonetheless, even as broader risk sentiment among investors improved, the spreads remained at levels near the top of their ranges since 2012 and the outlook for corporate earnings deteriorated somewhat over the intermeeting period. (See the box “The Level of U.S. Corporate Bond Yield Spreads” for a longer-term perspective on spreads.)

With earnings reports of roughly 10 percent of companies in the S&P 500 index on hand and a straight read of Wall Street equity analysts’ forecasts for the rest, corporate earnings in the first quarter are projected to have decreased about 7 percent relative to the previous quarter. The staff expects that, following typical patterns, most actual reports will beat Wall Street analysts’ forecasts—as appears to be the case so far—and the decline in earnings will likely be more modest. In addition, Wall Street analysts

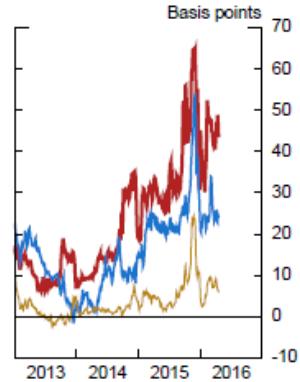
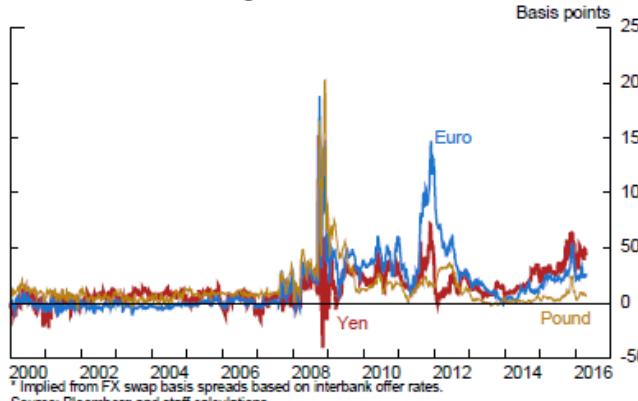
## Recent Developments in Offshore Dollar Funding Markets

Since the Global Financial Crisis (GFC), the cost of dollar funding by directly borrowing dollars has differed significantly from funding by indirectly borrowing another currency and using a foreign exchange (FX) swap to convert those funds into dollars. In theory, these differences in dollar funding costs should be small, as wide spreads between the two rates create arbitrage opportunities that make it profitable to engage in transactions that would tend to close the gap. This discussion examines possible causes for the rise in differences in dollar funding costs and offers a possible explanation for the recent divergence in these measures across currencies. Although large dollar funding gaps were often viewed as a sign of funding distress in the past, the recent rise in these gaps likely reflects other factors, particularly the combination of increased financial intermediation costs after the GFC and divergent monetary policy stances between the Fed and foreign central banks in recent years.

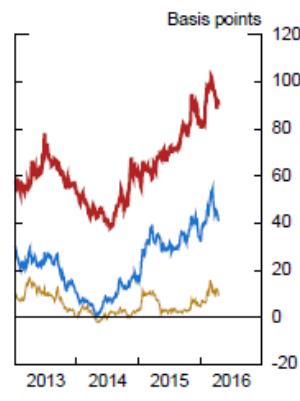
Dollar funding gaps used to be small. As shown in figures 1 and 2, the dollar funding premium, which is the cost of funding via the FX swap market minus the cost of funding directly, was close to zero before 2007. During the GFC, the dollar funding premium spiked, reflecting the acute global shortages of dollar liquidity and, more generally, the disorder in global financial markets. Even after more orderly financial conditions returned, the funding premium has remained wider and considerably more variable.

In addition, dollar funding premiums now differ remarkably based on the currency involved. The recent increases in premiums have been especially pronounced for the euro and yen at both

**1. 3-Month Dollar Funding Premium\***



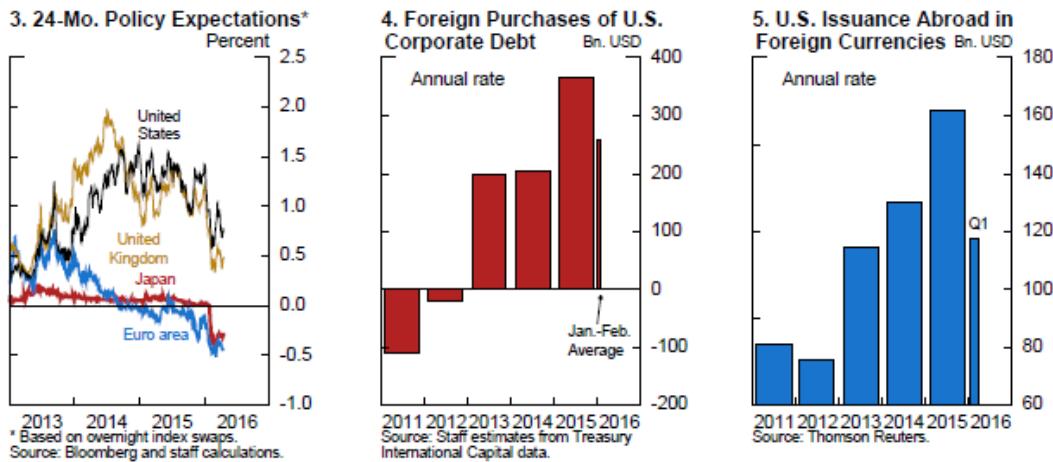
**2. 5-year Dollar Funding Premium\***



short and long maturities. Short-term premiums are important for banks when transforming funding across currencies, whereas long-term premiums are particularly relevant for corporate issuers and investors of long-dated securities when hedging long-term currency risk. The five-year premium vis-à-vis the yen is currently about 90 basis points, near its historical high, and the five-year premium vis-à-vis the euro is about 40 basis points, close to the level observed during the GFC's peak. In contrast, the recent rise in the premium vis-à-vis the British pound has been much more subdued.

Rather than reflecting severe offshore dollar funding distress, the recent increase in dollar funding premiums more likely reflects two other factors. First, balance sheet constraints faced by global banks, in part as a result of regulatory reforms since the GFC, could be weakening market making and arbitrage mechanisms that ensured near-zero dollar funding premiums before the crisis. Even under normal financial market conditions, tighter regulations have likely increased the return that banks require to provide FX swap liquidity and to directly engage in activities that narrow variations in dollar funding costs.

Second, in the presence of costly financial intermediation after the crisis, divergent monetary policy stances have likely contributed to the recent increase in dollar funding premiums. Figure 3 shows policy expectations in the United States started diverging from those in the euro area and Japan in 2013 and 2014 but remained close to those in the United Kingdom. The persistently low- or negative-yield environment in Europe and Japan in recent years and the ample liquidity in euros and yen supplied through unconventional monetary policies have likely increased the imbalance between the demand for dollar-denominated assets and the supply of euro- and yen-denominated liabilities.<sup>1</sup> Consistent with this narrative, figures 4 and 5 show, respectively, strong demand from foreign investors for U.S. corporate debt and strong issuance by U.S. firms in foreign currencies starting in 2013. To offset the imbalance between the strong demand for dollar-denominated assets and the strong supply of foreign currency funding, financial intermediaries demand more dollar funding via the FX swap market, exerting upward pressure on dollar funding premiums vis-à-vis the euro and the yen. The relatively similar monetary policy stances in the United States and the United Kingdom help explain the much smaller magnitude of the premium vis-à-vis the pound.



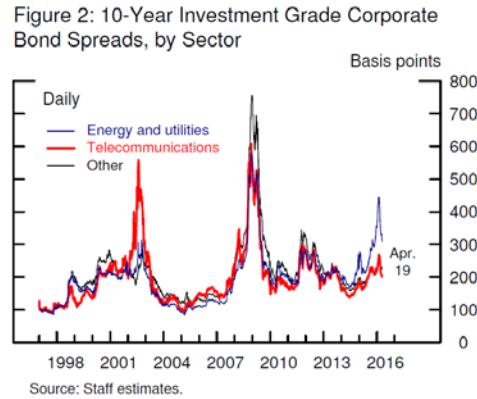
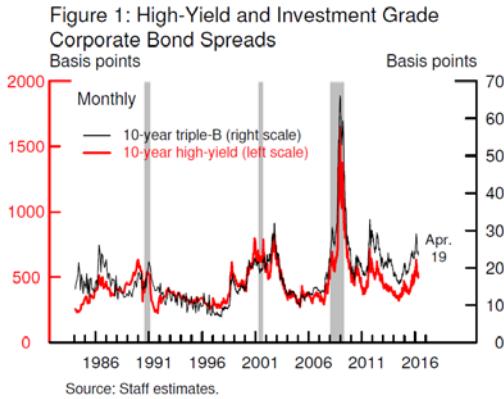
<sup>1</sup>We note that despite the rising dollar funding premium, borrowers without ready access to direct dollar funding may still find it more advantageous to obtain dollar funding indirectly via the FX swap.

## The Level of U.S. Corporate Bond Yield Spreads

Even though corporate bond spreads narrowed notably in late February and March, their levels remained very elevated and are currently around the 75th percentile of their historical distributions (figure 1). These elevated spreads are consistent with the deterioration in the energy sector, heightened risk aversion, and increased concerns on the outlook for credit defaults, all of which contribute to tightness in financing conditions for the corporate sector and may warn of some sluggishness in economic activity going forward.<sup>1</sup>

The sharp drop in the price of oil since mid-2014 has substantially threatened the prospects, and in some cases the viability, of many firms involved in the exploration and production of fossil fuels. Over this period, spreads for investment- and speculative-grade bonds of these firms have widened substantially to levels not seen since the Great Recession (figure 2). However, spreads have also widened outside the energy sector, although by considerably less, indicating that factors specific to this sector cannot entirely account for the overall high level of spreads.

Estimated risk premiums in bond spreads also have increased since mid-2014 (figure 3). The increase is consistent with both investors' perception of higher economic uncertainty and less willingness to hold risky securities. However, near-term forward spreads on speculative-grade bonds, which are interpreted as an indicator of factors such as the near-term credit outlook, have widened more than far-term spreads have, which is interpreted more as an indicator of investors' appetite to bear credit risk (figure 4). This divergence suggests that an increase in expected credit losses for the broad market accounts for some of the increase in corporate bond spreads.



<sup>1</sup> Some studies find that corporate bond spreads tend to increase before recessions (for example, Mark Gertler and Cara Lown (1999), "The Information in the High-Yield Bond Spread for the Business Cycle: Evidence and Some Implications," *Oxford Review of Economic Policy*, vol. 15 (Autumn), pp. 132–50) and have significant predictive power for economic activity (see, for example, Simon Gilchrist and Egon Zakrajšek (2012), "Credit Spreads and Business Cycle Fluctuations," *American Economic Review*, vol. 102 (4), pp. 1692–720). Other studies point out that spreads frequently increase even outside recession periods (for example, James Stock and Mark Watson (2003), "Forecasting Output and Inflation: The Role of Asset Prices," *Journal of Economic Literature*, vol. 41 (3), pp. 788–829), such as during the Long-Term Capital Management and the European debt crises. In the March 2016 memo to the FOMC titled "Probability of Recession Implied by Credit Market Sentiment," Giovanni Favara, Kurt Lewis, and Gustavo Suarez document and evaluate the significant predictive power of an investor sentiment measure extracted from bond spreads.

Information from nonfinancial corporations' financial reports are consistent with a potential weakening in credit performance. After trending up for several years, the aggregate ratio of debt to total assets for the corporate sector is at its highest level in more than two decades (figure 5). In recent quarters, growth in corporate earnings has slowed and credit quality downgrades have significantly outpaced upgrades. Last quarter, corporate defaults neared six-year highs, with about half of the defaulted principal accounted for by energy and commodities industry debt. These developments suggest increased vulnerability of the corporate sector in the near term, as reflected in current estimates of expected defaults.<sup>2</sup> However, these estimates remain low relative to the historical average, and a few additional factors mitigate the level of concern (figure 6). Aggregate cash holdings remain high, interest expenses remain low by historical standards, and reliance on short-term debt by U.S. corporations remains low in the aggregate.

Finally, although we cannot rule out that concerns about market liquidity risks may also have contributed to the widening of bond spreads, traditional measures of market liquidity, such as trading volume and bid-asked spreads have not signaled a significant worsening of liquidity in recent years.<sup>3</sup>

Figure 3: Estimated Risk Premium of High-Yield Spreads

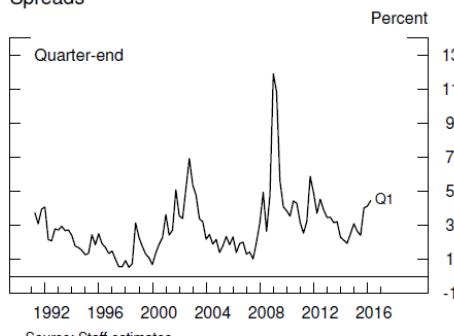


Figure 4: Far- and Near-Term Forward High-Yield Corporate Bond Spreads

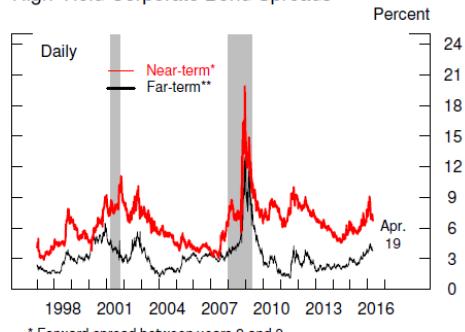


Figure 5: S&P 500 Earnings per Share and Debt-over-Total-Assets

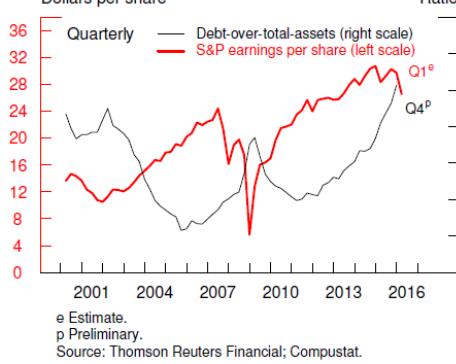
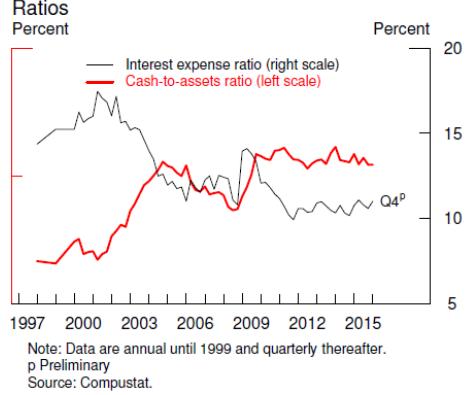
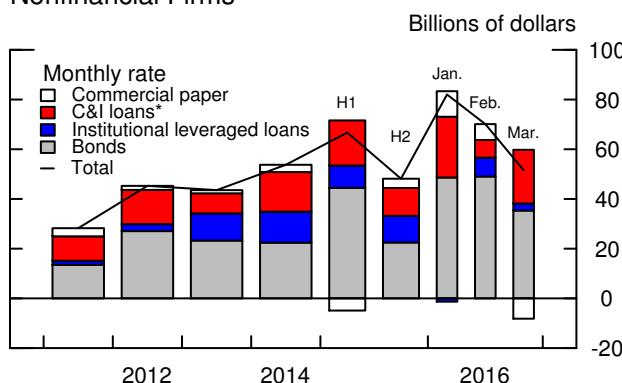


Figure 6: Interest Expense and Cash-to-Assets Ratios



<sup>2</sup> Similar vulnerabilities are discussed in the March 2016 Tealbook (see the box "Recent Developments in Speculative-Grade Corporate Debt Markets" in Tealbook A).

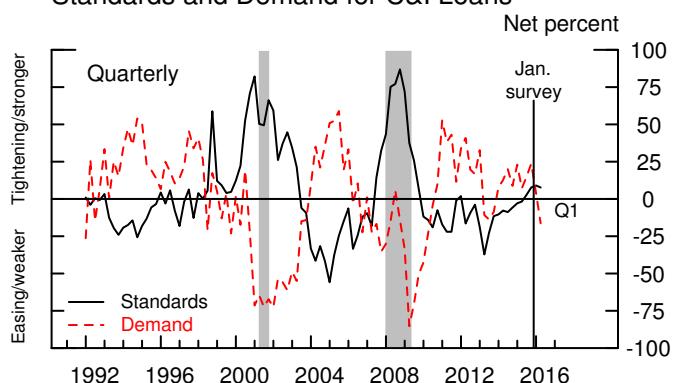
<sup>3</sup> Available liquidity indicators are based on executed trades, as most trading is over the counter with no centralized mechanism to collect trade orders. The stability in recent years of these indicators contrasts with the view, shared by a wide range of market participants, of a deterioration of liquidity in credit markets. However, no evidence is available to suggest that the perceived deterioration accounts for the widening of spreads since 2014.

**Business and Municipal Finance****Selected Components of Net Debt Financing,  
Nonfinancial Firms**

Note: C&I is commercial and industrial.

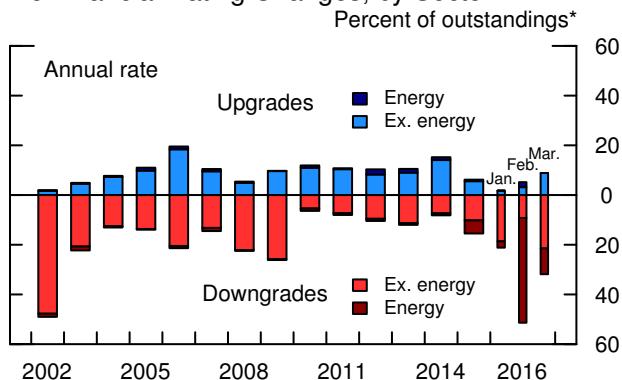
\* Period-end basis, seasonally adjusted.

Source: Depository Trust & Clearing Corporation; Mergent Fixed Income Securities Database; Federal Reserve Board; Thomson Reuters LPC.

**Standards and Demand for C&I Loans**

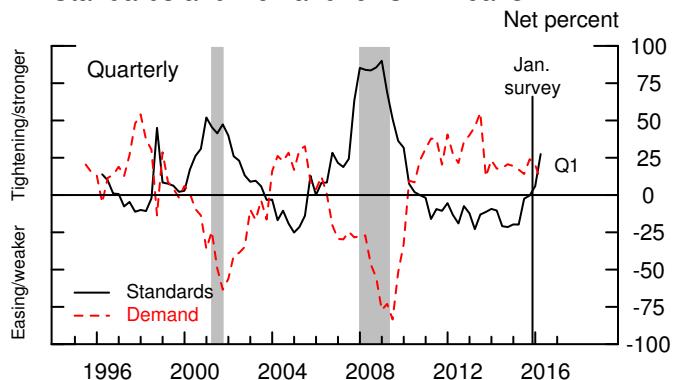
Note: Individual bank responses are weighted by the outstanding amount of the relevant loan category on the bank's balance sheet at the end of the prior quarter. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research. C&I is commercial and industrial.

Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices.

**Nonfinancial Rating Changes, by Sector**

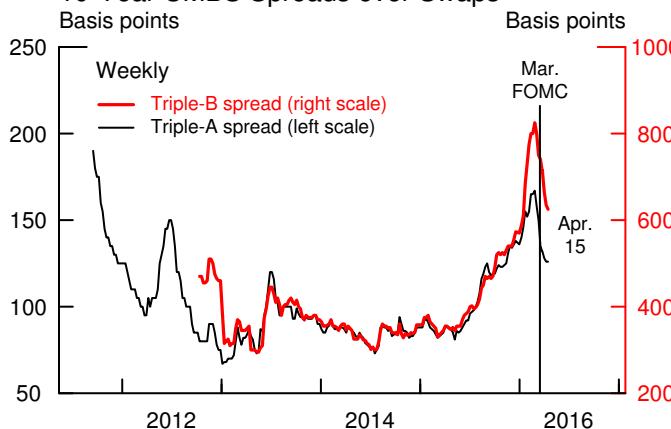
\* Calculated as percent of the dollar value of all nonfinancial bonds outstanding.

Source: Calculated using Moody's ratings from Mergent Fixed Income Securities Database.

**Standards and Demand for CRE Loans**

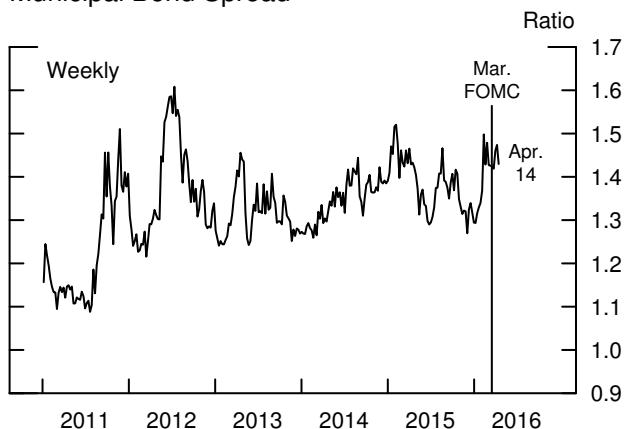
Note: Individual bank responses are weighted by the outstanding amount of the relevant loan category on the bank's balance sheet at the end of the prior quarter. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research. CRE is commercial real estate.

Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices.

**10-Year CMBS Spreads over Swaps**

Note: CMBS is commercial mortgage-backed securities.

Source: J.P. Morgan.

**Municipal Bond Spread**

Note: Bond Buyer general obligation 20-year index over 20-year Treasury yields.

Source: Bond Buyer; Merrill Lynch.

continued to revise down their forecasts for year-ahead earnings through mid-April, even beyond the energy sector, although the downward revisions were much smaller than in prior months.

## BUSINESS AND MUNICIPAL FINANCE

Overall, financing conditions for U.S. nonfinancial businesses remained generally accommodative for investment-grade issuers, and those for speculative-grade firms improved somewhat after having shown strains earlier in the year. Corporate bond issuance for speculative-grade firms rebounded in March from the sluggish pace in January and February. While initial public equity offerings remained anemic in the first quarter, early indications suggest that stock repurchases and M&A activity stayed robust.

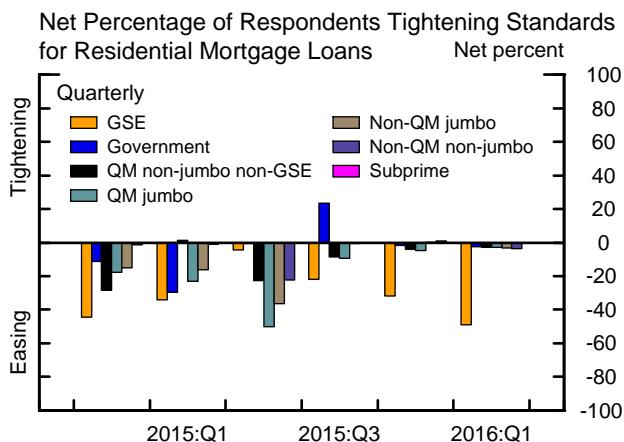
Growth of C&I loans on banks' books remained strong and continued to be driven by lending at large banks making loans to investment-grade borrowers. Nonetheless, according to the most recent SLOOS, on balance during the first quarter, banks further tightened their lending standards on C&I loans to large and middle-market firms, while demand for such loans weakened. Banks mainly pointed to a less favorable economic outlook and a worsening of conditions in the energy sector in explaining the tightening in lending standards last quarter; customers' reduced needs for financing fixed investments and merger activity were cited as the drivers of weaker demand.

Expected credit performance for nonfinancial corporations, while still solid overall, showed additional signs of weakening, as the volume of corporate bonds downgraded by Moody's Investors Service in March significantly exceeded the volume upgraded, even among firms outside the energy sector. The SLOOS indicated that banks expect an increase this year in delinquencies and charge-offs on existing loans to firms in the energy sector. Moreover, banks noted some deterioration in credit quality of loans to non-energy businesses located in U.S. regions that are dependent on the energy sector.

Turning to the commercial real estate (CRE) sector, a significant number of SLOOS respondents reported tightening their lending standards on all major categories of these loans during the first quarter, following a moderate number that reported doing so in the fourth quarter and after several years of easing. Banks also reportedly tightened several loan terms over the past year and pointed to the outlook for vacancy rates, capitalization rates, and property prices, as well as a reduced tolerance for risk, by way of explanation. However, demand for CRE loans reportedly strengthened, and CRE loans

## Household Finance

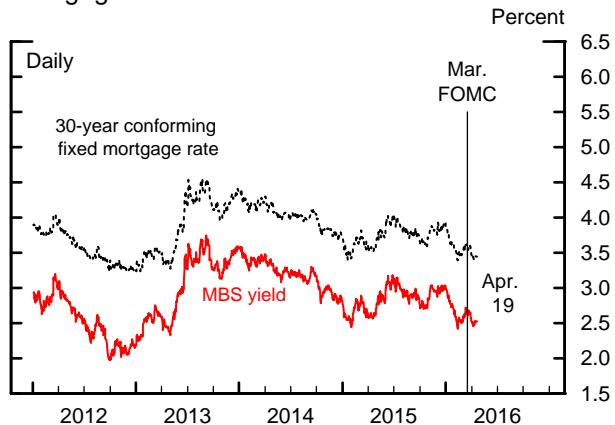
## Financial Developments



Note: Responses are weighted by survey respondents' holdings of relevant loan types as reported on Call Reports. GSE is government-sponsored enterprise; QM is qualified mortgage.

Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices.

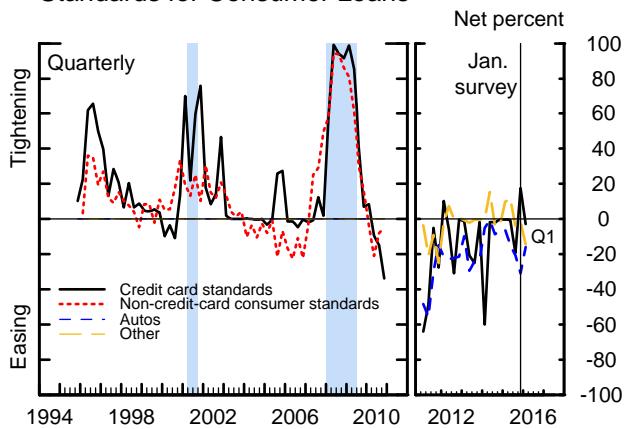
### Mortgage Rate and MBS Yield



Note: The MBS yield is the Fannie Mae 30-year current-coupon rate.

Source: For MBS yield, Barclays; for mortgage rate, Loansifter.

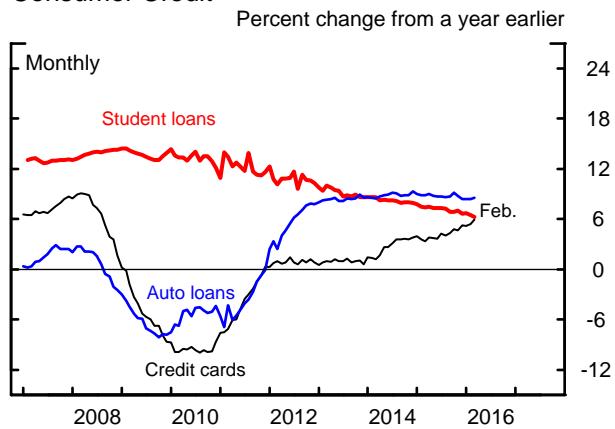
### Standards for Consumer Loans



Note: Responses are weighted by survey respondents' holdings of relevant loan types as reported on Call Reports. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.

Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices.

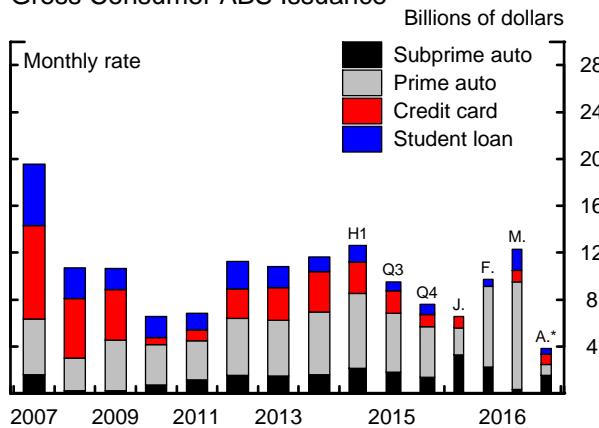
### Consumer Credit



Note: The data are not seasonally adjusted.

Source: Federal Reserve Board.

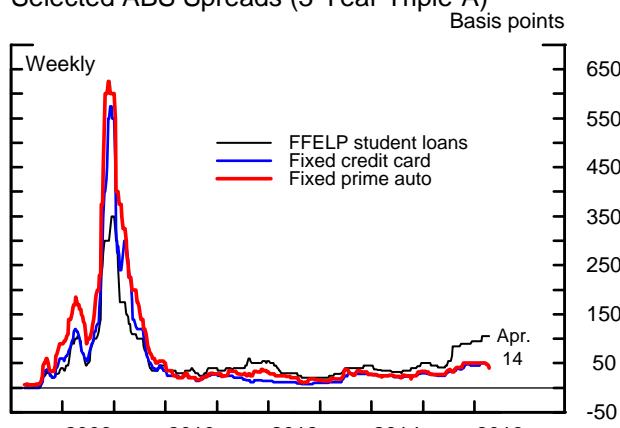
### Gross Consumer ABS Issuance



\* Month to date.

Source: Inside MBS & ABS; Merrill Lynch; Federal Reserve Board.

### Selected ABS Spreads (3-Year Triple-A)



Note: Spreads are to swap rate for credit card and auto asset-backed securities (ABS) and to 3-month LIBOR for student loans. FFELP is Federal Family Education Loan Program.

Source: J.P. Morgan.

on banks' books continued to grow at a robust pace over the first quarter. In response to wider and more volatile CMBS spreads at the beginning of the year, CMBS issuance has been subdued in the first quarter, consistent with reports from banks in the SLOOS. Over the intermeeting period, CMBS spreads narrowed markedly but remained at elevated levels.

Credit conditions in municipal bond markets continued to be stable, even as the situation facing Puerto Rico's creditors deteriorated further. Gross issuance of municipal bonds remained solid in the first quarter, and yield spreads on general obligation (GO) municipal bonds over comparable-maturity Treasury securities were little changed, on net, over the intermeeting period. A default by Puerto Rico on a wider range of debt, including its GO bonds, remains likely in the absence of a restructuring agreement with investors or congressional intervention. Puerto Rico's Government Development Bank has a substantial debt payment due in early May, and the next sizable payment of GO bonds is due in July. In addition, the Puerto Rican legislature passed a bill allowing the governor to declare a moratorium on debt payments. However, market participants reportedly consider the risks of broader spillovers from a possible default to be low.

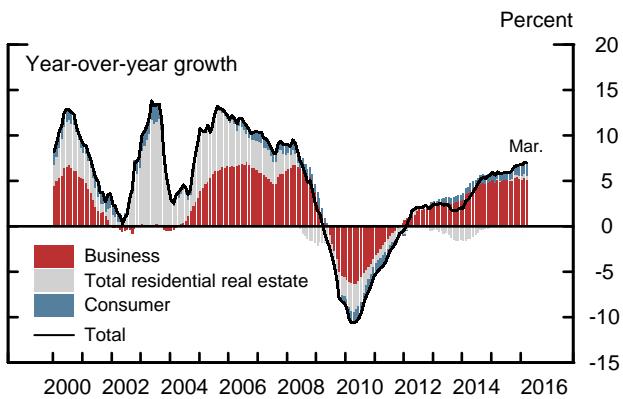
## HOUSEHOLD FINANCE

Growth of residential real estate (RRE) loans on banks' books remained subdued through the first quarter, and credit conditions stayed tight for mortgage borrowers with low credit scores, hard-to-document income, or relatively high debt-to-income ratios. A significant number of SLOOS respondents reportedly eased lending standards on GSE-eligible residential mortgages and witnessed stronger demand overall for RRE loans in the first quarter. Over the intermeeting period, quoted interest rates on 30-year fixed-rate mortgages to well-qualified borrowers declined 17 basis points, on net, in line with MBS yields and comparable-maturity Treasury yields, and stand at about 3.44 percent, near their all-time lows.

Financing conditions in consumer credit markets were little changed and remained largely accommodative, with student and auto loans continuing to be broadly available and credit card lending conditions relatively tight, particularly for borrowers with subprime credit scores. Moreover, responses to the SLOOS indicate that during the first quarter, while credit card lending standards were little changed, a modest number of banks reported easing lending standards on auto and other consumer loans. Over the same period, demand for auto loans reportedly further strengthened at many banks.

## Banking Developments

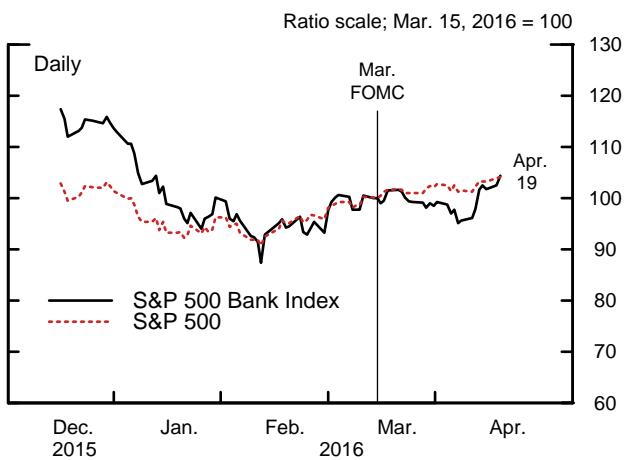
### Core Loan Growth



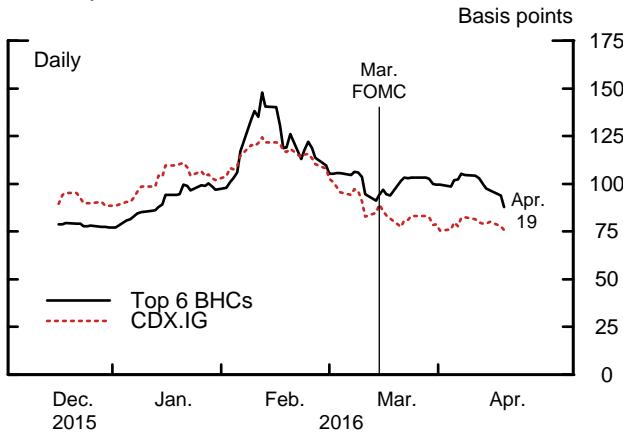
Note: Business loans include commercial and industrial loans and commercial real estate loans. Consumer loans include credit card, auto, and other consumer loans.

Source: Federal Reserve Board, FR 2644, Weekly Report of Selected Assets and Liabilities of Domestically Chartered Commercial Banks and U.S. Branches and Agencies of Foreign Banks.

### S&P 500 Stock Price Indexes



### CDS Spreads



Note: Top 6 bank holding companies (BHCs) are Bank of America, Citigroup, Goldman Sachs, Morgan Stanley, JPMorgan Chase, and Wells Fargo. CDX.IG is the on-the-run investment-grade credit default swap (CDS) index.

Source: Markit.

Consumer loan balances continued to increase at a robust pace through February, and data on bank lending activities suggest further growth through March. Issuance of ABS continued to be robust in the first quarter, with their spreads stabilizing at levels that remained a bit higher than usual.

## BANKING DEVELOPMENTS

Growth of core loans and deposits at commercial banks stayed robust during the first quarter. Over the intermeeting period, the largest banks reported declines in profitability during the first quarter due to reduced trading and investment banking revenues and low net interest margins. However, for several banks, these declines in profitability were in line with or slightly better than analysts' consensus expectations. Stock prices of bank holding companies underperformed broad equity market indexes but edged higher on banks' earnings reports later in the period, while banks' CDS spreads remained elevated.

## FEDERAL RESERVE OPERATIONS AND SHORT-TERM FUNDING MARKETS

Over the intermeeting period, take-up in overnight reverse repurchase agreement (ON RRP) operations continued to be well below average levels in 2015 and strikingly below the median dealer estimate of ON RRP take-up after liftoff in the Desk's December Survey of Primary Dealers. The elevated triparty Treasury repo volumes, combined with the high Treasury bill issuance, likely depressed take-up. Low take-up has persisted despite recent conversions of prime money market mutual funds (MMFs) into government funds (see the box "Developments regarding the Implementation of Money Market Fund Reforms" for a discussion about ongoing prime MMF conversions). Meanwhile, take-up on quarter-end was about \$170 billion lower than on year-end; however, the increase in take-up on March 31 was in line with recent quarter-ends, suggesting cash investment opportunities diminished somewhat as major borrowers—foreign banks, in particular—pared their balance sheets on the statement date.

Over the intermeeting period, the effective federal funds and Eurodollar rates both traded consistently at 37 basis points, although they both dipped to 25 basis points on the March quarter-end.<sup>3</sup> The overnight repo rate for Treasury collateral, as surveyed by the Desk, stayed above the ON RRP offer rate of 25 basis points. On quarter-end, the GCF

<sup>3</sup> The effective federal funds rate averaged 37 basis points over the intermeeting period, with the intraday standard deviation averaging 3 basis points.

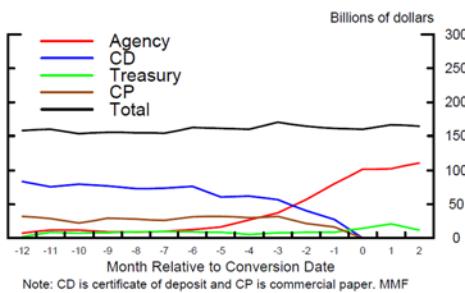
## Developments regarding the Implementation of Money Market Fund Reforms

In July 2014, the SEC adopted changes in the rules that govern the operation of money market funds (MMFs). The key reforms include requiring floating net asset values (NAVs) for prime institutional funds and tax-exempt institutional funds and mandating that all prime and tax-exempt funds have the ability to impose liquidity fees and redemption gates when their liquid assets fall below specified thresholds. These new rules go into effect in October 2016.<sup>1</sup>

In response, fund complexes have announced or completed changes that will, on net, reduce prime fund assets under management (AUM) by about \$300 billion—approximately 20 percent of the prime fund industry. These changes mostly reflect conversions of prime funds to government-only funds, which allow funds to avoid the gates-and-fees and floating NAV requirements. Moreover, some funds have been closed or have left the MMF sector, and others may still be waiting to announce a conversion. In addition, prime funds with about \$100 billion in assets have completed conversions from institutional to retail funds, which allows them to avoid the floating NAV requirement.<sup>2</sup>

The implementation of the new rules could raise a number of issues for markets and policymakers. First, large moves from prime to government funds require a shift in assets from private securities to U.S. government securities and government repurchase agreements, and these changes could affect credit spreads for money market instruments. Funds that have completed conversions to government funds have eliminated their holdings of private instruments, including commercial paper and certificates of deposit, and increased their holdings of Agency debt (figure 1). Partly in preparation for this shift, over the past year, prime funds in

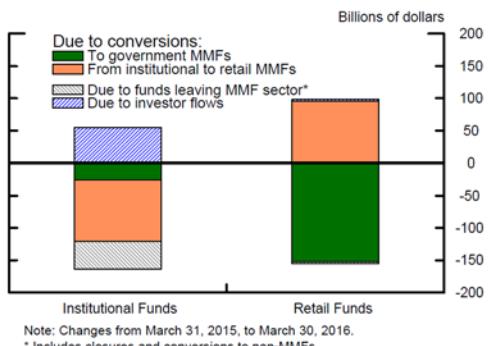
**Figure 1: Asset Composition of Converted Funds - Prime to Government**



Note: CD is certificate of deposit and CP is commercial paper. MMF conversions through February 29, 2016. Conversions exclude: partial fund conversions, feeder funds, and multiple conversions for a single fund.

Source: SEC Form N-MFP.

**Figure 2: Year-over-Year Changes in Prime MMF Assets under Management**



Source: iMoneyNet.

<sup>1</sup> A number of new regulations, also announced in July 2014, will take effect later this month. These regulations include additional rules on asset diversification, enhanced disclosure of information allowing investors to assess risks, and enhancements of the stress-testing requirements adopted by the SEC in 2010.

<sup>2</sup> Under the SEC's Investment Company Act Rule 2a-7, as amended, retail MMFs are funds that have "policies and procedures reasonably designed to limit all beneficial owners of the fund to natural persons" (<https://www.sec.gov/rules/final/2014/33-9616-rule-2a-7-amendments.pdf>). Institutional funds are not subject to such a restriction and may be held primarily by institutional investors. The SEC imposed the floating NAV requirement only on institutional funds because, historically, institutional investors have been far more likely than retail investors to redeem MMF shares during episodes of stress.

aggregate have substantially reduced their holdings of private instruments with more than 30 days to maturity. Overall, money funds managed these sizable shifts by reallocating assets very gradually over a period of several months and, as a result, it is difficult to identify any price effects.

Second, the implementation of MMF reforms could drive investors away from prime MMFs, which could be disruptive for short-term funding markets. Although, to date, investors have not moved away from prime MMFs (see the blue hashed portions of the bars in figure 2), large and disruptive outflows from institutional prime funds could occur ahead of the October deadline, particularly if institutional investors want to avoid floating NAVs, gates, and fees. As a reported precaution against such redemptions, fund managers have increased, in aggregate, their holdings of liquid assets.

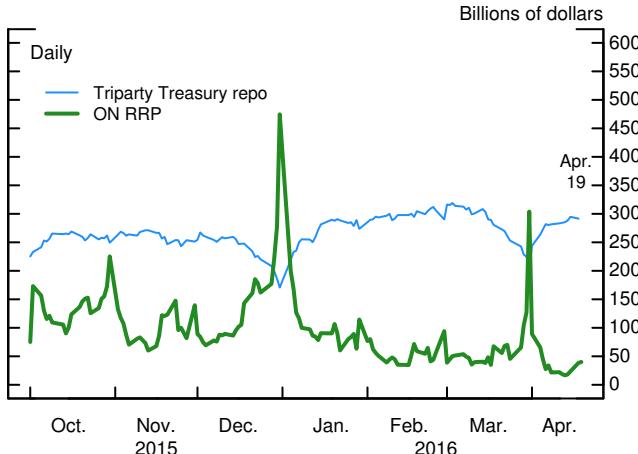
Third, the shift in assets from prime MMFs to government MMFs could boost take-up at the overnight reverse repurchase agreement (ON RRP) facility because government funds typically invest larger shares of their assets in ON RRPs than do prime funds. That said, we have not observed signs of increased take-up at the facility in response to the conversions. In fact, the average daily take-up by government MMFs has remained under \$35 billion over the intermeeting period. As regards ON RRP participation at quarter-ends, when prime MMFs tend to place a large amount of their assets in the Fed's facility, the reduction in the AUM of prime MMFs could damp ON RRP participation spikes.

Fourth, the reduction in the AUM of prime MMFs should have a net positive effect on financial stability, as prime funds are particularly vulnerable to runs. However, the net effect depends on what happens to the assets previously held by prime funds and how investors—particularly institutional investors who have used prime funds for cash management—move their balances.

So far, the money fund industry, and money markets more generally, appears to be adjusting relatively smoothly to the new rules. However, given that the adjustment is ongoing, the staff will continue to monitor both the transition and the efficacy of the SEC's reforms.

## Federal Reserve Operations and Short-Term Funding Markets

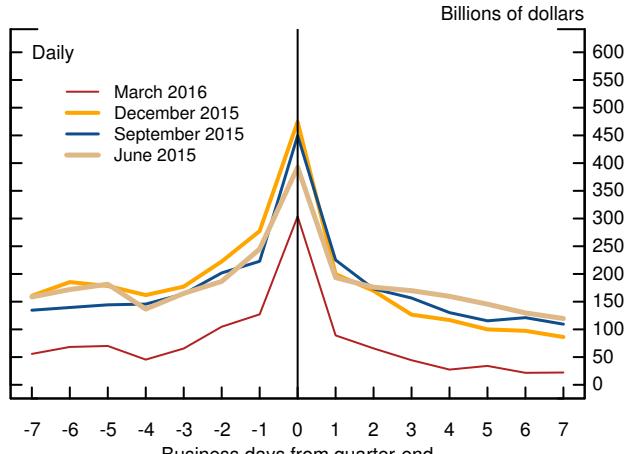
### Money Market Volumes and RRP Usage



Note: RRP is reverse repurchase agreement; repo is repurchase agreement; ON RRP is overnight reverse repurchase agreement.

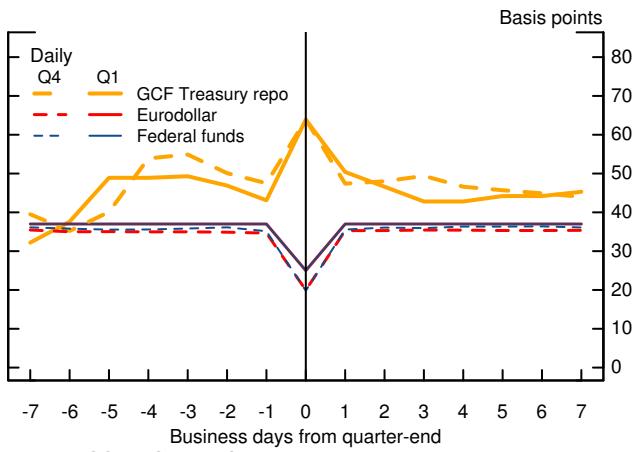
Source: Federal Reserve Bank of New York.

### Total RRP Usage around Quarter-End



Source: Federal Reserve Board.

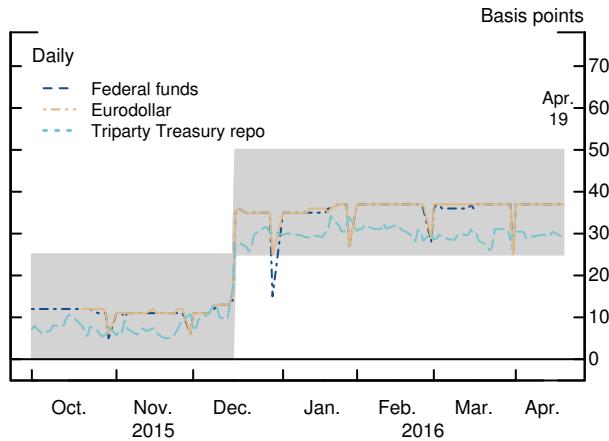
### Money Market Rates around Quarter-End



Note: GCF is General Collateral Finance; repo is repurchase agreement.

Source: Depository Trust & Clearing Corporation; Federal Reserve Bank of New York; Federal Reserve Board.

### Money Market Rates



Note: The shaded area is the target range for the federal funds rate; repo is repurchase agreement.

Source: Depository Trust & Clearing Corporation; Federal Reserve Bank of New York; Federal Reserve Board.

repo rate for Treasury collateral increased 21 basis points to a level of 64 basis points, while the survey repo rate moved up marginally.

Over the intermeeting period, the Desk reinvested \$24 billion of maturing Treasury securities and purchased \$23 billion of agency MBS under the reinvestment program. Meanwhile, the Desk rolled \$0.7 billion in expected settlements of agency MBS.

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## Risks and Uncertainty

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### ASSESSMENT OF RISKS

We continue to view the uncertainty around our projections for real GDP growth, the unemployment rate, and inflation as broadly in line with the average over the past 20 years (the benchmark used by the FOMC). We have maintained our assumption that the risks to our GDP projection are tilted to the downside, in part because we view neither monetary nor fiscal policy as well positioned to offset large adverse shocks. In addition, while there has recently been some improvement in global financial and economic conditions, downside risks emanating from abroad remain. We view the risks around our unemployment rate projection as aligned with those for GDP and, therefore, as skewed to the upside. We continue to see the risks around our inflation projection as weighted to the downside. Market-based measures of inflation compensation remain low, and some survey-based measures of longer-term inflation expectations are at the low ends of their historical ranges.

Our view of the risks to the economic outlook is informed by the staff's quarterly quantitative surveillance assessment, which judges the vulnerabilities of the U.S. financial system as moderate overall. This assessment is due importantly to high capital positions at banks and insurance companies, sizable holdings of liquid assets at large banks, and below-trend leverage for the household sector. That said, valuation pressures have increased in equity markets and commercial real estate in absolute terms, although such pressures are less apparent when judged relative to the low level of Treasury yields. Moreover, nonfinancial corporate firms' leverage is elevated; although these corporations are not expected to face debt repayment difficulties in the near term, given their expected profits and the low interest rates, elevated leverage leaves these firms vulnerable to distress should profits unexpectedly weaken.

### ALTERNATIVE SCENARIOS

To illustrate some of the risks to the outlook, we construct a number of alternatives to the baseline projection using simulations of staff models. The first two scenarios explore the effects of shocks that weaken labor productivity growth and illustrate how weaker productivity can be associated with different economic outcomes, depending on the nature of the shocks. In the third scenario, a sharp increase in the term

**Alternative Scenarios**  
(Percent change, annual rate, from end of preceding period except as noted)

Measure and scenario	2016		2017	2018	2019-20
	H1	H2			
<i>Real GDP</i>					
Extended Tealbook baseline	1.3	2.7	2.4	2.0	1.6
Weaker labor productivity, weaker labor market	1.1	1.6	1.8	1.7	1.5
Weaker labor productivity, stronger labor market	1.5	2.2	2.1	2.0	1.7
Sharp increases in term premiums	1.3	2.1	1.5	1.7	1.8
Lower long-term inflation expectations	1.3	2.7	2.4	2.0	1.6
Disorderly Brexit	1.2	2.2	1.9	2.0	1.7
Stronger foreign growth and weaker dollar	1.3	2.9	2.8	2.2	1.4
<i>Unemployment rate<sup>1</sup></i>					
Extended Tealbook baseline	4.9	4.8	4.4	4.2	4.4
Weaker labor productivity, weaker labor market	5.0	4.9	4.5	4.3	4.5
Weaker labor productivity, stronger labor market	4.9	4.7	4.2	3.9	3.9
Sharp increases in term premiums	4.9	4.9	4.9	4.9	4.9
Lower long-term inflation expectations	4.9	4.8	4.4	4.2	4.3
Disorderly Brexit	4.9	4.8	4.7	4.5	4.7
Stronger foreign growth and weaker dollar	4.9	4.7	4.2	3.8	4.1
<i>Total PCE prices</i>					
Extended Tealbook baseline	.8	1.4	1.7	1.8	2.0
Weaker labor productivity, weaker labor market	.8	1.5	1.9	2.0	2.1
Weaker labor productivity, stronger labor market	.9	1.7	2.2	2.3	2.2
Sharp increases in term premiums	.8	1.4	1.6	1.7	1.9
Lower long-term inflation expectations	.7	1.3	1.4	1.5	1.7
Disorderly Brexit	.7	.7	1.3	1.7	1.9
Stronger foreign growth and weaker dollar	.8	1.8	2.1	2.1	2.1
<i>Core PCE prices</i>					
Extended Tealbook baseline	1.7	1.3	1.6	1.8	2.0
Weaker labor productivity, weaker labor market	1.7	1.5	1.8	2.0	2.1
Weaker labor productivity, stronger labor market	1.8	1.7	2.1	2.3	2.2
Sharp increases in term premiums	1.7	1.3	1.5	1.7	1.9
Lower long-term inflation expectations	1.7	1.2	1.4	1.5	1.7
Disorderly Brexit	1.7	.9	1.3	1.7	1.9
Stronger foreign growth and weaker dollar	1.8	1.6	2.0	2.1	2.1
<i>Federal funds rate<sup>1</sup></i>					
Extended Tealbook baseline	.6	1.3	2.4	3.3	4.1
Weaker labor productivity, weaker labor market	.6	1.2	2.4	3.3	4.1
Weaker labor productivity, stronger labor market	.6	1.4	2.9	4.1	5.2
Sharp increases in term premiums	.6	1.2	1.9	2.4	3.1
Lower long-term inflation expectations	.6	1.2	2.2	3.0	3.8
Disorderly Brexit	.6	1.2	1.9	2.7	3.6
Stronger foreign growth and weaker dollar	.7	1.4	2.9	3.9	4.7

1. Percent, average for the final quarter of the period.

premiums on long-duration Treasury securities slows economic growth. The fourth scenario considers the implications of long-term inflation expectations that are lower than in the baseline. In the fifth scenario, a U.K. exit from the European Union (EU) leads to increases in financial stress and an appreciation of the dollar. The final scenario considers the possibility that stronger growth abroad causes the dollar to depreciate substantially relative to the baseline.

We illustrate the first two scenarios using the Board staff's EDO model. The next two scenarios are generated using the FRB/US model, and the last two scenarios use the multicountry SIGMA model. In each of the scenarios, the federal funds rate is governed—as in the baseline forecast—by an inertial version of the Taylor (1999) rule.<sup>1</sup> In all cases, we assume that the size and composition of the SOMA portfolio follow their baseline paths.

## **Weaker Labor Productivity, Weaker Labor Market**

Labor productivity growth has been weak over the past several years, averaging less than  $\frac{1}{2}$  percent per year from 2011 through 2015. In the baseline projection, productivity growth is assumed to pick up to an average annual rate of  $1\frac{1}{4}$  percent in 2017 and 2018. However, as presented in the box “Alternative View: Productivity Acceleration Will Be More Gradual” in the Domestic Economic Developments and Outlook section, the forces that have contributed to subdued productivity growth over the past several years may abate more slowly than is assumed in the baseline. In this scenario and the next, the path of labor productivity is assumed to be the same as the one considered in the alternative view box: Labor productivity increases  $\frac{1}{2}$  percent in 2016,  $\frac{3}{4}$  percent in 2017, and 1 percent in 2018. The growth rate of labor productivity remains at 1 percent in 2019 and 2020 and gradually converges to the baseline path thereafter.

In this scenario, the lower path of labor productivity is driven solely by reduced total factor productivity. With a slower growth rate of total factor productivity, real GDP grows more slowly than in the baseline, averaging about  $1\frac{1}{2}$  percent per year over the next five years. The bad news about future productivity causes a slight deterioration in labor market conditions by reducing households’ permanent income and depressing

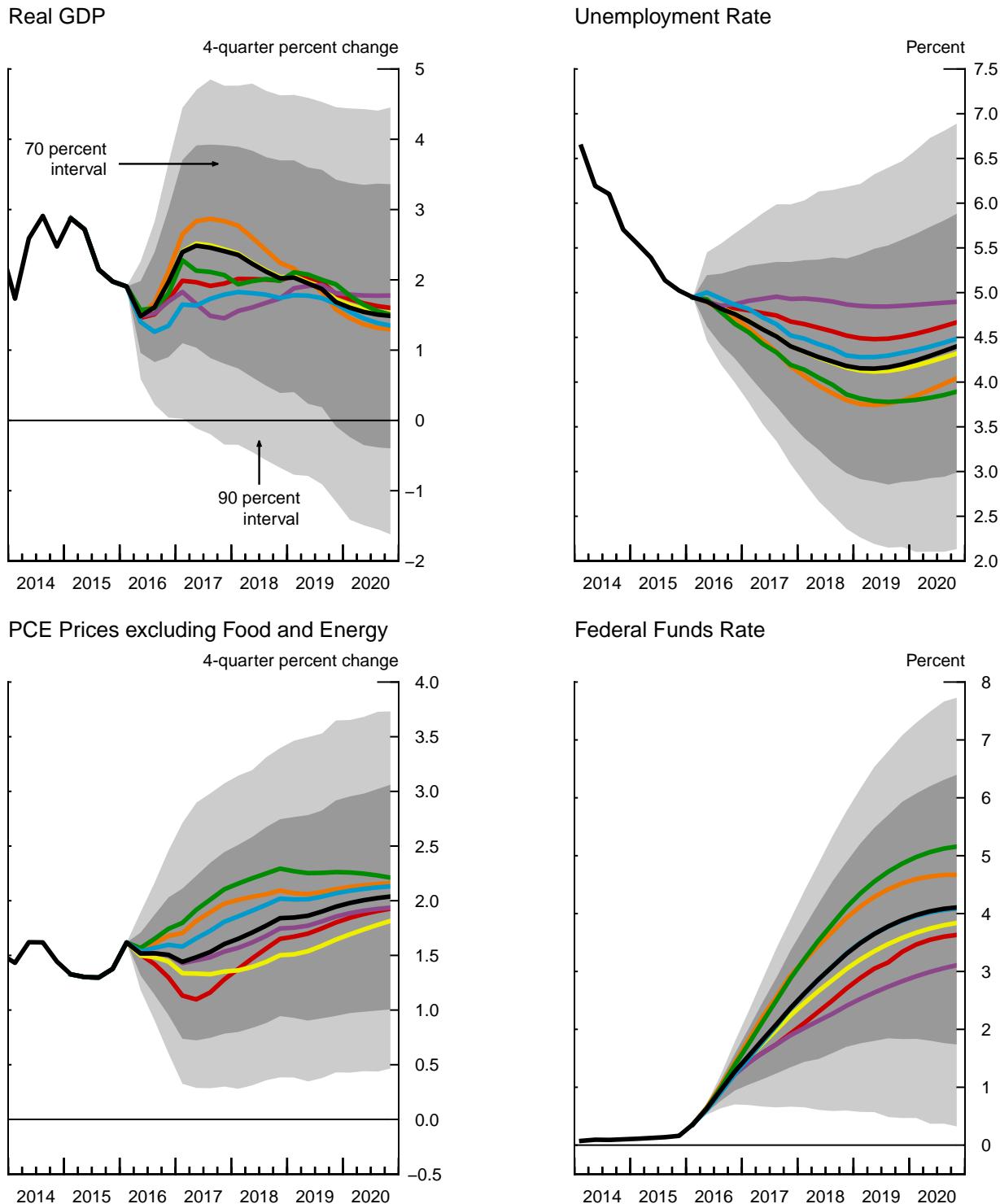
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<sup>1</sup> For the scenarios run in EDO and SIGMA, we assume a policy rule broadly similar to the FRB/US simulations. One key difference relative to the FRB/US simulation is that the policy rules in EDO and SIGMA use a measure of slack equal to the difference between actual output and the model’s estimate of the level of output that would occur in the absence of slow adjustment of wages and prices.

## Forecast Confidence Intervals and Alternative Scenarios

Confidence Intervals Based on FRB/US Stochastic Simulations

- █ Extended Tealbook baseline
- █ Weaker labor productivity, weaker labor market
- █ Weaker labor productivity, stronger labor market
- █ Sharp increases in term premiums
- █ Lower long-term inflation expectations
- █ Disorderly Brexit
- █ Stronger foreign growth and weaker dollar



aggregate demand; accordingly, the unemployment rate follows a trajectory that is a bit higher than the baseline path. Lower total factor productivity increases firms' marginal costs of production, leading to inflation that rises a little more quickly than in the baseline and reaches 2 percent in late 2018. The path for the federal funds rate is essentially unchanged from the baseline, as the effect of a slightly higher path for the unemployment rate is offset by mildly higher inflation.

## **Weaker Labor Productivity, Stronger Labor Market**

It is difficult to gauge all of the underlying sources behind weak labor productivity growth in recent years, and this scenario presents an alternative set of economic forces with different implications for key macroeconomic outcomes. In this scenario, the lower path of labor productivity is driven by a combination of lower total factor productivity growth and stronger aggregate demand, similar to the staff's interpretation of the past several years.<sup>2</sup> Real GDP and employment rise faster than in the first scenario, at rates that are more in line with the average paces seen since 2014. The unemployment rate declines more rapidly than in the baseline, reaching a low point of 3½ percent in 2019. With resource utilization tighter in this scenario, the path for core PCE price inflation is higher than in the baseline and in the first scenario. Core PCE price inflation peaks at 2¼ percent in late 2018. Reflecting both the lower unemployment rate and higher inflation, the federal funds rate rises faster than in the baseline and reaches 5¼ percent by the end of 2020.

## **Sharp Increases in Term Premiums**

Measures of the term premiums on long-maturity Treasury securities have recently fallen further into negative territory. In the baseline projection, these term premiums are expected to increase gradually from their current levels to positive long-run average values. However, as noted in the "QS Assessment of Financial Stability," the rise in term premiums could be abrupt. In this scenario, we consider the possibility that term premiums on 5-year and 10-year Treasury securities rise more than 200 basis points in one year and that term premiums on 30-year Treasury securities rise 165 basis points.

Sharp increases in Treasury term premiums lead to price declines across a broad range of long-duration assets—including mortgages, corporate bonds, and equities—

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<sup>2</sup> In EDO and other DSGE models with both labor and capital as inputs to production, a positive shock to aggregate demand typically leads to a larger increase in hours than in output—and thus to a lower labor productivity—because the marginal product of labor declines with hours.

**Selected Tealbook Projections and 70 Percent Confidence Intervals Derived from Historical Tealbook Forecast Errors and FRB/US Simulations**

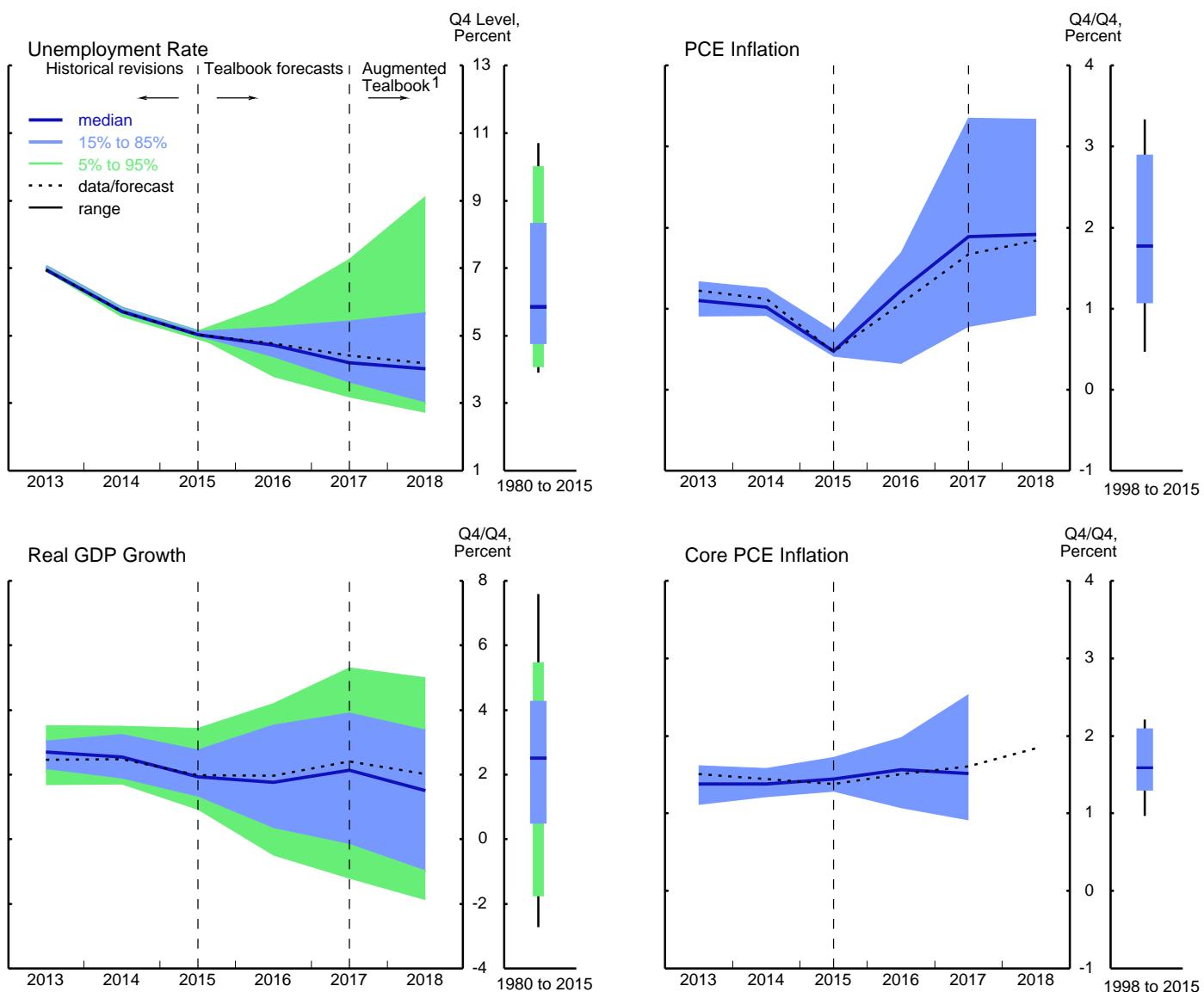
Measure	2016	2017	2018	2019	2020
<i>Real GDP</i> (percent change, Q4 to Q4)					
Projection	2.0	2.4	2.0	1.7	1.5
Confidence interval					
Tealbook forecast errors	.3–3.5	-.2–3.9	-1.0–3.4	...	...
FRB/US stochastic simulations	.9–3.0	.8–3.9	.4–3.7	-.1–3.4	-.4–3.4
<i>Civilian unemployment rate</i> (percent, Q4)					
Projection	4.8	4.4	4.2	4.2	4.4
Confidence interval					
Tealbook forecast errors	4.3–5.3	3.6–5.4	3.0–5.7	...	...
FRB/US stochastic simulations	4.3–5.3	3.5–5.3	3.0–5.4	2.9–5.6	3.0–5.9
<i>PCE prices, total</i> (percent change, Q4 to Q4)					
Projection	1.1	1.7	1.8	1.9	2.0
Confidence interval					
Tealbook forecast errors	.3–1.7	.8–3.3	.9–3.3	...	...
FRB/US stochastic simulations	.4–1.7	.8–2.6	.9–2.8	.8–3.0	.9–3.1
<i>PCE prices excluding food and energy</i> (percent change, Q4 to Q4)					
Projection	1.5	1.6	1.8	1.9	2.0
Confidence interval					
Tealbook forecast errors	1.1–2.0	.9–2.5	...	...	...
FRB/US stochastic simulations	1.0–2.0	.8–2.4	.9–2.7	.9–2.9	1.0–3.1
<i>Federal funds rate</i> (percent, Q4)					
Projection	1.3	2.4	3.3	3.9	4.1
Confidence interval					
FRB/US stochastic simulations	.9–1.6	1.3–3.4	1.7–4.9	1.8–5.9	1.7–6.4

Note: Shocks underlying FRB/US stochastic simulations are randomly drawn from the 1969–2015 set of model equation residuals. Intervals derived from Tealbook forecast errors are based on projections made from 1980 to 2015 for real GDP and unemployment and from 1998 to 2015 for PCE prices. The intervals for real GDP, unemployment, and total PCE prices are extended into 2018 using information from the Blue Chip survey and forecasts from the CBO and CEA.

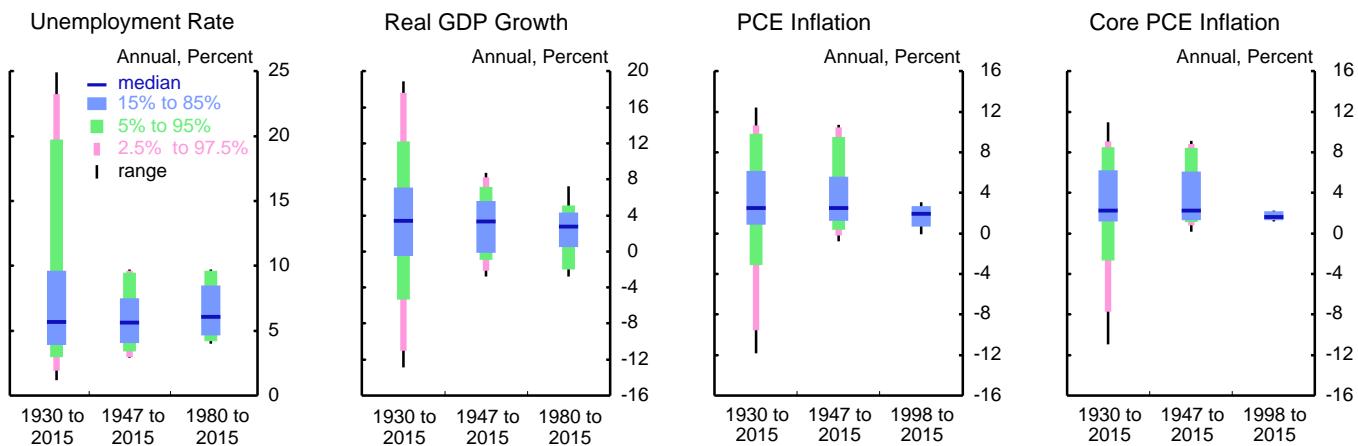
... Not applicable.

## Prediction Intervals Derived from Historical Tealbook Forecast Errors

### Forecast Error Percentiles



### Historical Distributions



Note: See the technical note in the appendix for more information on this exhibit.

1. Augmented Tealbook prediction intervals use 1- and 2-year-ahead forecast errors from Blue Chip, CBO, and CEA to extend the Tealbook prediction intervals through 2018.

tightening overall financial conditions and thus exerting downward pressure on household consumption and business activity. Real GDP grows 1½ percent per year from 2016 through 2018, ½ percentage point below the baseline. The unemployment rate remains near 5 percent over the next five years. The path for inflation is a touch lower than in the baseline and reaches just under 2 percent at the end of 2020. Even though long-term Treasury yields are higher than in the baseline, the federal funds rate is lower, reflecting the weaker economic conditions. The federal funds rate rises to only 3 percent by late 2020.

The adverse effects of a sharp increase in term premiums could plausibly be either smaller or larger than described in this scenario. For example, in implementing this scenario, we assume that the sharp increases in term premiums and the associated rises in yields will not cause widespread financial stress or disrupt the financial system and that their effects on economic activity will only come through the usual interest rate channels. If that assumption turned out to be wrong, the negative effects on economic conditions could be worse than those shown in this scenario. Alternatively, if term premiums have become more negative recently as a result of increased uncertainty about the economic outlook and some of the increases in term premiums are driven by the unwinding of such uncertainty effects, this unwinding could mitigate some of the adverse effects of the increases in term premiums described in this scenario.

## Lower Long-Term Inflation Expectations

In the baseline projection, PCE price inflation is projected to increase gradually to the Committee's longer-run objective of 2 percent. A key assumption behind this projection is that the level of long-term inflation expectations relevant for wage and price setting is currently consistent with PCE price inflation of 1¾ percent, and that expectations will eventually rise to a level consistent with 2 percent inflation. However, a wide range of uncertainty surrounds this assumption, and some measures of longer-run inflation expectations are currently near the low ends of their historical ranges. In this scenario, we assume that long-term inflation expectations currently stand at 1.5 percent and that, going forward, households and businesses form their expectations adaptively based on past inflation.<sup>3</sup>

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<sup>3</sup> Long-term inflation expectations can persistently stay below the Committee's target even when households and businesses are fully rational and forward looking if households and businesses perceive that

Core PCE price inflation is lower than in the baseline, reaching its trough of 1.3 percent in early 2017, as subdued inflation expectations and low actual inflation are mutually reinforcing. Thereafter, core inflation rises gradually, reaching 1¾ percent in 2020. The path of the federal funds rate is lower than in the baseline, while the paths of real GDP growth and the unemployment rate are roughly unchanged. However, the effect of low inflation on the real economy could be adverse if, for example, there was a pronounced debt-deflation dynamic.

## Disorderly Brexit

Although our baseline assumes that the U.K. electorate will vote to stay in the EU in the June 23 referendum, this outcome is far from assured. In this scenario, we assume that the United Kingdom opts to leave the EU and that subsequent negotiations on new trade and financial arrangements between U.K. and EU authorities prove contentious.<sup>4</sup> U.K. household and business confidence deteriorates markedly, and financial conditions tighten sharply. Moreover, concerns about the future of European integration also cause a persistent worsening of European financial conditions. All told, EU GDP falls around 1¼ percent below baseline, with an even sharper decline in the United Kingdom, while flight-to-safety flows cause the broad real dollar to appreciate about 5 percent.

The stronger dollar and some tightening of U.S. financial conditions cause U.S. real GDP growth to moderate to about 1¾ percent in 2016 and 2 percent in 2017. The U.S. unemployment rate falls less than in the baseline. Weaker economic activity and falling import prices reduce U.S. core inflation to 1¼ percent in 2016 and 2017. The federal funds rate follows a shallower path than in the baseline and is about 2¾ percent at the end of 2018.

## Stronger Foreign Growth and Weaker Dollar

In our baseline forecast, the substantial downside risks facing the foreign economies diminish only gradually as foreign output growth picks up modestly and inflation slowly moves closer to central bank targets. However, a number of factors—

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risks to future inflation are tilted to the downside. The lower-bound constraint on interest rates naturally tilts inflation risk to the downside and thus can depress long-term inflation expectations. See Timothy Hills, Taisuke Nakata, and Sebastian Schmidt (2016), “The Risky Steady State and the Interest Rate Lower Bound,” Finance and Economics Discussion Series 2016-009 (Washington: Board of Governors of the Federal Reserve System, February), <http://dx.doi.org/10.17016/FEDS.2016.009>.

<sup>4</sup> For analysis of some of the possible implications and developments that might attend a U.K. exit from the EU, see the box “Effect of a U.K. Vote to Leave the European Union” in the International Economic Developments and Outlook section.

including highly accommodative foreign monetary policies, fiscal stimulus in some EMEs, and the unleashing of pent-up demand as financial conditions continue to improve—could spur a stronger recovery abroad than we are currently projecting. In this scenario, we assume that foreign GDP improves at a moderately faster pace than in our baseline so that the level of foreign output runs 1 percent above the baseline by early 2018. Increased optimism about the foreign recovery and the perception of diminished tail risks cause the broad real dollar to depreciate 8 percent by the end of next year, reversing about half of the appreciation that has occurred since the middle of 2014.

The weaker dollar and somewhat stronger foreign growth boost U.S. real net exports. Consequently, U.S. real GDP expands 2 $\frac{3}{4}$  percent in 2017, nearly  $\frac{1}{2}$  percentage point more than in the baseline, and the unemployment rate falls to 3 $\frac{3}{4}$  percent by the end of 2018. Higher import prices and resource pressures cause core PCE inflation to reach 2 percent by late 2017. The federal funds rate rises more quickly than in the baseline, reaching almost 4 percent by the end of 2018.

**Assessment of Key Macroeconomic Risks (1)****Probability of Inflation Events**

(4 quarters ahead)

Probability that the 4-quarter change in total PCE prices will be ...	Staff	FRB/US	EDO	BVAR
<i>Greater than 3 percent</i>				
Current Tealbook	.04	.10	.14	.05
Previous Tealbook	.03	.08	.10	.06
<i>Less than 1 percent</i>				
Current Tealbook	.27	.10	.02	.19
Previous Tealbook	.28	.12	.02	.18

**Probability of Unemployment Events**

(4 quarters ahead)

Probability that the unemployment rate will ...	Staff	FRB/US	EDO	BVAR
<i>Increase by 1 percentage point</i>				
Current Tealbook	.03	.01	.16	.01
Previous Tealbook	.04	.01	.15	.01
<i>Decrease by 1 percentage point</i>				
Current Tealbook	.10	.32	.12	.21
Previous Tealbook	.08	.29	.14	.36

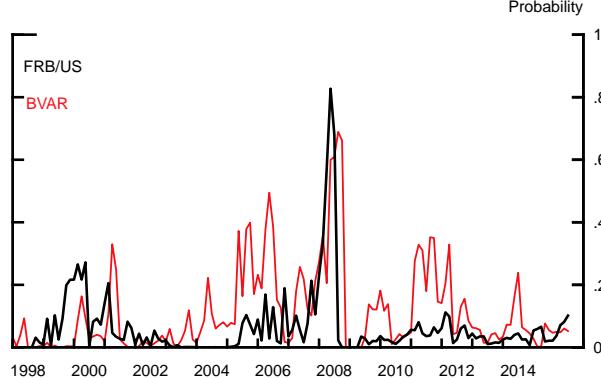
**Probability of Near-Term Recession**

Probability that real GDP declines in the next two quarters	Staff	FRB/US	EDO	BVAR	Factor Model
Current Tealbook	.02	.02	.07	.07	.08
Previous Tealbook	.02	.02	.05	.02	.00

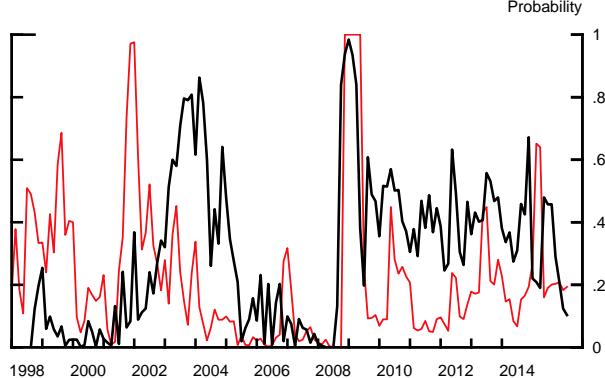
Note: "Staff" represents stochastic simulations in FRB/US around the staff baseline; baselines for FRB/US, BVAR, EDO, and the factor model are generated by those models themselves, up to the current-quarter estimate. Data for the current quarter are taken from the staff estimate for the second Tealbook in each quarter; if the second Tealbook for the current quarter has not yet been published, the preceding quarter is taken as the latest historical observation.

## Assessment of Key Macroeconomic Risks (2)

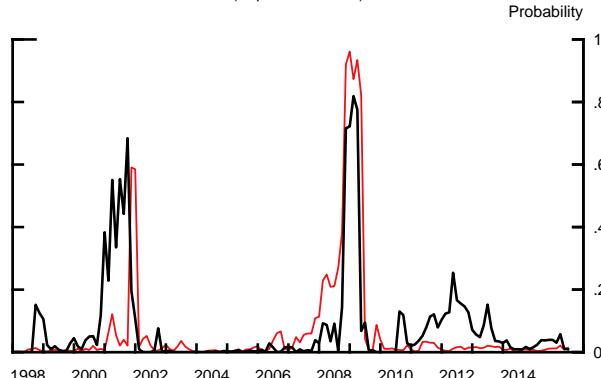
Probability that Total PCE Inflation Is above 3 Percent  
(4 quarters ahead)



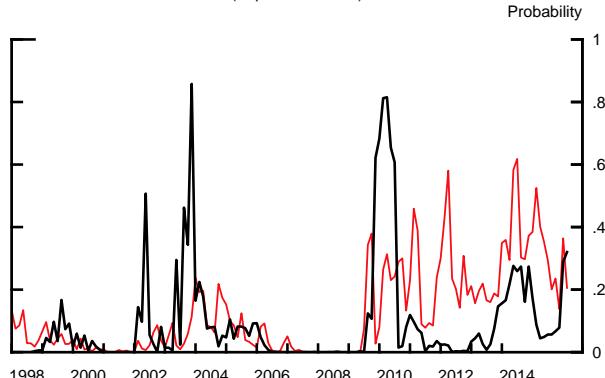
Probability that Total PCE Inflation Is below 1 Percent  
(4 quarters ahead)



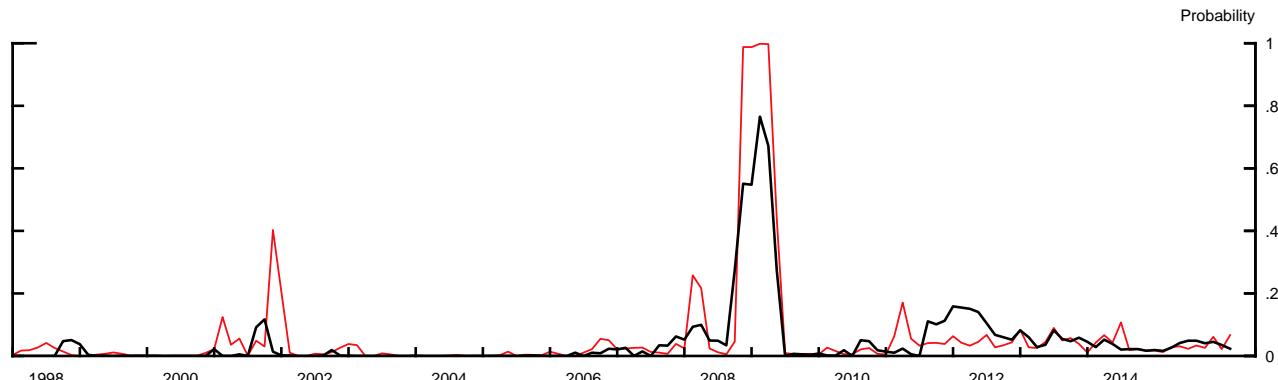
Probability that the Unemployment Rate Increases 1 ppt  
(4 quarters ahead)



Probability that the Unemployment Rate Decreases 1 ppt  
(4 quarters ahead)



Probability that Real GDP Declines in Each of the Next Two Quarters



Note: See notes on facing page. Recession and inflation probabilities for FRB/US and the BVAR are real-time estimates. See Robert J. Tetlow and Brian Ironside (2007), "Real-Time Model Uncertainty in the United States: The Fed, 1996–2003," *Journal of Money, Credit and Banking*, vol. 39 (October), pp. 1533–61.

## Appendix

### Technical Note on “Prediction Intervals Derived from Historical Tealbook Forecast Errors”

This technical note provides additional details about the exhibit “Prediction Intervals Derived from Historical Tealbook Forecast Errors.” In the four large fan charts, the black dotted lines show staff projections and current estimates of recent values of four key economic variables: average unemployment rate in the fourth quarter of each year and the Q4/Q4 percent change for real GDP, total PCE prices, and core PCE prices. (The GDP series is adjusted to use GNP for those years when the staff forecast GNP and to strip out software and intellectual property products from the currently published data for years preceding their introduction. Similarly, the core PCE inflation series is adjusted to strip out the “food away from home” component for years before it was included in core.)

The historical distributions of the corresponding series (with the adjustments described above) are plotted immediately to the right of each of the fan charts. The thin black lines show the highest and lowest values of the series during the indicated time period. At the bottom of the page, the distributions over three different time periods are plotted for each series. To enable the use of data for years prior to 1947, we report annual-average data in this section. The annual data going back to 1930 for GDP growth, PCE inflation, and core PCE inflation are available in the conventional national accounts; we used estimates from Lebergott (1957) for the unemployment rate from 1930 to 1946.<sup>1</sup>

The prediction intervals around the current and one-year-ahead forecasts are derived from historical staff forecast errors, comparing staff forecasts with the latest published data. For the unemployment rate and real GDP growth, errors were calculated for 1980 through 2014, yielding percentiles of the sizes of the forecast errors. For PCE and core PCE inflation, errors for 1998 through 2014 were used. This shorter range reflects both more limited data on staff forecasts of PCE inflation and the staff judgment that the distribution of inflation since the mid-1990s is more appropriate for the projection period than distributions of inflation reaching further back. In all cases, the prediction intervals are computed by adding the percentile bands of the errors onto the forecast. The blue bands encompass 70 percent prediction-interval ranges; adding the green bands expands this range to 90 percent. The dark blue line plots the median of the prediction intervals. There is not enough historical forecast data to calculate meaningful 90 percent ranges for the two inflation series. A median line above the staff forecast means that forecast errors were positive more than half of the time.

<sup>1</sup> Stanley Lebergott (1957), “Annual Estimates of Unemployment in the United States, 1900–1954,” in National Bureau of Economic Research, *The Measurement and Behavior of Unemployment* (Princeton, N.J.: Princeton University Press), pp. 213–41.

Because the staff has produced two-year-ahead forecasts for only a few years, the intervals around the two-year-ahead forecasts are constructed by augmenting the staff projection errors with information from outside forecasters: the Blue Chip consensus, the Council of Economic Advisers, and the Congressional Budget Office. Specifically, we calculate prediction intervals for outside forecasts in the same manner as for the staff forecasts. We then calculate the change in the error bands from outside forecasts from one year ahead to two years ahead and apply the average change to the staff's one-year-ahead error bands. That is, we assume that any deterioration in the performance between the one- and two-year-ahead projections of the outside forecasters would also apply to the Tealbook projections. Limitations on the availability of data mean that a slightly shorter sample is used for GDP and unemployment, and the outside projections may only be for a similar series, such as total CPI instead of total PCE prices or annual growth rates of GDP instead of four-quarter changes. In particular, because data on forecasts for core inflation by these outside forecasters are much more limited, we did not extrapolate the staff's errors for core PCE inflation two years ahead.

The intervals around the historical data in the four fan charts are based on the history of data revisions for each series. The previous-year, two-year-back, and three-year-back values as of the current Tealbook forecast are subtracted from the corresponding currently published estimates (adjusted as described earlier) to produce revisions, which are then combined into distributions and revision intervals in the same way that the prediction intervals are created.

**Changes in GDP, Prices, and Unemployment**  
(Percent, annual rate except as noted)

	Nominal GDP		Real GDP		PCE price index		Core PCE price index		Unemployment rate <sup>1</sup>	
Interval	03/09/16	04/20/16	03/09/16	04/20/16	03/09/16	04/20/16	03/09/16	04/20/16	03/09/16	04/20/16
<i>Quarterly</i>										
2015:Q1	.8	.8	.6	.6	-1.9	-1.9	1.0	1.0	5.5	5.5
Q2	6.1	6.1	3.9	3.9	2.2	2.2	1.9	1.9	5.4	5.4
Q3	3.3	3.3	2.0	2.0	1.3	1.3	1.4	1.4	5.1	5.1
Q4	2.1	2.3	1.2	1.4	.4	.3	1.3	1.3	5.0	5.0
2016:Q1	2.4	.9	1.9	.4	.1	.2	1.9	1.9	4.9	4.9
Q2	2.8	2.9	2.0	2.2	1.3	1.3	1.5	1.5	4.9	4.9
Q3	3.8	3.3	2.4	2.5	1.4	1.3	1.2	1.4	4.8	4.8
Q4	3.8	4.3	2.4	2.8	1.3	1.5	1.2	1.3	4.8	4.8
2017:Q1	3.7	3.9	1.8	2.0	1.7	1.8	1.6	1.7	4.7	4.7
Q2	4.1	4.4	2.3	2.6	1.7	1.7	1.6	1.6	4.6	4.6
Q3	4.0	4.1	2.3	2.4	1.6	1.6	1.5	1.6	4.5	4.5
Q4	4.0	4.4	2.3	2.6	1.6	1.6	1.5	1.5	4.5	4.4
<i>Two-quarter<sup>2</sup></i>										
2015:Q2	3.4	3.4	2.3	2.3	.1	.1	1.4	1.4	-.3	-.3
Q4	2.7	2.8	1.6	1.7	.8	.8	1.4	1.3	-.4	-.4
2016:Q2	2.6	1.9	2.0	1.3	.7	.8	1.7	1.7	-.1	-.1
Q4	3.8	3.8	2.4	2.7	1.4	1.4	1.2	1.3	-.1	-.1
2017:Q2	3.9	4.2	2.1	2.3	1.7	1.7	1.6	1.7	-.2	-.2
Q4	4.0	4.2	2.3	2.5	1.6	1.6	1.5	1.6	-.1	-.2
<i>Four-quarter<sup>3</sup></i>										
2014:Q4	3.9	3.9	2.5	2.5	1.1	1.1	1.4	1.4	-1.3	-1.3
2015:Q4	3.0	3.1	1.9	2.0	.5	.5	1.4	1.4	-.7	-.7
2016:Q4	3.2	2.8	2.2	2.0	1.0	1.1	1.4	1.5	-.2	-.2
2017:Q4	4.0	4.2	2.2	2.4	1.6	1.7	1.6	1.6	-.3	-.4
2018:Q4	4.0	4.0	2.0	2.0	1.8	1.8	1.8	1.8	-.2	-.2
<i>Annual</i>										
2014	4.1	4.1	2.4	2.4	1.4	1.4	1.5	1.5	6.2	6.2
2015	3.4	3.5	2.4	2.4	.3	.3	1.3	1.3	5.3	5.3
2016	3.0	2.7	2.0	1.7	.9	.9	1.5	1.5	4.8	4.9
2017	3.8	4.0	2.2	2.4	1.5	1.6	1.4	1.5	4.6	4.5
2018	4.0	4.1	2.1	2.2	1.8	1.8	1.7	1.7	4.4	4.3

- 1. Level, except for two-quarter and four-quarter intervals.
- 2. Percent change from two quarters earlier; for unemployment rate, change is in percentage points.
- 3. Percent change from four quarters earlier; for unemployment rate, change is in percentage points.

**Greensheets**  
**Changes in Real Gross Domestic Product and Related Items**  
(Percent, annual rate except as noted)

Item	2015			2016			2017			2015 <sup>1</sup>			2016 <sup>1</sup>			2017 <sup>1</sup>		
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2015 <sup>1</sup>	2016 <sup>1</sup>	2017 <sup>1</sup>	2016 <sup>1</sup>	2017 <sup>1</sup>	2018 <sup>1</sup>	
Real GDP <i>Previous Tealbook</i>	3.9	2.0	1.4	.4	2.2	2.5	2.8	2.0	2.6	2.4	2.6	2.0	2.0	2.4	2.2	2.2	2.0	
Final sales <i>Previous Tealbook</i>	3.9	2.7	1.6	.8	2.3	2.4	2.9	2.1	2.7	2.5	2.7	2.0	2.1	2.5	2.3	2.2	2.3	
Priv. dom. final purch. <i>Previous Tealbook</i>	3.9	3.2	2.0	1.4	2.2	2.4	2.0	1.8	2.3	2.3	2.5	1.9	2.3	2.2	2.2	2.2	2.3	
Personal cons. expend. <i>Previous Tealbook</i>	3.6	3.0	2.4	1.8	3.0	2.9	2.9	3.0	2.9	2.9	2.9	2.8	2.8	2.7	2.7	2.7	2.7	
Durables	8.0	6.6	3.8	-1.0	7.5	4.0	4.6	5.1	5.5	5.0	5.6	5.1	5.1	3.7	5.3	4.3	4.3	
Nondurables	4.3	4.2	.6	.6	2.9	2.7	2.7	2.8	2.6	2.5	2.8	2.4	2.4	2.3	2.7	2.7	2.7	
Services	2.7	2.1	2.8	2.6	2.3	2.7	2.7	2.7	2.7	2.7	2.7	2.5	2.4	2.6	2.6	2.6	2.2	
Residential investment <i>Previous Tealbook</i>	9.3	8.2	10.1	12.8	2.5	12.5	11.5	8.7	6.3	5.6	4.2	9.4	9.8	6.2	5.5	5.5	6.0	
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	4.1	2.6	-2.1	-3.7	1.4	3.6	3.7	3.3	3.3	3.8	3.9	1.5	1.2	3.6	2.7	2.7	2.7	
Equipment & intangibles <i>Previous Tealbook</i>	3.5	5.5	-1.3	-1.1	3.1	3.4	3.4	3.1	3.4	3.5	3.3	1.6	2.2	3.3	3.3	3.3	2.7	
Nonres. structures <i>Previous Tealbook</i>	3.5	5.5	-.4	-.4	3.7	4.2	3.9	3.6	3.3	3.8	4.0	3.0	2.8	3.7	3.7	2.9	2.9	
Gov't. cons. & invest. <i>Previous Tealbook</i>	2.6	2.6	1.8	1.1	3.3	1.9	2.0	.5	1.5	1.5	1.2	.5	.5	2.5	1.9	.9	.7	
Federal	.0	.2	2.3	-.4	4.0	3.9	2.6	.6	.6	.6	.3	-1.1	.9	.2.5	.1	.1	-.8	
Defense	.3	-1.4	2.8	-4.2	3.0	2.7	2.1	.1	.0	.0	.0	-1.1	.7	.9	-4	-4	-.5	
Nonddefense	-.5	2.8	1.5	5.6	5.6	3.3	1.5	1.4	1.2	1.2	1.3	1.3	.5	.8	1.2	1.2	1.2	
State & local	4.3	2.8	-1.2	3.0	1.2	1.0	.9	2.8	1.6	1.6	1.2	1.2	1.2	1.7	1.7	1.7	1.7	
Change in priv. inventories <sup>2</sup> <i>Previous Tealbook</i> <sup>2</sup>	114	85	78	66	52	69	70	73	73	49	47	98	60	52	23	23	23	
	114	85	78	66	52	69	70	73	73	49	47	98	64	71	39	39	39	

1. Change from fourth quarter of previous year to fourth quarter of year indicated.

2. Billions of chained (2009) dollars.

**Changes in Real Gross Domestic Product and Related Items**  
 (Change from fourth quarter of previous year to fourth quarter of year indicated, unless otherwise noted)

Item	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Real GDP <i>Previous Tealbook</i>	-2	2.7	1.7	1.3	2.5	2.5	2.0	2.0	2.4	2.0
Final sales <i>Previous Tealbook</i>	-4	2.0	1.5	1.7	1.9	2.6	2.0	2.1	2.5	2.2
Priv. dom. final purch. <i>Previous Tealbook</i>	-2.4	3.5	2.6	2.3	2.6	3.6	2.8	2.7	2.2	2.3
Personal cons. expend. <i>Previous Tealbook</i>	-2	3.1	1.5	1.3	2.3	3.2	2.7	2.7	2.9	2.5
Durables	2.5	9.3	4.8	7.2	4.6	7.5	5.1	3.7	5.3	2.5
Nondurables	.2	3.3	.4	.8	2.6	2.3	2.4	2.3	2.7	4.3
Services	-.8	2.0	1.4	.6	1.8	2.8	2.4	2.6	2.6	2.2
Residential investment <i>Previous Tealbook</i>	-10.8	-5.2	6.0	15.7	3.5	5.1	9.4	9.8	6.2	5.0
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	-12.2	8.1	9.0	5.2	4.2	5.5	1.5	1.2	3.6	2.7
Equipment & intangibles <i>Previous Tealbook</i>	-6.0	12.0	9.2	5.5	3.6	5.7	1.6	2.2	3.3	2.7
Nonres. structures <i>Previous Tealbook</i>	-6.0	12.0	9.2	5.5	3.6	5.7	3.0	2.8	3.7	2.9
Net exports <sup>1</sup> <i>Previous Tealbook</i>	-27.1	-4.0	8.0	4.1	6.5	5.0	-3.5	-4.8	3.1	1.7
Exports	-395	-459	-459	-447	-417	-443	-543	-619	-715	-756
Imports	.8	10.1	4.2	2.2	5.2	2.4	-.6	1.5	2.7	3.8
Gov't. cons. & invest. <i>Previous Tealbook</i>	2.3	-1.1	-3.0	-2.2	-2.9	.4	1.1	1.9	1.1	.7
Federal	2.3	-1.1	-3.0	-2.2	-2.9	.4	1.1	1.9	.9	.7
Defense	3.9	3.2	-4.0	-2.1	-6.8	-.8	.9	2.5	1	-.8
Nondefense	3.6	2.0	-4.1	-3.9	-7.4	-2.9	.7	.9	-.4	-.5
State & local	4.6	5.5	-3.9	1.0	-5.9	2.7	1.3	5.0	.8	-1.2
Change in priv. inventories <sup>1</sup> <i>Previous Tealbook</i>	-148	58	38	55	61	68	98	60	52	23
	-148	58	38	55	61	68	97	64	71	39

1. Billions of chained (2009) dollars.

**Greensheets**
**Contributions to Changes in Real Gross Domestic Product**  
(Percentage points, annual rate except as noted)

Item	2015			2016				2017				2015 <sup>1</sup>	2016 <sup>1</sup>	2017 <sup>1</sup>	2018 <sup>1</sup>
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Real GDP <i>Previous Tealbook</i>	3.9	2.0	1.4	.4	2.2	2.5	2.8	2.0	2.6	2.4	2.6	2.0	2.0	2.4	2.0
Final sales <i>Previous Tealbook</i>	3.9	2.7	1.6	.8	2.3	2.4	2.9	2.1	2.7	2.5	2.7	2.0	2.1	2.5	2.2
Priv. dom. final purch. <i>Previous Tealbook</i>	3.3	2.6	1.7	1.2	2.3	2.0	2.4	1.8	2.3	2.3	2.5	1.9	2.2	2.2	2.3
Personal cons. expend. <i>Previous Tealbook</i>	2.4	2.0	1.7	1.2	2.1	2.0	2.0	2.1	2.0	2.0	2.0	1.8	2.0	2.0	1.7
Durables	.6	.5	.3	-.1	.5	.3	.4	.4	.4	.4	.4	.3	.4	.3	.3
Nondurables	.6	.6	.1	.1	.4	.4	.4	.4	.4	.4	.4	.3	.4	.4	.4
Services	1.2	1.0	1.3	1.2	1.1	1.3	1.3	1.3	1.3	1.2	1.1	1.2	1.3	1.0	1.0
Residential investment <i>Previous Tealbook</i>	.3	.3	.3	.4	.1	.4	.4	.3	.2	.2	.2	.3	.3	.2	.2
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	.5	.3	-.3	-.5	.2	.5	.5	.4	.4	.4	.5	.5	.2	.2	.3
Equipment & intangibles <i>Previous Tealbook</i>	.5	.3	-.2	-.1	.4	.4	.4	.4	.4	.4	.4	.4	.2	.3	.3
Nonres. structures <i>Previous Tealbook</i>	.4	.5	-.1	.0	.4	.4	.4	.3	.4	.4	.3	.3	.3	.4	.3
Net exports <i>Previous Tealbook</i>	2	-3	-1	-7	-4	-9	-3	-9	-4	-4	-4	0	-5	-6	-4
Exports	2	-3	-1	-7	-7	-10	-4	-10	-6	-6	-6	-1	-5	-7	-6
Imports	6	.1	-3	-1	.2	.2	.4	-.1	.4	.3	.6	-1	.2	.3	.5
Gov't. cons. & invest. <i>Previous Tealbook</i>	5	.3	0	.3	.4	.4	.3	.1	.3	.2	.1	2	3	2	1
Federal Defense	.5	.3	0	.2	.0	.3	.2	.0	.0	.0	.0	-1	.1	.2	.1
Nondefense	0	0	-1	.1	-.2	.1	.1	.0	.0	.0	.0	0	0	0	-1
State & local	0	.0	.1	.0	.1	.1	.1	.1	.3	.2	.1	.1	.2	.2	.2
Change in priv. inventories <i>Previous Tealbook</i>	0	0	-.7	-2	-4	-1	.1	-1	0	-1	0	0	-1	-.1	-2
	0	0	-.7	-2	-.3	-.3	.4	.0	.0	.0	.0	.0	.0	.0	-.2

1. Change from fourth quarter of previous year to fourth quarter of year indicated.

**Changes in Prices and Costs**  
(Percent, annual rate except as noted)

Item	2015				2016				2017				2018 <sup>1</sup>			
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2015 <sup>1</sup>	2016 <sup>1</sup>	2017 <sup>1</sup>	2018 <sup>1</sup>	
GDP chain-wt. price index	2.1	1.3	.9	.5	.7	.8	1.4	1.9	1.7	1.7	1.7	1.1	.8	1.7	1.9	
<i>Previous Tealbook</i>	2.1	1.3	.9	.5	.8	1.4	1.4	1.9	1.7	1.7	1.7	1.1	1.0	1.7	1.9	
PCE chain-wt. price index	2.2	1.3	.3	.2	1.3	1.3	1.5	1.8	1.7	1.6	1.6	.5	1.1	1.7	1.8	
<i>Previous Tealbook</i>	2.2	1.3	.4	.1	1.3	1.4	1.3	1.7	1.7	1.6	1.6	.5	1.0	1.6	1.8	
Energy	15.1	-1.9	-17.2	-30.0	1.3	-2.0	6.2	4.2	2.6	2.0	2.0	-15.1	-7.3	2.7	1.6	
<i>Previous Tealbook</i>	15.1	-1.9	-17.2	-32.4	-3.4	6.7	4.2	3.9	2.8	2.1	1.9	-15.1	-7.7	2.7	1.4	
Food	-1.1	2.2	.0	-1.8	-.2	1.6	1.9	1.9	1.9	2.0	2.0	.2	.4	2.0	2.0	
<i>Previous Tealbook</i>	-1.1	2.2	.0	-1.4	1.5	1.7	1.9	1.9	1.9	2.0	2.0	.2	.9	2.0	2.0	
Ex. food & energy	1.9	1.4	1.3	1.9	1.5	1.4	1.3	1.7	1.6	1.6	1.5	1.4	1.5	1.6	1.8	
<i>Previous Tealbook</i>	1.9	1.4	1.3	1.9	1.5	1.2	1.2	1.6	1.6	1.5	1.5	1.4	1.4	1.6	1.8	
Ex. food & energy, market based	1.8	1.2	1.3	1.9	1.5	1.4	1.3	1.7	1.6	1.6	1.5	1.2	1.5	1.6	1.8	
<i>Previous Tealbook</i>	1.8	1.2	1.4	1.7	1.5	1.2	1.2	1.6	1.6	1.5	1.5	1.3	1.4	1.5	1.8	
CPI	2.4	1.4	.8	-.3	1.7	1.7	2.2	2.3	2.2	2.2	2.1	.4	1.3	2.2	2.2	
<i>Previous Tealbook</i>	2.4	1.4	.8	-.4	1.8	2.2	2.1	2.2	2.1	2.1	2.1	.4	1.4	2.1	2.2	
Ex. food & energy	2.3	1.8	2.2	2.7	2.0	2.0	1.9	2.1	2.2	2.1	2.0	2.0	2.1	2.1	2.3	
<i>Previous Tealbook</i>	2.3	1.8	2.2	2.5	2.1	1.9	1.9	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.3	
ECI, hourly compensation <sup>2</sup>	.0	2.6	1.9	2.5	2.1	2.1	2.1	2.4	2.4	2.4	2.4	1.9	2.2	2.4	2.5	
<i>Previous Tealbook</i>	.0	2.6	1.9	2.5	2.2	2.2	2.2	2.5	2.5	2.5	2.5	1.9	2.3	2.5	2.6	
Business sector	3.4	2.4	-1.7	-2.2	2.1	1.8	2.0	.9	1.5	1.3	1.6	.7	.9	1.3	1.3	
Output per hour	3.4	2.4	-2.0	-.0	3.4	2.1	1.4	1.0	1.6	1.3	1.4	.6	1.7	1.3	1.4	
<i>Previous Tealbook</i>	3.4	2.4	.9	2.5	3.0	2.8	2.9	3.2	2.9	3.0	3.0	2.6	2.8	3.0	3.2	
Compensation per hour	5.5	2.4	.9	1.9	3.1	3.1	.9	3.3	3.0	3.0	3.0	2.6	2.8	3.1	3.3	
<i>Previous Tealbook</i>	5.5	2.4	.9	2.7	4.8	.9	.9	2.2	1.3	1.6	1.3	1.8	1.9	1.6	1.9	
Unit labor costs	2.1	.0	3.0	1.9	-.3	.9	.9	1.7	2.3	1.4	1.7	1.6	1.9	1.7	1.9	
<i>Previous Tealbook</i>	2.1	.0	3.0	3.0	1.9	1.1	3.3	1.2	1.1	1.0	1.0	1.1	-3.4	.9	1.0	
Core goods imports chain-wt. price index <sup>3</sup>	-3.1	-2.1	-3.7	-1.8	1.1	1.3	.9	1.0	1.0	1.0	1.1	-3.3	-.1	1.0	1.1	
<i>Previous Tealbook</i>	-3.1	-2.1	-3.6	-2.2	-.6	1.3	.9	1.0	1.0	1.0	1.1	-3.3	-.1	1.0	1.1	

1. Change from fourth quarter of previous year to fourth quarter of year indicated.

2. Private-industry workers.

3. Core goods imports exclude computers, semiconductors, oil, and natural gas.

**Greensheets****Changes in Prices and Costs**  
(Change from fourth quarter of previous year to fourth quarter of year indicated, unless otherwise noted)

Item	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
GDP chain-wt. price index <i>Previous Tealbook</i>	.4	1.8	1.9	1.9	1.6	1.3	1.1	.8	1.7	1.9
PCE chain-wt. price index <i>Previous Tealbook</i>	1.2	1.3	2.7	1.8	1.2	1.1	.5	1.1	1.7	1.8
Energy <i>Previous Tealbook</i>	1.2	1.3	2.7	1.8	1.2	1.1	.5	1.0	1.6	1.8
Food <i>Previous Tealbook</i>	2.3	6.4	12.0	2.3	-2.5	-6.4	-15.1	-7.3	2.7	1.6
Ex. food & energy <i>Previous Tealbook</i>	2.3	6.4	12.0	2.3	-2.5	-6.4	-15.1	-7.7	2.7	1.4
Ex. food & energy, market based <i>Previous Tealbook</i>	-1.8	1.3	5.1	1.2	.8	2.8	.2	.4	2.0	2.0
CPI <i>Previous Tealbook</i>	1.4	1.0	1.9	1.8	1.5	1.4	1.4	1.5	1.6	1.8
Ex. food & energy <i>Previous Tealbook</i>	1.4	1.0	1.9	1.8	1.5	1.4	1.4	1.6	1.6	1.8
ECL, hourly compensation <sup>1</sup> <i>Previous Tealbook</i>	1.8	.7	1.9	1.5	1.2	1.2	1.2	1.5	1.6	1.8
Business sector										
Output per hour <i>Previous Tealbook</i>	5.6	1.7	.0	-2	1.6	-.1	.7	.9	1.3	1.3
Compensation per hour <i>Previous Tealbook</i>	5.6	1.7	.0	-2	1.6	-.1	.6	1.7	1.3	1.4
Unit labor costs <i>Previous Tealbook</i>	1.2	1.3	.6	5.8	-.1	2.7	2.6	2.8	3.0	3.2
Core goods imports chain-wt. price index <sup>2</sup> <i>Previous Tealbook</i>	-1.9	2.3	4.3	.1	-1.1	.5	-3.4	.9	1.0	1.1
	-1.9	2.3	4.3	.1	-1.1	.5	-3.3	-.1	1.0	1.1

1. Private-industry workers.

2. Core goods imports exclude computers, semiconductors, oil, and natural gas.

## Other Macroeconomic Indicators

Item	2015			2016			2017			2015 <sup>1</sup>	2016 <sup>1</sup>	2017 <sup>1</sup>	2018 <sup>1</sup>
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
<i>Employment and production</i>													
Nonfarm payroll employment <sup>2</sup>	.7	.7	.7	.7	.6	.6	.6	.6	.6	.5	2.8	2.5	2.3
Unemployment rate <sup>3</sup>	5.4	5.1	5.0	4.9	4.9	4.8	4.8	4.7	4.6	4.4	5.0	4.8	4.4
<i>Previous Tealbook</i> <sup>3</sup>	5.4	5.1	5.0	4.9	4.9	4.8	4.8	4.7	4.6	4.5	5.0	4.8	4.5
Natural rate of unemployment <sup>3</sup>	5.1	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
<i>Previous Tealbook</i> <sup>3</sup>	5.1	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Employment-to-Population Ratio <sup>3</sup>	59.4	59.3	59.4	59.8	59.8	59.6	59.7	59.7	59.7	59.8	59.4	59.7	59.8
Employment-to-Population Trend <sup>3</sup>	60.0	59.9	59.9	59.8	59.7	59.6	59.5	59.4	59.4	59.3	59.9	59.6	59.6
GDP gap <sup>4</sup>	-4	-1	0	-3	-1	2	.5	.7	.9	1.1	0	.5	1.3
<i>Previous Tealbook</i> <sup>4</sup>	-3	-1	-.1	0	-.1	.1	.3	.5	.6	.8	1.1	.5	1.1
Industrial production <sup>5</sup>	-2.7	1.5	-3.3	-2.2	.3	.6	2.1	2.2	1.9	1.5	2.0	-1.6	2.1
<i>Previous Tealbook</i> <sup>5</sup>	-2.3	2.7	-3.3	-.2	1.4	1.0	2.0	2.8	2.0	1.3	1.6	-.8	1.9
Manufacturing industr. prod. <sup>5</sup>	.6	1.7	-.5	.6	.5	1.0	2.2	2.2	2.2	1.9	1.9	.1	1.9
<i>Previous Tealbook</i> <sup>5</sup>	1.5	3.0	0	1.5	1.4	1.9	2.6	2.4	2.4	1.9	1.6	1.0	2.1
Capacity utilization rate - mfg. <sup>3</sup>	75.5	75.6	75.4	75.4	75.3	75.3	75.5	75.8	76.1	76.3	76.6	75.4	75.5
<i>Previous Tealbook</i> <sup>3</sup>	75.9	76.3	76.0	76.1	76.1	76.3	76.6	76.8	77.1	77.3	77.4	76.0	76.6
Housing starts <sup>6</sup>	1.2	1.2	1.1	1.1	1.2	1.3	1.4	1.4	1.4	1.5	1.5	1.1	1.2
Light motor vehicle sales <sup>6</sup>	17.1	17.8	17.8	17.1	17.3	17.2	17.2	17.1	17.0	16.9	16.9	17.4	17.2
<i>Income and saving</i>													
Nominal GDP <sup>5</sup>	6.1	3.3	2.3	.9	2.9	3.3	4.3	3.9	4.4	4.1	4.4	3.1	2.8
Real disposable pers. income <sup>5</sup>	2.6	3.2	2.3	4.7	3.1	2.7	1.9	3.3	2.4	2.6	2.1	3.0	2.6
<i>Previous Tealbook</i> <sup>5</sup>	2.6	3.2	2.5	5.3	3.0	2.8	2.6	3.3	2.1	2.7	2.4	3.1	3.4
Personal saving rate <sup>3</sup>	5.0	5.0	5.0	5.7	5.7	5.6	5.4	5.5	5.3	5.1	5.0	5.4	5.1
<i>Previous Tealbook</i> <sup>3</sup>	5.0	5.0	5.1	5.6	5.6	5.6	5.6	5.7	5.5	5.4	5.3	5.1	5.3
Corporate profits <sup>7</sup>	14.7	-6.2	-27.7	3.3	-3.7	-4.4	-3.1	.2	1.3	1.5	1.5	-11.5	-2.0
Profit share of GNP <sup>3</sup>	11.5	11.2	10.3	10.4	10.2	10.0	9.8	9.7	9.7	9.6	9.5	10.3	9.8
Gross national saving rate <sup>3</sup>	18.7	18.3	18.2	18.3	18.3	17.9	17.6	17.4	17.5	17.4	17.2	18.2	17.6
Net national saving rate <sup>3</sup>	3.8	3.3	3.1	3.3	3.2	2.8	2.4	2.2	2.3	2.1	1.9	3.1	2.4

1. Change from fourth quarter of previous year to fourth quarter of year indicated, unless otherwise indicated.

2. Change, millions.

3. Percent; annual values are for the fourth quarter of the year indicated.

4. Percent difference between actual and potential GDP; a negative number indicates that the economy is operating below potential.

Annual values are for the fourth quarter of the year indicated.

5. Percent change, annual rate.

6. Level, millions; annual values are annual averages.

7. Percent change, annual rate, with inventory valuation and capital consumption adjustments.

**Greensheets****Other Macroeconomic Indicators**  
(Change from fourth quarter of previous year to fourth quarter of year indicated, unless otherwise noted)

Item	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<i>Employment and production</i>										
Nonfarm payroll employment <sup>1</sup>	-5.6	.8	2.0	2.1	2.4	2.8	2.8	2.5	2.3	1.7
Unemployment rate <sup>2</sup>	9.9	9.5	8.7	7.8	7.0	5.7	5.0	4.8	4.4	4.2
<i>Previous Tealbook</i> <sup>4</sup>	9.9	9.5	8.7	7.8	7.0	5.7	5.0	4.8	4.5	4.3
Natural rate of unemployment <sup>2</sup>	5.9	5.9	5.9	5.6	5.4	5.1	5.0	5.0	5.0	5.0
<i>Previous Tealbook</i> <sup>2</sup>	5.9	5.9	5.6	5.4	5.1	5.0	5.0	5.0	5.0	5.0
Employment-to-Population Ratio <sup>2</sup>	58.4	58.3	58.5	58.7	58.5	59.2	59.4	59.7	59.8	59.6
Employment-to-Population Trend <sup>2</sup>	61.5	61.1	60.7	60.3	60.2	60.1	59.9	59.6	59.3	59.0
GDP gap <sup>3</sup>	-5.5	-4.2	-3.7	-3.7	-2.5	-2.5	-.9	0	.5	1.6
<i>Previous Tealbook</i> <sup>3</sup>	-5.5	-4.2	-3.7	-3.7	-2.5	-2.5	-.9	-.1	.5	1.4
Industrial production <sup>4</sup>	-5.6	5.9	2.6	2.3	2.0	3.5	-1.6	.2	1.9	1.7
<i>Previous Tealbook</i> <sup>4</sup>	-5.4	5.9	2.8	2.1	2.3	4.5	-.8	1.0	1.9	2.0
Manufacturing industr. prod. <sup>4</sup>	-6.3	5.9	2.5	1.7	.8	2.0	.1	1.1	2.1	1.6
<i>Previous Tealbook</i> <sup>4</sup>	-6.1	6.0	2.7	1.5	1.3	3.4	1.0	1.9	2.1	1.8
Capacity utilization rate - mfg. <sup>2</sup>	67.0	72.4	74.4	74.3	74.6	76.0	75.4	75.5	76.6	77.3
<i>Previous Tealbook</i> <sup>2</sup>	67.1	72.5	74.4	74.1	74.2	76.2	76.0	76.6	77.4	78.0
Housing starts <sup>5</sup>	.6	11.6	12.7	14.4	.8	.9	1.0	1.1	1.2	1.5
Light motor vehicle sales <sup>5</sup>	10.4	11.6	12.7	14.4	15.5	16.4	17.4	17.2	17.0	16.7
<i>Income and saving</i>										
Nominal GDP <sup>4</sup>	.1	4.6	3.6	3.2	4.1	3.9	3.1	2.8	4.2	4.0
Real disposable pers. income <sup>4</sup>	-.7	2.6	1.7	5.1	-2.9	3.6	3.0	3.1	2.6	2.4
<i>Previous Tealbook</i> <sup>4</sup>	-.7	2.6	1.7	5.1	-2.9	3.6	3.1	3.4	2.6	2.4
Personal saving rate <sup>2</sup>	5.6	5.5	5.8	9.2	4.4	4.7	5.0	5.4	5.1	4.9
<i>Previous Tealbook</i> <sup>2</sup>	5.6	5.5	5.8	9.2	4.4	4.7	5.1	5.6	5.3	5.2
Corporate profits <sup>6</sup>	53.7	18.0	6.8	6	4.1	3.4	-11.5	-2.0	1.1	1.7
Profit share of GNP <sup>2</sup>	10.6	12.0	12.3	12.0	12.0	11.9	10.3	9.8	9.5	9.4
Gross national saving rate <sup>2</sup>	14.6	15.2	16.1	18.0	18.1	18.8	18.2	17.6	17.2	17.0
Net national saving rate <sup>2</sup>	-1.7	-.3	.8	2.9	3.1	3.9	3.1	2.4	1.9	1.6

1. Change, millions.

2. Percent; values are for the fourth quarter of the year indicated.

3. Percent difference between actual and potential GDP; a negative number indicates that the economy is operating below potential.

Values are for the fourth quarter of the year indicated.

4. Percent change.

5. Level, millions; values are annual averages.

6. Percent change, with inventory valuation and capital consumption adjustments.

**Staff Projections of Federal Sector Accounts and Related Items**  
(Billions of dollars except as noted)

Item	Fiscal year				2015				2016				2017			
	2015	2016	2017	2018	Q1 <sup>a</sup>	Q2 <sup>a</sup>	Q3 <sup>a</sup>	Q4 <sup>a</sup>	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Unified budget</b>																
Receipts	3,249	3,384	3,484	3,625	680	1,027	802	766	711	1,062	846	775	744	1,099	866	805
Outlays	3,688	3,910	4,075	4,235	943	904	925	981	956	949	1,024	956	1,086	1,000	1,033	1,001
Surplus/deficit	-439	-526	-590	-610	-263	123	-123	-216	-245	113	-178	-181	-342	100	-167	-197
<i>Previous Tealbook</i>	-439	-519	-581	-614	-263	123	-123	-216	-246	119	-177	-183	-339	108	-167	-200
Means of financing:																
Borrowing	337	826	729	733	67	-16	46	552	251	-131	154	236	370	-67	189	232
Cash decrease	-40	-103	-19	-3	123	-154	56	-135	20	-44	57	-25	2	-3	8	-5
Other <sup>1</sup>	142	-197	-120	-120	73	47	21	-202	-25	63	-33	-30	-30	-30	-30	-30
Cash operating balance, end of period	199	301	320	323	100	254	199	333	314	358	301	327	325	328	320	325
<b>NIPA federal sector</b>																
Receipts	3,390	3,496	3,623	3,778	3,356	3,440	3,468	3,457	3,481	3,507	3,540	3,575	3,600	3,639	3,677	3,717
Expenditures	3,988	4,140	4,359	4,562	3,936	4,015	4,080	4,063	4,113	4,152	4,231	4,280	4,367	4,363	4,428	4,471
Consumption expenditures	956	983	1,021	1,036	957	957	961	967	977	988	1,000	1,008	1,021	1,025	1,029	1,031
Defense	594	601	614	622	595	595	595	595	598	602	606	610	615	616	617	617
Nondefense	362	382	407	415	362	362	362	366	369	378	386	393	399	406	412	414
Other spending	3,032	3,157	3,338	3,526	2,979	3,057	3,118	3,095	3,136	3,164	3,232	3,271	3,346	3,338	3,398	3,440
Current account surplus	-598	-643	-737	-784	-579	-574	-612	-606	-632	-644	-691	-704	-767	-724	-751	-754
Gross investment	263	269	277	280	262	264	268	266	269	273	276	277	278	279	278	278
Gross saving less gross investment <sup>2</sup>	-590	-634	-731	-777	-569	-567	-603	-598	-620	-635	-684	-699	-762	-719	-746	-747
<b>Fiscal indicators</b>																
High-employment (HEB) surplus/deficit <sup>3</sup>	-546.5	-641.7	-790.3	-889.8	-502.7	-538.8	-597.7	-602.3	-619.0	-640.4	-705.0	-738.0	-809.2	-784.7	-829.2	-849.0
Change in HEB, percent of potential GDP	.5	.5	.7	.4	-.3	.2	.3	.0	.1	.1	.3	.2	.3	-.2	.2	.1
Fiscal impetus (FI), percent of GDP <sup>4</sup>	.4	.6	.3	.2	.0	.7	.5	.3	.5	.6	.6	.5	.2	.5	.3	.2
<i>Previous Tealbook</i>	.4	.6	.3	.2	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Federal purchases	.1	.2	.0	.2	-.1	.5	.3	-.1	.3	.1	.1	.1	.1	.1	.2	.1
State and local purchases	.1	.2	.2	.1	.0	.2	.2	.2	.2	.2	.2	.2	.1	.1	.1	.1
Taxes and transfers	.2	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

1. Other means of financing include checks issued less checks paid, accrued items, and changes in other financial assets and liabilities.

2. Gross saving is the current account surplus plus consumption of fixed capital of the general government as well as government enterprises.

3. HEB is gross saving less gross investment (NIPA) of the federal government in current dollars, with cyclically sensitive receipts and outlays adjusted to the staff's measure of potential output and the natural rate of unemployment. The sign on Change in HEB, as a percent of nominal potential GDP, is reversed. Quarterly figures for change in HEB are not at annual rates.

4. Fiscal impetus measures the contribution to growth of real GDP from fiscal policy actions at the general government level (excluding multiplier effects). It equals the sum of the direct contributions to real GDP growth from changes in federal purchases and state and local purchases, plus the estimated contribution from real consumption and investment that is induced by discretionary policy changes in transfers and taxes.

a Actual.

**Greensheets**
**Foreign Real GDP and Consumer Prices: Selected Countries**  
(Quarterly percent changes at an annual rate)

Measure and country	2015				2016				Projected 2017			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Real GDP<sup>1</sup></b>												
Total foreign	1.7	1.4	2.4	1.7	2.4	2.2	2.6	2.6	2.8	2.8	2.8	2.8
<i>Previous Tealbook</i>	1.7	1.4	2.5	1.7	2.1	2.3	2.6	2.6	2.9	2.5	2.8	2.8
Advanced foreign economies	1.0	.4	1.9	1.0	2.1	1.5	1.9	2.0	2.0	2.0	2.0	1.9
Canada	-9	-4	2.4	.8	2.8	1.6	2.0	2.0	2.1	2.1	2.0	1.8
Japan	4.6	-1.4	1.4	-1.1	.0	.3	1.0	.8	.9	.9	.8	.8
United Kingdom	1.8	2.4	1.8	2.4	1.9	2.0	2.2	2.4	2.5	2.4	2.3	2.3
Euro area	2.3	1.6	1.2	1.3	1.8	1.5	1.7	1.9	2.0	2.0	2.0	2.1
Germany	1.6	1.6	1.1	1.1	1.8	1.6	1.8	1.9	2.0	2.0	2.0	2.0
Emerging market economies	2.4	2.4	2.9	2.5	2.6	3.0	3.3	3.4	3.5	3.6	3.6	3.7
Asia	4.2	4.2	4.9	4.5	4.3	5.1	5.1	5.0	4.9	4.9	4.9	4.8
Korea	3.2	1.7	5.0	2.7	3.1	3.7	3.9	3.8	3.8	3.8	3.8	3.8
China	5.7	7.2	7.2	7.0	5.4	6.8	7.0	6.5	6.2	6.1	6.1	6.1
Latin America	1.1	.7	1.5	.7	1.3	1.3	1.8	2.0	2.4	2.5	2.6	2.7
Mexico	2.1	2.6	3.3	2.2	2.2	2.3	2.5	2.6	2.7	2.8	2.8	2.9
Brazil	-3.2	-8.2	-6.7	-5.7	-3.0	-3.0	-1.0	.5	1.1	1.5	1.8	2.0
<i>Consumer prices<sup>2</sup></i>												
Total foreign	.4	2.5	1.9	1.1	1.6	2.3	2.3	2.5	2.4	2.4	2.4	2.5
<i>Previous Tealbook</i>	.3	2.5	2.0	1.1	1.2	2.1	2.3	2.4	2.4	2.8	2.4	2.4
Advanced foreign economies	-.6	1.7	.6	.2	-.4	1.0	1.2	1.4	1.5	1.5	1.5	1.6
Canada	-.1	2.4	2.0	.9	1.0	1.5	1.6	1.7	1.9	2.0	2.0	2.0
Japan	0	1.2	0	-.1	-.7	.1	.3	.5	.5	.6	.7	.8
United Kingdom	-1.3	.8	1.0	-.3	-.1	1.7	1.9	2.1	2.1	2.0	2.0	2.1
Euro area	-1.0	2.0	-.2	-.1	-1.4	1.0	1.2	1.4	1.4	1.4	1.4	1.5
Germany	-1.1	2.0	-.3	.2	-1.4	1.2	1.3	1.5	1.5	1.5	1.5	1.6
Emerging market economies	1.1	3.1	2.9	1.7	3.0	3.3	3.2	3.3	3.2	3.2	3.2	3.2
Asia	.2	2.7	2.5	.8	2.4	3.0	2.7	2.9	2.8	2.7	2.8	2.8
Korea	.1	1.5	.9	1.9	.0	.4	3.0	3.0	3.0	3.0	3.0	3.0
China	.3	2.6	3.1	-.2	3.1	3.6	2.6	2.8	2.6	2.5	2.5	2.5
Latin America	2.5	3.9	4.1	3.9	4.6	4.0	4.2	4.1	4.1	4.1	4.1	4.1
Mexico	1.1	2.7	2.8	2.4	2.9	2.8	3.2	3.2	3.2	3.2	3.2	3.2
Brazil	12.8	11.5	8.0	9.3	11.8	6.4	6.2	5.7	5.4	5.4	5.4	5.4

<sup>1</sup>Foreign GDP aggregates calculated using shares of U.S. exports.

<sup>2</sup>Foreign CPI aggregates calculated using shares of U.S. non-oil imports.

**Foreign Real GDP and Consumer Prices: Selected Countries**  
 (Percent change, Q4 to Q4)

Measure and country	2010	2011	2012	2013	2014	2015	2016	2017	2018	Projected
<b>Real GDP<sup>1</sup></b>										
Total foreign	4.8	3.3	2.3	2.8	2.5	1.8	2.5	2.8	2.7	2.7
<i>Previous Tealbook</i>	4.8	3.3	2.3	2.8	2.5	1.8	2.4	2.7	2.8	2.8
Advanced foreign economies	3.1	1.9	.2	2.2	1.7	1.1	1.8	2.0	1.7	1.7
Canada	3.6	3.1	.7	3.1	2.4	.5	2.1	2.0	1.8	1.8
Japan	3.6	.3	.0	2.1	-.9	.8	.5	.9	-.5	-.5
United Kingdom	1.8	2.1	1.0	2.8	2.8	2.1	2.1	2.4	2.2	2.2
Euro area	2.4	.5	-1.1	.6	1.0	1.6	1.7	2.0	2.0	2.0
Germany	4.5	2.4	.1	1.3	1.5	1.3	1.8	2.0	1.8	1.8
Emerging market economies	6.6	4.7	4.3	3.4	3.3	2.5	3.1	3.6	3.7	3.7
Asia	8.2	5.0	5.7	5.3	5.0	4.4	4.9	4.9	4.8	4.8
Korea	6.1	2.9	2.1	3.5	2.7	3.1	3.6	3.8	3.8	3.8
China	10.0	8.6	7.9	7.6	7.2	6.8	6.4	6.1	6.0	6.0
Latin America	4.7	4.2	3.3	1.6	1.9	1.0	1.6	2.5	2.8	2.8
Mexico	4.4	4.2	3.4	1.1	2.6	2.5	2.4	2.8	2.9	2.9
Brazil	5.7	2.5	2.6	2.4	-.7	-6.0	-1.6	1.6	2.1	2.1
Consumer prices <sup>2</sup>										
Total foreign	3.2	3.4	2.3	2.3	2.0	1.5	2.2	2.5	2.6	2.6
<i>Previous Tealbook</i>	3.2	3.4	2.3	2.3	2.0	1.5	2.0	2.5	2.4	2.4
Advanced foreign economies	1.7	2.2	1.3	1.0	1.1	.5	.8	1.5	1.8	1.8
Canada	2.2	2.7	1.0	1.0	1.9	1.3	1.4	2.0	2.0	2.0
Japan	-.3	-.3	-.2	1.4	2.5	.3	.0	.6	2.1	2.1
United Kingdom	3.4	4.6	2.6	2.1	.9	.1	1.4	2.0	2.0	2.0
Euro area	2.0	2.9	2.3	.8	.1	.2	.5	1.4	1.5	1.5
Germany	1.5	2.6	1.9	1.4	.4	.2	.6	1.5	1.7	1.7
Emerging market economies										
Asia	4.3	4.3	3.1	3.4	2.7	2.2	3.2	3.2	3.2	3.2
Korea	4.3	4.5	2.6	3.0	1.8	1.5	2.8	2.8	2.8	2.8
China	3.2	3.9	1.7	1.1	1.0	1.1	1.6	3.0	3.0	3.0
Latin America	4.6	4.6	2.0	2.9	1.5	1.5	3.0	2.6	2.5	2.5
Mexico	4.3	3.5	4.1	3.6	4.1	4.9	3.6	4.1	4.1	4.1
Brazil	5.6	6.7	5.6	5.8	6.5	10.4	7.6	5.5	5.4	5.4

<sup>1</sup> Foreign GDP aggregates calculated using shares of U.S. exports.

<sup>2</sup> Foreign CPI aggregates calculated using shares of U.S. non-oil imports.

**U.S. Current Account  
Quarterly Data**

	2015				2016				2017			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>Billions of dollars, s.a.a.r.</i>												
<b>U.S. current account balance</b>	<b>-472.1</b>	<b>-443.2</b>	<b>-519.7</b>	<b>-501.3</b>	<b>-536.9</b>	<b>-540.0</b>	<b>-602.4</b>	<b>-623.8</b>	<b>-688.9</b>	<b>-692.1</b>	<b>-724.6</b>	<b>-756.9</b>
<i>Previous Tealbook</i>	-473.3	-444.5	-516.0	-515.9	-587.6	-602.3	-653.9	-679.6	-746.7	-759.8	-796.4	-827.0
Current account as percent of GDP	-2.7	-2.5	-2.9	-2.8	-2.9	-3.2	-3.3	-3.3	-3.7	-3.6	-3.8	-3.9
<i>Previous Tealbook</i>	-2.7	-2.5	-2.9	-2.8	-3.2	-3.3	-3.5	-3.6	-3.9	-4.0	-4.1	-4.2
Net goods & services	-537.3	-532.4	-554.3	-535.0	-560.5	-593.2	-658.5	-679.4	-723.3	-731.3	-752.4	-761.3
Investment income, net	210.1	222.6	191.7	181.6	189.4	200.8	203.6	208.4	200.2	186.8	175.3	157.2
Direct, net	280.2	289.9	256.5	254.3	260.0	281.2	293.6	312.4	320.5	326.8	337.9	343.4
Portfolio, net	-70.1	-67.3	-64.8	-72.7	-70.6	-80.4	-90.0	-104.0	-120.3	-140.1	-162.5	-186.2
Other income and transfers, net	-144.9	-133.4	-157.1	-147.9	-165.8	-147.6	-147.5	-152.8	-165.8	-147.6	-147.5	-152.8
<i>Annual Data</i>												
	2010	2011	2012	2013	2014	2015	2016	2017	2017	2017	2018	
<i>Billions of dollars</i>												
<b>U.S. current account balance</b>	<b>-442.0</b>	<b>-460.4</b>	<b>-449.7</b>	<b>-449.7</b>	<b>-376.8</b>	<b>-376.8</b>	<b>-389.5</b>	<b>-484.1</b>	<b>-575.8</b>	<b>715.6</b>	<b>814.4</b>	<b>-884.4</b>
<i>Previous Tealbook</i>	-442.0	-460.4	-449.7	-449.7	-376.8	-376.8	-389.5	-487.4	-630.8	-782.5	-782.5	-884.4
Current account as percent of GDP	-3.0	-3.0	-2.8	-2.8	-2.3	-2.3	-2.2	-2.7	-3.1	-3.7	-4.1	-4.1
<i>Previous Tealbook</i>	-3.0	-3.0	-2.8	-2.8	-2.3	-2.3	-2.2	-2.7	-3.4	-4.1	-4.4	-4.4
Net goods & services	-494.7	-548.6	-536.8	-478.4	-508.3	-539.8	-622.9	-622.9	-742.1	-784.8	-784.8	
Investment income, net	185.7	229.0	220.8	233.6	247.4	201.5	200.6	179.9	179.9	123.9	123.9	
Direct, net	288.0	298.6	290.2	301.7	300.5	270.2	286.8	332.2	332.2	368.2	368.2	
Portfolio, net	-102.3	-69.5	-69.4	-68.1	-53.1	-68.7	-86.2	-152.3	-152.3	-244.3	-244.3	
Other income and transfers, net	-133.0	-140.8	-133.7	-132.0	-128.6	-145.8	-153.4	-153.4	-153.4	-153.4	-153.4	

## Abbreviations

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ABS	asset-backed securities
AFE	advanced foreign economy
BEA	Bureau of Economic Analysis
BOJ	Bank of Japan
CDS	credit default swap
C&I	commercial and industrial
CMBS	commercial mortgage-backed securities
CPI	consumer price index
CRE	commercial real estate
Desk	Open Market Desk
ECB	European Central Bank
EME	emerging market economy
EU	European Union
FOMC	Federal Open Market Committee; also, the Committee
GCF	General Collateral Finance
GDP	gross domestic product
GO	general obligation
GSE	government-sponsored enterprise
LMCI	labor market conditions index
M&A	mergers and acquisitions
MBS	mortgage-backed securities
Michigan survey	University of Michigan Surveys of Consumers
MMF	money market fund
OIS	overnight index swap
ON RRP	overnight reverse repurchase agreement
PCE	personal consumption expenditures
PMI	purchasing managers index
PPI	producer price index

QS	quantitative surveillance
repo	repurchase agreement; also, RP
RMB	renminbi
RRE	residential real estate
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