

## **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

October 21, 2015

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

Authorized for Public Release

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## Domestic Economic Developments and Outlook

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The information that we received since the previous Tealbook was mixed and left our outlook little changed on balance. Indicators of consumption and investment spending came in stronger than expected and point to solid growth in real private domestic final purchases in the third and fourth quarters. By contrast, we estimate that inventory investment, which was elevated in the first half of the year, fell back significantly more than we had anticipated last quarter, and net exports continued to decline. Moreover, the news on the labor market and industrial production was disappointing, and these indicators seem consistent with some slowing in activity. Altogether, we now project that real GDP will expand at an annual rate of 1¾ percent in the second half of this year, a step-down from the 2¼ percent pace in the first half of the year and a bit lower than in our September forecast.

We have not taken signal from the recent data for activity beyond this year, and with our key conditioning assumptions little revised, on net, our medium-term projection is similar to that in September. We expect real GDP growth to edge down from 2¼ percent in 2016 to 1¾ percent in 2018. By the end of the medium term, actual GDP is projected to exceed its potential by 1.0 percent, just 0.1 percentage point more than in the September Tealbook, and the unemployment rate is projected to fall to 4.7 percent, the same as in our previous forecast.

As for inflation, the CPI for September came in a little higher than we expected. In response, we raised our forecast for core inflation in both the third and fourth quarters by about 0.2 percentage point to 1.4 percent. We also slowed the pace of the pass-through of the summer's oil price declines into consumer energy prices based on recent readings on gasoline prices. As a result, headline PCE price inflation is now expected to be 0.4 percent in the current quarter, about ¾ percentage point higher than projected in September. Beyond the near term, our inflation forecast is little changed: We continue to project that both total and core inflation will gradually move up to 1.9 percent in 2018, as energy prices bottom out and start to increase moderately, import prices turn back up, and resource utilization tightens further.

As always, numerous risks attend our outlook. We view the uncertainty around our projection for real GDP growth, the unemployment rate, and inflation as broadly in

## Comparing the Staff Projection with Other Forecasts

The staff's projection for real GDP growth is a little lower than the most recent Blue Chip Consensus Outlook and the Survey of Professional Forecasters (SPF) median projections. The staff's forecast of the unemployment rate is a bit higher in 2016 and the staff's inflation projections are lower. Note that the SPF projection was completed in the first half of August and therefore does not reflect the effects of recent data releases and the volatility in financial markets since then.

### Comparison of Tealbook and Outside Forecasts

	2015	2016
<b>GDP (Q4/Q4 percent change)</b>		
October Tealbook	2.0	2.2
Blue Chip (10/10/15)	2.3	2.6
SPF median (8/14/15)	2.1	n.a.
<b>Unemployment rate (Q4 level)</b>		
October Tealbook	5.0	4.9
Blue Chip (10/10/15)	5.0	4.7
SPF median (8/14/15)	5.1	n.a.
<b>Consumer price inflation (Q4/Q4 percent change)</b>		
October Tealbook	.4	1.8
Blue Chip (10/10/15)	.6	2.2
SPF median (8/14/15)	.8	2.1
<b>PCE price inflation (Q4/Q4 percent change)</b>		
October Tealbook	.5	1.4
SPF median (8/14/15)	.8	1.8
<b>Core PCE price inflation (Q4/Q4 percent change)</b>		
October Tealbook	1.4	1.4
SPF median (8/14/15)	1.5	1.8

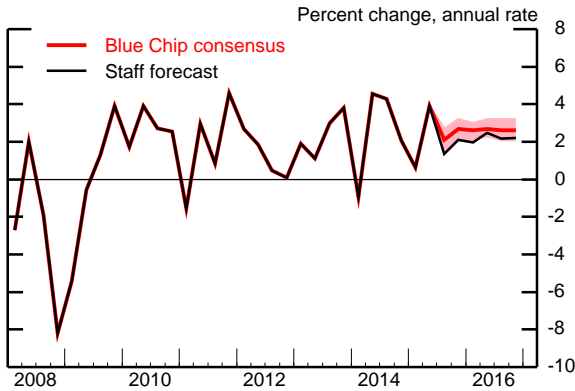
Note: SPF is the Survey of Professional Forecasters. Blue Chip does not provide results for PCE price inflation. The Blue Chip Consensus contains about 50 panelists, and the SPF about 40. Roughly 20 panelists contribute to both surveys.

n.a. Not available.

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

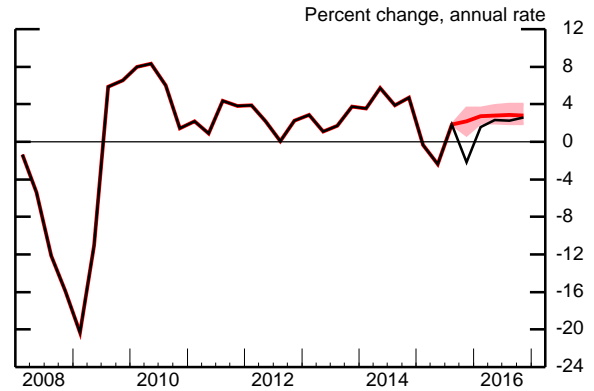
### Tealbook Forecast Compared with Blue Chip (Blue Chip survey released October 10, 2015)

#### Real GDP

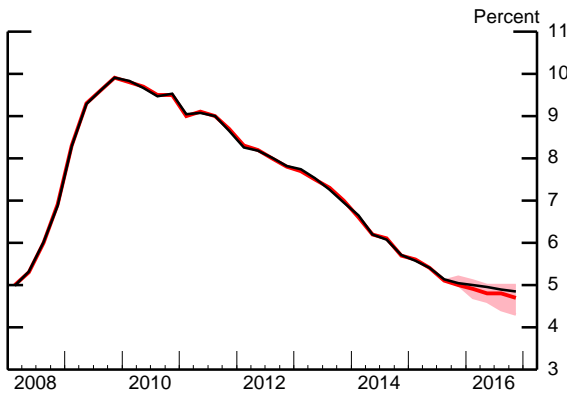


Note: The shaded area represents the area between the Blue Chip top 10 and bottom 10 averages.

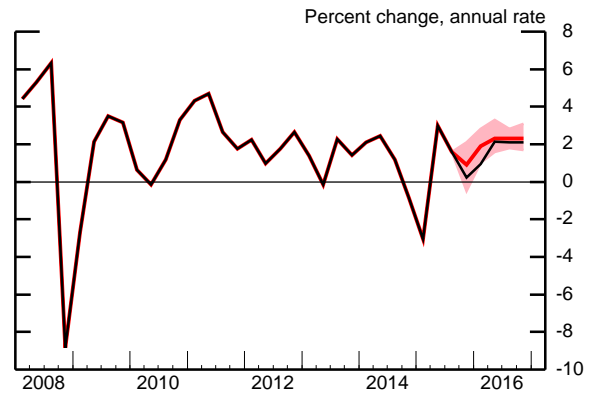
#### Industrial Production



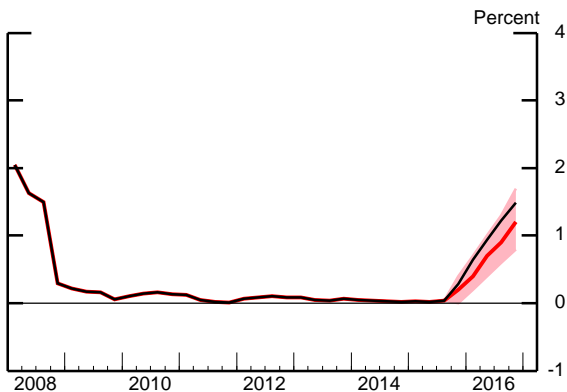
#### Unemployment Rate



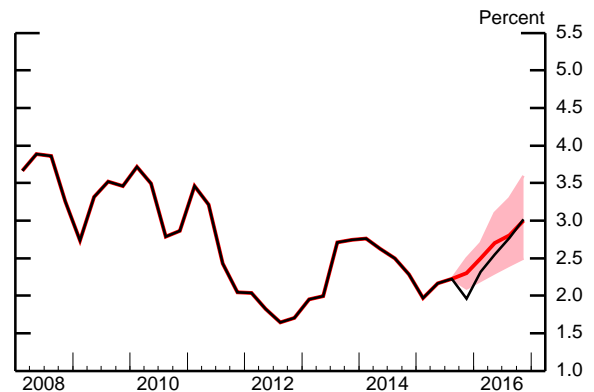
#### Consumer Price Index



#### Treasury Bill Rate



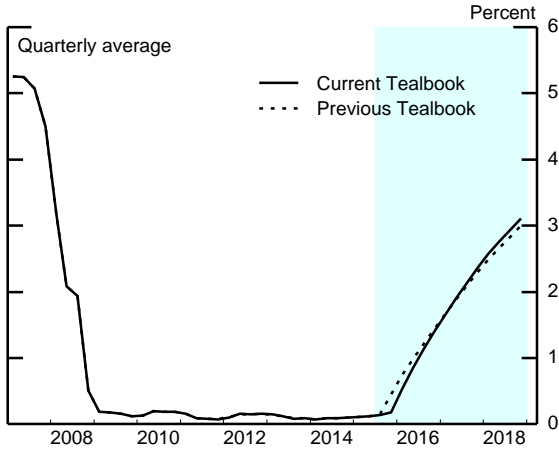
#### 10-Year Treasury Yield



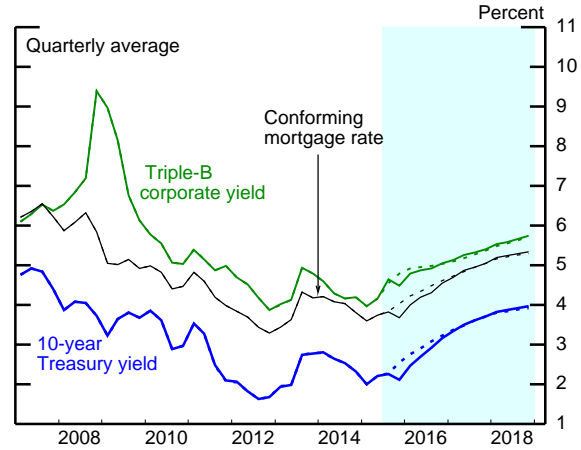
Note: The yield is for on-the-run Treasury securities. Over the forecast period, the staff's projected yield is assumed to be 15 basis points below the off-the-run yield.

### Key Background Factors underlying the Baseline Staff Projection

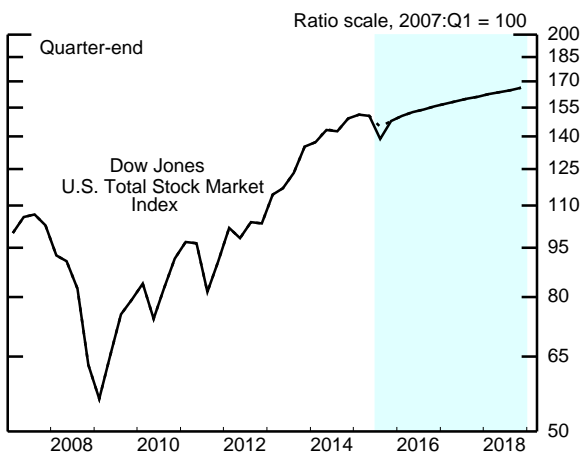
#### Federal Funds Rate



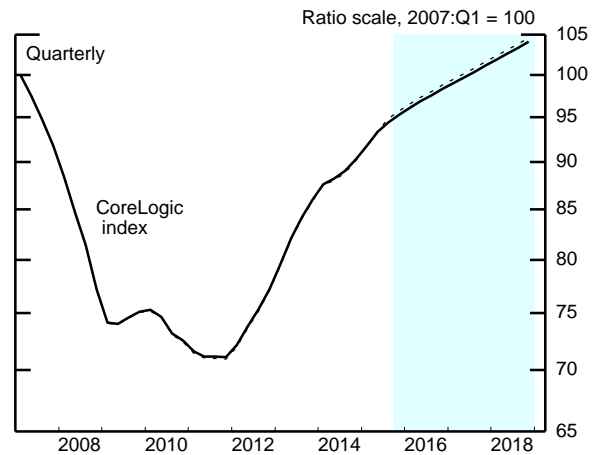
#### Long-Term Interest Rates



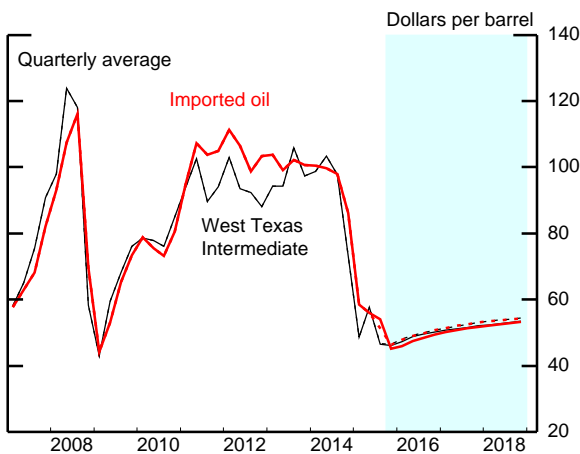
#### Equity Prices



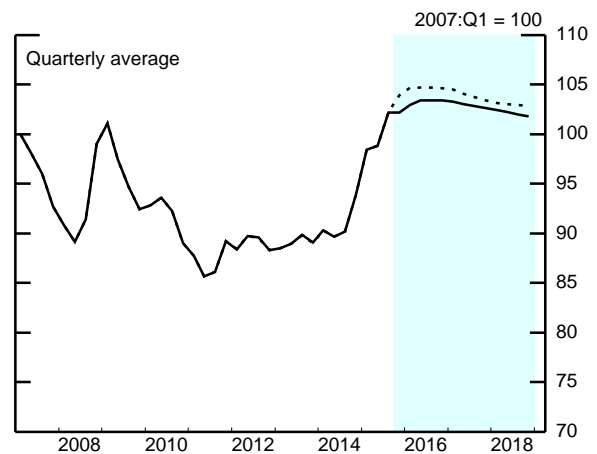
#### House Prices



#### Crude Oil Prices



#### Broad Real Dollar



line with the average over the past 20 years, a period that includes considerable volatility. We have maintained our assessment that the risks to our GDP projection are tilted somewhat to the downside and that the risks to our unemployment rate projection are tilted to the upside, largely reflecting our view that neither monetary nor fiscal policy are well positioned to offset large adverse shocks to the economy. Our concerns with respect to the inflation outlook remain mostly to the downside, given the risks to the real outlook as well as the low levels of market-based measures of inflation compensation and the hints of lower longer-term inflation expectations from some surveys.

## KEY BACKGROUND FACTORS

### Monetary Policy

- We now assume that the federal funds rate will lift off from its effective lower bound following the December meeting, and we continue to assume that it will be governed thereafter by an inertial version of the Taylor (1999) policy rule. The change to the timing of our liftoff assumption is broadly consistent with the responses to the “flash” Survey of Primary Dealers conducted following the September FOMC meeting as well as expectations derived from the federal funds futures market, as both sources suggest that market participants see very low probability of liftoff immediately following the October meeting.<sup>1</sup> Despite the later liftoff assumption, by the end of 2018, the nominal federal funds rate is projected to be 3.1 percent, 0.1 percentage point higher than in our previous projection, largely reflecting the slightly tighter resource utilization in this projection.
- The SOMA portfolio is assumed to remain at its current size until about two quarters after the federal funds rate is initially raised above its effective lower bound, at which point the portfolio begins to contract as proceeds from maturing assets are not reinvested.

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<sup>1</sup> Model simulations can provide a sense of the sensitivity of the outlook to the liftoff assumption. For example, if we had assumed that the federal funds rate would lift off two meetings later (that is, after the March 2016 meeting), the FRB/US model projects that the level of real GDP would be 0.2 percent higher by the end of 2018, the unemployment rate would be less than 0.1 percentage point lower, core inflation would be 2 basis points higher, and the federal funds rate would be 8 basis points higher. One reason for these very small deviations is that the simulation implicitly assumes that the public does not take signal from the delayed liftoff for either the monetary policymakers’ reaction function or for the outlook for economic activity or inflation.



## Other Interest Rates

- Our projection continues to call for the 10-year Treasury yield to rise significantly, reflecting the movement of the 10-year valuation window through the period of extremely low short-term interest rates as well as an increase in the term premium toward its historically normal level. Compared with the September Tealbook, the 10-year Treasury yield is a bit lower through 2016, mostly reflecting the recent decline in market quotes, but is similar to the previous path thereafter.
- We revised the paths for the 30-year mortgage rate and the 10-year triple-B corporate bond rate mostly in line with the revision to Treasury yields. Compared with the September Tealbook, our projection implies a slightly wider spread of the 10-year triple-B corporate bond yield over those on comparable-maturity Treasury securities, reflecting increases in market spreads for corporate bonds.

## Equity Prices and Home Prices

- Our projection for equity prices is nearly unrevised as equity prices have increased, on net, about in line with our previous projection. After the current quarter, stock prices are projected to rise about 4 percent per year on average. As before, by the end of the medium term the equity premium is projected to be somewhat below its historical average.
- We continue to expect house prices to rise about 5½ percent this year and then to increase 3 percent per year over the medium term. One valuation metric that we monitor—the price-to-rent ratio—suggests that housing is currently overvalued by 6 percent, compared with more than 40 percent a decade ago. Our forecast has rents rising slightly faster than house prices, bringing this measure back toward neutral.

## Fiscal Policy

- We have made no changes to our fiscal policy assumptions in this forecast. We continue to anticipate that, after having been a small drag on real GDP growth last year, fiscal policy actions at all levels of government provide a small boost to aggregate demand this year and over the medium term.

- The federal government faces multiple fiscal deadlines over the remainder of this year. The two key items requiring action are lifting the federal debt limit, as the Treasury will reportedly exhaust its extraordinary measures no later than November 3, and enacting legislation to fund the government by December 11, when the current continuing resolution expires. We assume these deadlines will be navigated such that there are no significant disruptions to government operations or financial markets.<sup>2</sup>

### Foreign Economic Activity and the Dollar

- After expanding at an annual rate of only 1 percent in the second quarter, foreign real GDP is estimated to have risen at a still subdued 2¼ percent pace in the third quarter. Although recent indicators of economic activity have been a touch weaker than expected in a number of emerging market economies and in Japan, these disappointments have been offset by stronger-than-expected growth in Canada and China. We continue to expect foreign economic growth to pick up to just under 3 percent by the middle of 2016 and to remain close to that pace through 2018. This projection reflects our expectation that the advanced economies will continue to recover, supported by accommodative monetary policy, which in turn boosts exports and growth in the emerging market economies. Overall, this outlook is little changed from our September projection.
- The broad nominal dollar has depreciated around 1 percent, on net, since the time of the September Tealbook. The dollar fell against most currencies, as market participants shifted out the expected date for liftoff of the U.S. policy rate. We expect the nominal dollar to rise a bit through the first quarter of next year—pushed up by monetary policy actions in the United States and by concerns about the global economic outlook—and then to be little changed, on

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<sup>2</sup> A short-term shutdown of the federal government would have only minor implications for the outlook. For example, the staff estimates that the 16-day shutdown in October 2013 reduced real GDP growth by ¼ percentage point in the fourth quarter of that year and boosted it by an equal amount in the following quarter. This calculation embodies our judgment that there were no material effects on private investment or consumption owing to reduced confidence or increased uncertainty. The consequences of a failure to lift the debt ceiling are not well understood and could potentially be large. To date, the possibility of a failure to lift the debt limit has made only a small imprint on Treasury markets. (See the box “Debt Ceiling Update and Review of 2013 Episode” in the Financial Developments section.)

**Federal Reserve System Nowcasts of 2015:Q3 Real GDP Growth**  
(Percent change at annual rate from previous quarter)

Federal Reserve entity	Type of model	Nowcast as of Oct. 20, 2015
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 (as of Oct. 16, 2015)</li> </ul>	2.0 2.8 2.0
Cleveland	<ul style="list-style-type: none"> <li>• Bayesian regressions with stochastic volatility</li> <li>• Tracking model</li> </ul>	2.1 1.1
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>	0.9
Chicago	<ul style="list-style-type: none"> <li>• Dynamic factor models</li> <li>• Bayesian VARs</li> </ul>	1.8 1.4
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>	1.7 2.7 2.5
Minneapolis	<ul style="list-style-type: none"> <li>• Bayesian VARs</li> </ul>	2.1
Kansas City	<ul style="list-style-type: none"> <li>• Accounting-based tracking estimate</li> </ul>	1.7
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>	1.4 3.0
Memo: Median of Federal Reserve System nowcasts		2.0

1. The October Tealbook forecast, finalized on October 21, is also 1.4 percent.

net, over the medium term. Our path for the broad real dollar is about 1 percent lower than in the previous Tealbook.

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

- Oil markets have been relatively stable since the September Tealbook. Both the spot price of Brent crude oil and prices for futures contracts with delivery at the end of 2018 are down about \$1 per barrel relative to the previous projection. Consequently, our forecast for the price of imported oil is also little changed. We forecast that the price of imported oil will move up slowly from about \$45 per barrel this quarter to about \$53 per barrel by the end of 2018, supported by a continued slowing in U.S. oil production.
- Our index for nonfuel commodity prices is also little changed, on net, since the September Tealbook. Over the forecast period, we expect nonfuel commodity prices to remain about flat, in line with quotes from futures markets.

### **THE OUTLOOK FOR REAL GDP**

After rising at an annual rate of 2¼ percent over the first half of the year, real GDP is projected to increase 1¾ percent in the second half. Although spending indicators for the third quarter indicate solid growth in private domestic final purchases, GDP appears to have been held down by a sharp pullback in the pace of inventory accumulation and by a continued drag from net exports. As a result, we estimate that real GDP increased at an annual rate of just 1½ percent last quarter.<sup>3</sup> We expect growth to move up to a 2 percent pace in the current quarter.

- Although the retail sales figures for September were disappointing, the recent data on consumer spending, taken as a whole, have been more upbeat than expected. Data for spending on services and motor vehicles were particularly strong. We now estimate that real PCE increased at an annual rate of 3¼ percent in the third quarter—½ percentage point faster than in the

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<sup>3</sup> As displayed in the table “Federal Reserve System Nowcasts of 2015:Q3 Real GDP Growth,” the median of the projections generated by the near-term forecasting approaches used within the system, at 2 percent, is ½ percentage point higher than the staff’s judgmental projection.

**Summary of the Near-Term Outlook**  
(Percent change at annual rate except as noted)

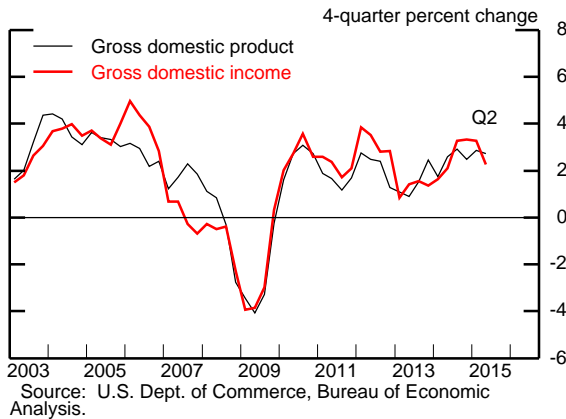
Domestic Econ Devel & Outlook

Measure	2015:H1		2015:Q3		2015:Q4	
	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook
<b>Real GDP</b>	<b>2.2</b>	<b>2.3</b>	<b>1.9</b>	<b>1.4</b>	<b>1.9</b>	<b>2.1</b>
Private domestic final purchases	2.7	3.0	3.3	3.8	3.1	2.9
Personal consumption expenditures	2.4	2.7	2.8	3.2	2.9	2.8
Residential investment	9.7	9.7	7.4	7.4	2.0	.9
Nonres. private fixed investment	2.6	2.8	5.0	6.4	4.5	4.0
Government purchases	1.3	1.3	.0	.7	.0	.2
<i>Contributions to change in real GDP</i>						
Inventory investment <sup>1</sup>	.5	.4	-.3	-1.4	.0	.4
Net exports <sup>1</sup>	-.9	-.9	-.5	-.6	-.8	-.7
<b>Unemployment rate<sup>2</sup></b>	<b>5.4</b>	<b>5.4</b>	<b>5.2</b>	<b>5.1</b>	<b>5.0</b>	<b>5.0</b>
<b>PCE chain price index</b>	<b>.1</b>	<b>.1</b>	<b>1.2</b>	<b>1.3</b>	<b>-.4</b>	<b>.4</b>
Ex. food and energy	1.4	1.4	1.2	1.4	1.2	1.4

- 1. Percentage points.
- 2. Percent; 2015:Q2 values are used for 2015:H1.

**Recent Nonfinancial Developments (1)**

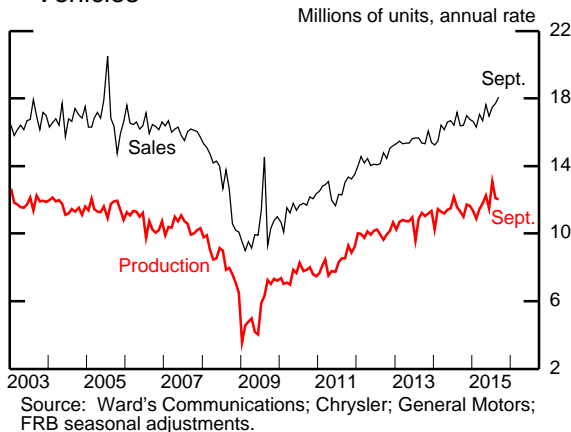
Real GDP and GDI



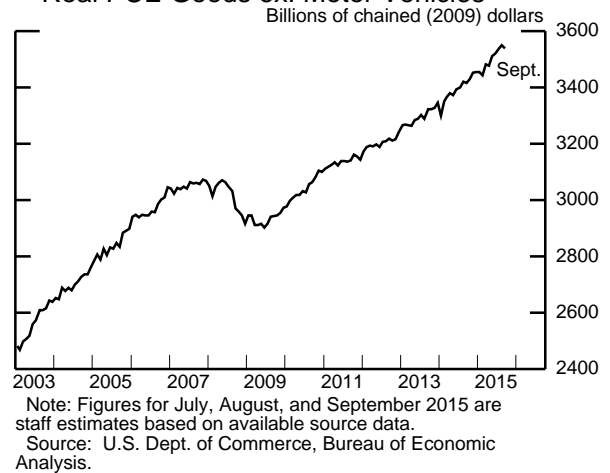
Manufacturing IP ex. Motor Vehicles and Parts



Sales and Production of Light Motor Vehicles

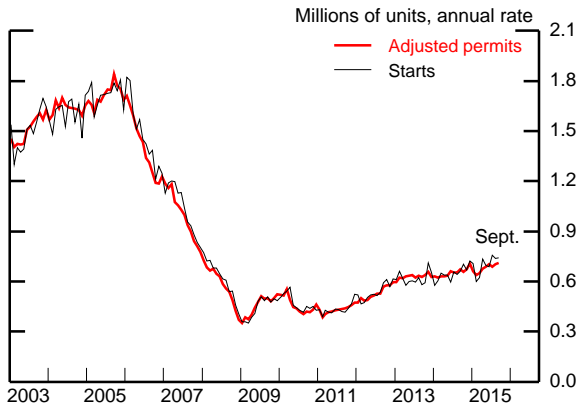


Real PCE Goods ex. Motor Vehicles



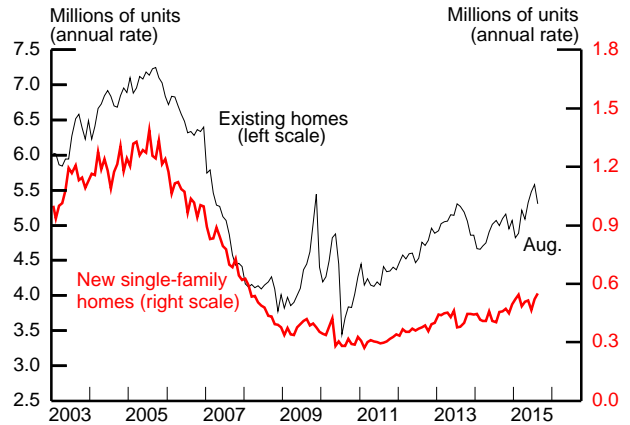
## Recent Nonfinancial Developments (2)

### Single-Family Housing Starts and Permits



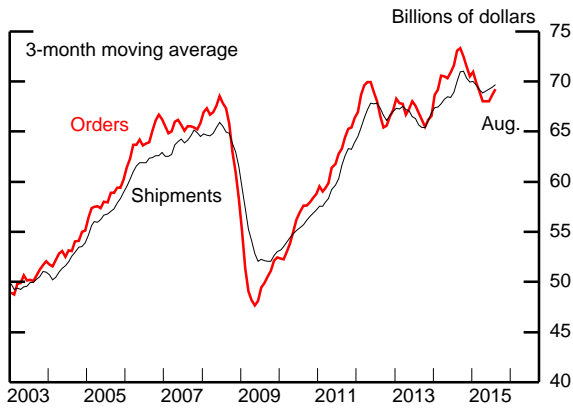
Note: Adjusted permits equal permit issuance plus total starts outside of permit-issuing areas.  
Source: U.S. Census Bureau.

### Home Sales



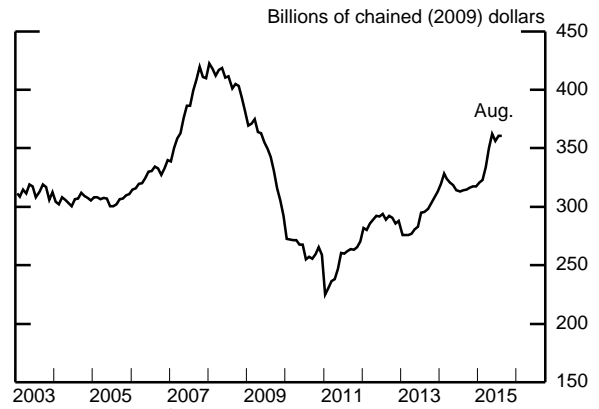
Source: For existing, National Association of Realtors; for new, U.S. Census Bureau.

### Nondefense Capital Goods ex. Aircraft



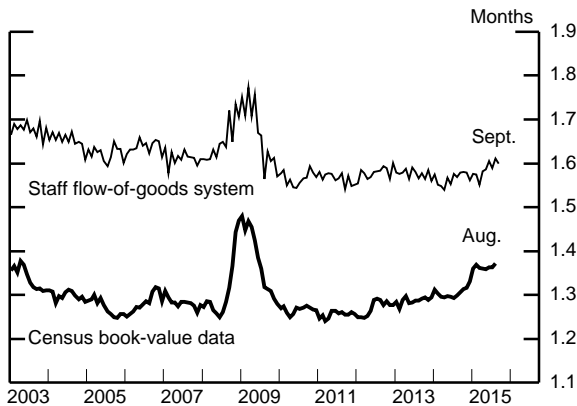
Source: U.S. Census Bureau.

### Nonresidential Construction Put in Place



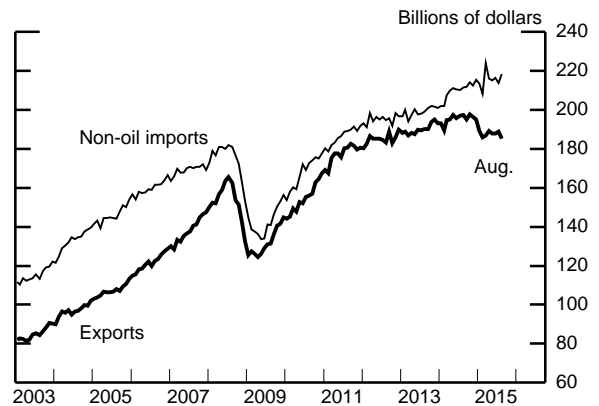
Note: Nominal CPIP deflated by BEA prices through 2015:Q2 and by the staff's estimated deflator thereafter.  
Source: U.S. Census Bureau.

### 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.

September Tealbook.<sup>4</sup> We expect real PCE growth to slow to 2¾ percent in the current quarter, largely reflecting an easing in motor vehicle purchases after two quarters of robust gains.

- The incoming data on housing activity were close to our expectations and continue to indicate a slow recovery in the sector. The readings on housing starts point to solid growth in residential investment in the third quarter, but the more modest readings for permits are consistent with a much smaller advance in the current quarter.
- Business fixed investment appears to have posted a solid gain in the third quarter, with notable contributions both from equipment and intangibles and from structures outside of the drilling and mining sector. We expect to see a more moderate increase in the fourth quarter, as outlays for transportation equipment drop back after an outsized gain in the third quarter. In addition, drilling and mining investment appears to be softening further.
- A correction in inventory investment has occurred more rapidly than we had anticipated. The data in hand indicate an abrupt step-down in stockbuilding in the third quarter, which we now estimate subtracted nearly 1½ percentage points from GDP growth, a 1 percentage point greater drag than in the September forecast. In the fourth quarter, we assume that inventory investment will pick up somewhat and add ½ percentage point to real GDP growth.
- Declines in net exports subtracted almost 1 percentage point from GDP growth in the first half of the year and are projected to take ¾ percentage point off output growth in the second half. This projection is little changed from the September Tealbook. Partly reflecting the lagged effect of past dollar appreciation, imports are expected to accelerate in the fourth quarter after a couple of quarters of modest increases and export growth is expected to remain weak.
- Industrial production continues to be held down by the effects of dollar appreciation as well as by the effects of low oil and gas prices on the energy

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<sup>4</sup> In addition, the BEA now estimates that real PCE increased 3½ percent in the second quarter, ½ percentage point faster than in September.

sector and its upstream suppliers. We now estimate that total IP rose at an annual rate of just 1¾ percent in the third quarter, 1 percentage point less than in our previous projection, and we forecast that it will decline 2¼ percent in the current quarter. The manufacturing portion of IP is expected to expand only a meager amount over the second half of the year, consistent with the generally weak readings from the national and regional manufacturing surveys and despite solid gains in motor vehicle assemblies.

Beyond the near term, real GDP is projected to rise modestly faster than our estimate of potential. But, largely because monetary accommodation wanes over time, GDP growth is projected to slow gradually, from 2¼ percent in 2016 to 2 percent in 2017 and to 1¾ percent in 2018.

- We revised up our medium-term outlook for real GDP growth a touch in response to the lower projected path for the dollar.
- As in previous Tealbooks, we expect above-trend growth in aggregate demand to be led by further solid gains in consumer spending. As labor markets improve further, we project real personal income to continue to rise faster than potential output; in addition, lagged effects of earlier increases in the wealth-to-income ratio are anticipated to lead to spending growth that modestly exceeds income growth.
- As policy tightens and interest rates rise, both consumer and business spending are expected to decelerate; this deceleration is partially offset by a diminishing drag from net exports on GDP growth as the effects of the past appreciation of the dollar wane.
- We have made no material changes to our supply-side assumptions in this projection. We now expect that output will exceed its potential by 1.0 percent at the end of the medium term, just 0.1 percentage point more than in the previous Tealbook.



## THE OUTLOOK FOR THE LABOR MARKET

The incoming data suggest that the pace of improvement in the labor market has slowed somewhat in recent months.

- Total nonfarm payrolls rose 140,000 in September, which was less than we had anticipated, and the figures for July and August were revised down.<sup>5</sup> All told, payrolls are now estimated to have increased 170,000 per month in the third quarter, somewhat below the 210,000 pace in the first half of the year. In response, we cut our projection for employment gains during the fourth quarter by 25,000 to 180,000 per month, similar to the third-quarter pace.
- The unemployment rate held steady at 5.1 percent in September and averaged that rate for the third quarter as a whole. We continue to expect that the unemployment rate will edge down to 5.0 percent in the fourth quarter.
- After holding steady at around 62.8 percent for about a year and a half, the labor force participation rate has fallen surprisingly quickly in recent months, reaching 62.4 percent in September. We suspect that a portion of the decline is statistical noise and project the participation rate to edge up to 62.5 percent this quarter, still 0.1 percentage point less than in our previous projection. Likewise, the employment-to-population ratio moved down in September to a level that we think is transitorily low, and we expect to see an uptick this quarter.
- The staff's labor market conditions index was unchanged in September and indicated that labor market conditions continued to improve only slowly in the third quarter.

Given the small revisions to the GDP projection, the medium-term outlook for the labor market is little changed, on net, from our previous projection.

- With output increasing faster than potential, the unemployment rate gradually moves down to 4.7 percent by 2018, unchanged from the September Tealbook. (See the box “Alternative View: Reconsidering Okun’s ‘Law’ ”

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<sup>5</sup> By contrast, we had expected August payrolls to be revised up by an amount consistent with the revisions to August that we have seen in recent years. Altogether, the level of payroll employment in September was reported to be about 190,000 lower than we had projected.

for a different view of the relationship between output growth and changes in the unemployment rate.)

- Monthly payroll gains are projected to slow from about 200,000 in 2015 to roughly 110,000 in 2018, as the pace of output growth eases.
- Although the unemployment rate in the third quarter was at our estimate of its natural rate, we believe that some slack remains in the labor market. This judgment reflects our view that the labor force participation rate is still unusually low relative to its trend and that the level of involuntary part-time employment is unusually high. As the economy improves further, we expect additional individuals to be drawn into the labor market and the rate of involuntary part-time employment to move down, slowing the decline in the unemployment rate relative to the improvement in the output gap.

## THE OUTLOOK FOR INFLATION

Total PCE price inflation is projected to slow from an annual rate of 1.3 percent in the third quarter to 0.4 percent in the current quarter, reflecting a sharp decline in consumer energy prices. Core PCE price inflation is now anticipated to be 1.4 percent in both the third and fourth quarters, restrained by further decreases in core import prices, some pass-through into core prices of the earlier steep declines in energy prices, and the effects of residual seasonality.

- The projection for core PCE price inflation in the second half of this year is 0.2 percentage point higher than in the September Tealbook, as the CPI data for September were above expectations.
- Our forecast for fourth-quarter headline PCE price inflation is  $\frac{3}{4}$  percentage point above our previous projection, reflecting a slower-than-expected unwinding of the abnormally wide margins between retail gasoline and crude oil prices observed this past summer as well as the upward revision to core inflation.
- Prices for core goods imports are expected to decline at an annual rate of  $2\frac{1}{4}$  percent over the second half of 2015, pushed down by the earlier rise in the dollar and declines in commodity prices. This projection is slightly more negative than in the September Tealbook, reflecting recent trade price data.

## Alternative View: Reconsidering Okun's "Law"

Okun's law has played an important role in monetary policymaking. Because potential output is not observable, it is difficult to directly measure the output gap (defined as the deviation of output from its potential). In 1962, Arthur Okun devised a shortcut to estimate potential output based on a mapping between the unemployment gap (defined as the difference between the actual unemployment rate and the natural rate of unemployment) and the output gap.<sup>1</sup> Starting from the following identity

$$Y = \frac{Y}{H} \cdot \frac{H}{E} \cdot \frac{E}{L} \cdot \frac{L}{N} \cdot N,$$

Okun found that a 1 percent change in output ( $Y$ ) relative to its potential level ( $Y^*$ ) can be decomposed into deviations of these components from their respective trends, with roughly 1/3 of the movement showing in labor productivity ( $Y/H$ ), 1/6 in change in hours per employee ( $H/E$ ), 1/3 in the employment rate ( $E/L$ ), and the remaining 1/6 in the labor force participation rate ( $L/N$ ). This decomposition implied a linear mapping between the output gap and the gap of the unemployment rate ( $U=1-E/L$ ) from its natural rate ( $U^*$ ), a relationship that became known as Okun's law:

$$U - U^* = -1/3 \times (Y - Y^*)/Y^*.$$

Given an estimate of the natural rate and data on output and the jobless rate, one can easily back out an estimate of the level of potential output. However, the law relies on the strong assumptions that the natural rate is more easily measured than potential output, and that the other components—such as labor force participation, the workweek of labor, and productivity—have a stable relationship with the state of the business cycle, as summarized by the output gap.

There is, however, evidence pointing to instability in the statistical relationships underlying Okun's law. Among others, productivity has become noticeably less procyclical than in Okun's era. Figure 1 shows that starting in the early 1990s, labor productivity has had negative correlations with output and hours worked.<sup>2</sup> This change could imply that the Okun's law coefficient is now larger in absolute magnitude than in the original formulation (the "1/3" in the equation above), as larger changes in the employment rate are needed to offset the countercyclical variation in productivity. The correlation change also implies that, all else being equal, total hours worked should now vary more than output. Figure 2, showing the ratio of the standard deviations of hours and output, confirms this greater variance in hours worked: Before the early 1990s, output was more volatile than hours, but since then, hours have become more volatile than output.

Unless they were completely offsetting, changes in the cyclical properties of the various components of the Okun's law identity would cause the Okun's law coefficient itself to be

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Note: This alternative view was prepared by Jae Sim.

<sup>1</sup> Okun used GNP instead of GDP, which may have different statistical properties. See Arthur M. Okun (1962), "Potential GNP: Its Measurement and Significance," *Proceedings of the Business and Economics Statistics Section of the American Statistical Association*, pp. 98–104.

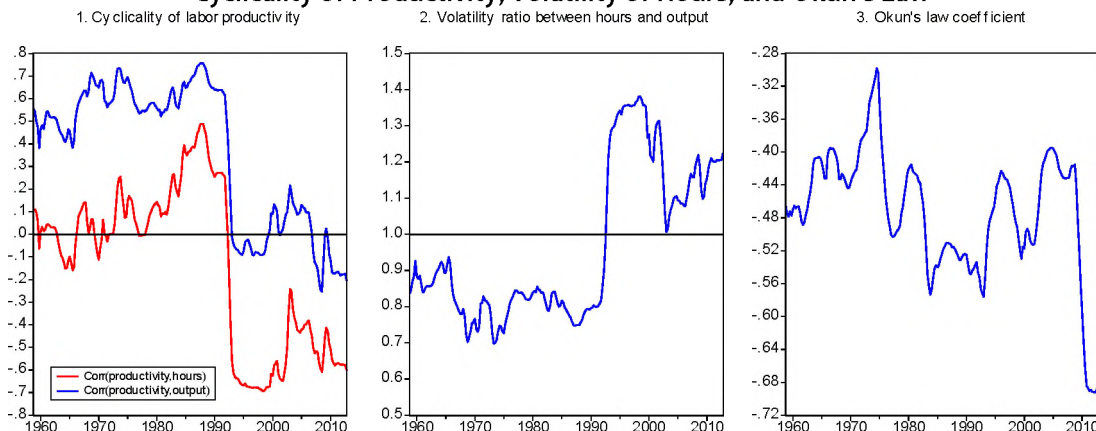
<sup>2</sup> See Kevin J. Stiroh (2009), "Volatility Accounting: A Production Perspective on Increased Economic Stability," *Journal of the European Economic Association*, vol. 7 (June), pp. 671–96.

unstable. Figure 3 shows the time-varying estimates of the Okun’s law coefficient using CBO estimates of the output and unemployment gaps for the time period from 1958:Q4 to 2015:Q1. Two key observations can be made. First, the Okun’s law coefficient has been unstable over time, and the time variation can be fairly large for any given short period of time. Second, the Okun’s law coefficient has trended down over time. The downward trend indicates that a given amount of change in output gap has been increasingly associated with larger changes in the unemployment rate, suggesting that the labor market has become more “flexible” over time. This aspect is particularly evident in the point estimates for the Okun’s law coefficient based on the post-2000 data.

Okun’s law has never actually been a law—it has, at times, been a useful rule of thumb. However, the institutional features underlying the original Okun’s law have changed. The decline of hiring and firing costs, shrinking labor union membership, the continued rise of a temporary workforce, and “just in time” workforce management all allow firms to adjust the size of their workforce with more flexibility than in Okun’s day. At one time, the practice of retaining an excessive workforce during downturns (that is, labor hoarding) allowed Okun to conclude that there exist *short-run increasing returns to labor*, but the practice is no longer as widespread.

This conclusion has practical importance. To highlight the risk associated with the use of Okun’s law for monetary policy strategy, let us assume that the recent plunge in the Okun’s law coefficient is persistent. Consider the Taylor (1999) rule, which recommends to move the nominal interest rate as much as changes in the output gap. In the absence of a direct estimate of the output gap, policymakers may want to replace the output gap with the unemployment gap. The change in the Okun’s law coefficient from negative 0.4 at around the early 2000s to negative 0.7 in recent data would then imply a change in the reaction coefficient for the unemployment gap from 2.5 to less than 1.5. Thus, a failure to recognize the decline in the Okun’s law parameter in a timely manner would imply that policy might become too tight if unemployment moves below the current estimate of the natural rate.

**Cyclicality of Productivity, Volatility of Hours, and Okun’s Law**



Note: Data are for 1958:Q4–2015:Q1. Labor hours, output, and productivity of figures 1 and 2 were de-trended with an HP filter with the smoothing parameter  $\lambda = 1,600$  before the 40-quarter backward-rolling window correlation (figure 1) and standard deviations (figure 2) were computed. Figure 3 shows 40-quarter backward-rolling window estimates of the Okun’s law coefficient using CBO data on the output and unemployment gaps. The CBO has two different estimates for the natural rate: the long-run and short-run rates. The CBO uses the former to estimate the potential GDP and the latter to forecast inflation. Naturally, the long-run rate is used in the regression analysis in figure 3.

Source: Bureau of Labor Statistics; Congressional Budget Office.

We expect import prices to flatten out in the first half of 2016 and to begin increasing at a 1 percent pace in the second half, consistent with moderate foreign inflation and the relatively flat trajectories for the dollar and commodity prices.

Beyond the near term, core PCE price inflation is projected to edge up gradually from 1.4 percent this year to 1.9 percent in 2018, as import prices turn back up, the effects on core inflation of the previous large declines in energy prices dissipate, and resource utilization continues to tighten in an environment of well-anchored inflation expectations. With consumer food and energy prices projected to rise roughly in line with core prices after the first quarter of next year, total PCE inflation is expected to run at nearly the same pace as core inflation throughout the medium term.

- The medium-term projection for inflation is almost identical to that in the September Tealbook.
- Survey-based measures of longer-term inflation expectations have remained stable over the intermeeting period but at the lower end of the ranges seen in recent years. (The box “Survey Measures of Longer-Term Inflation Expectations” reviews this survey evidence.) Market-based measures of longer-term inflation compensation have moved down appreciably since August 2014 and edged down further, on net, during the intermeeting period. (See the box “The Recent Decline in Longer-Horizon Inflation Compensation” in the Financial Developments section for further discussion.)

We have received little information on labor compensation since the previous Tealbook. Average hourly earnings rose 2¼ percent over the 12 months ending in September, similar to the increase over the prior 12 months. Over the medium term, we expect a gradual acceleration in compensation as the labor market tightens.

## THE LONG-TERM OUTLOOK

- The federal funds rate continues to be set according to the prescriptions of an inertial version of the Taylor (1999) rule. As in the previous Tealbook, the policy rule assumes a long-run equilibrium level of the nominal federal funds rate of 3¼ percent.

- 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 return to a normal size by 2021.
- The federal funds rate rises further after 2018. With the economy running above its potential level and inflation reaching the Committee's 2 percent objective, the federal funds rate moves above its long-run value in 2019 and 2020.
- In 2019 and 2020, the natural rate of unemployment remains at 5.1 percent and potential GDP rises about  $1\frac{3}{4}$  percent per year on average.
- As monetary policy continues to tighten, real GDP growth gradually slows to  $1\frac{1}{2}$  percent by 2020 and the unemployment rate remains at  $4\frac{3}{4}$  percent.
- PCE price inflation reaches the Committee's long-run objective of 2 percent in 2019, reflecting tight resource utilization along with our assumption that longer-run inflation expectations will eventually edge up from current levels.

## Survey Measures of Longer-Term Inflation Expectations

An important assumption underlying the staff's inflation forecast is that longer-term inflation expectations are well anchored and that they will remain so over the projection period. The staff tracks a number of measures of longer-term inflation expectations, including surveys, to monitor potential shifts in inflation expectations. Measures of longer-term inflation expectations from five surveys are shown in the exhibit on the next page.<sup>1</sup>

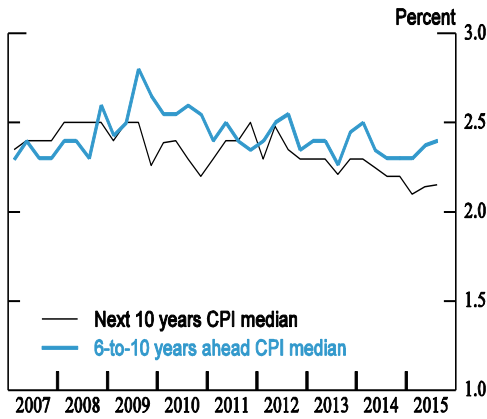
These surveys encompass different types of respondents and different measures of inflation. Three sets of respondents are represented in the exhibit: professional forecasters and financial industry participants (the Survey of Professional Forecasters, the Blue Chip Consensus Outlook, and the Survey of Primary Dealers), households (the Michigan Surveys of Consumers), and businesses (the Atlanta Fed Survey of Business Inflation Expectations). Additionally, the surveys capture different inflation concepts: The surveys of professionals explicitly reference expectations of CPI or PCE price index inflation, while the Michigan survey does not reference a specific price index but instead asks households about prices generally. The Atlanta Fed survey, instead of asking about prices, asks businesses in the Sixth District about their expectations for growth of their own overall unit costs.

In general, these survey measures suggest that longer-term inflation expectations have remained fairly stable over the course of the recession and recovery and are little different than they were prior to the recession. This result is consistent with the staff's assumption of anchored longer-term inflation expectations, and it may be somewhat surprising given the considerable changes in the unemployment rate over the past eight years, the volatility in financial markets, and the decline in oil prices since mid-2014. Some of the survey measures could be interpreted as drifting down in recent years; however, given the usual volatility of these surveys, it is difficult to distinguish noise from the beginning of a downward drift. For example, nearly all measures that appeared to have edged down earlier this year have ticked up in their recent readings (the Michigan survey is an exception).

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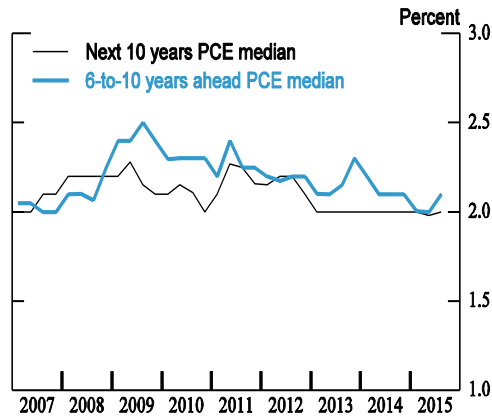
<sup>1</sup> Surveys of inflation expectations over shorter horizons—such as the New York Fed's Survey of Consumer Expectations, which asks about expectations over the next three years—are not shown.

Survey of Professional Forecasters (CPI)



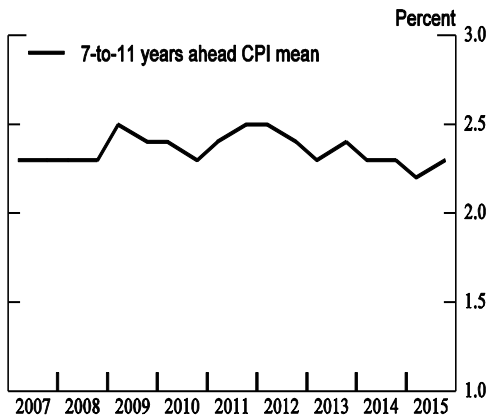
Source: Federal Reserve Bank of Philadelphia.

Survey of Professional Forecasters (PCE)



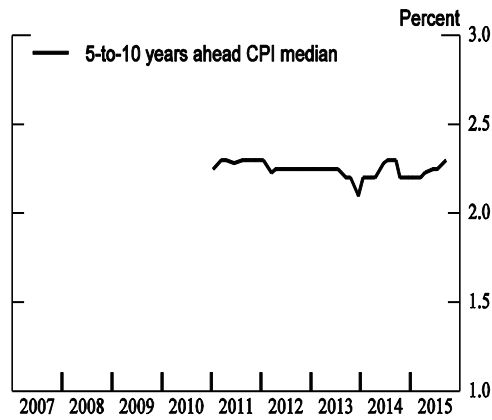
Source: Federal Reserve Bank of Philadelphia.

Blue Chip Consensus Outlook



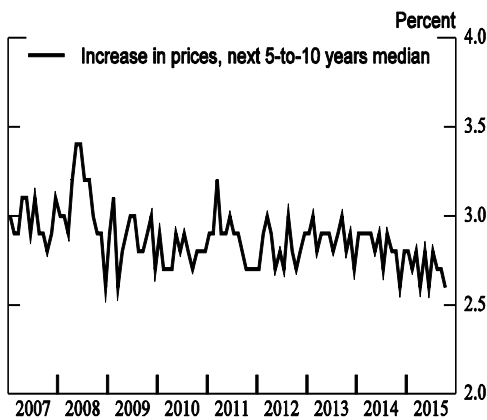
Source: Blue Chip Economic Indicators.

Survey of Primary Dealers



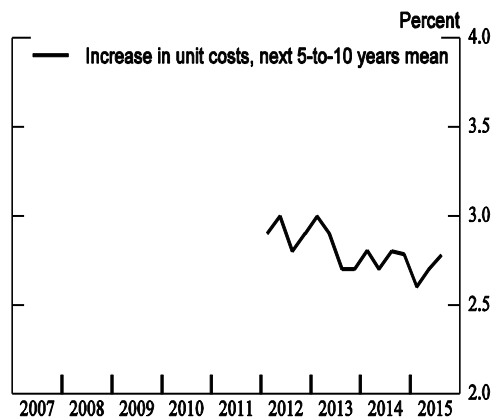
Note: Data begin in January 2011.  
Source: Federal Reserve Bank of New York.

Michigan Surveys of Consumers



Source: University of Michigan.

Survey of Business Inflation Expectations



Note: Survey of businesses in the Sixth District. Data begin in October 2011.  
Source: Federal Reserve Bank of Atlanta.



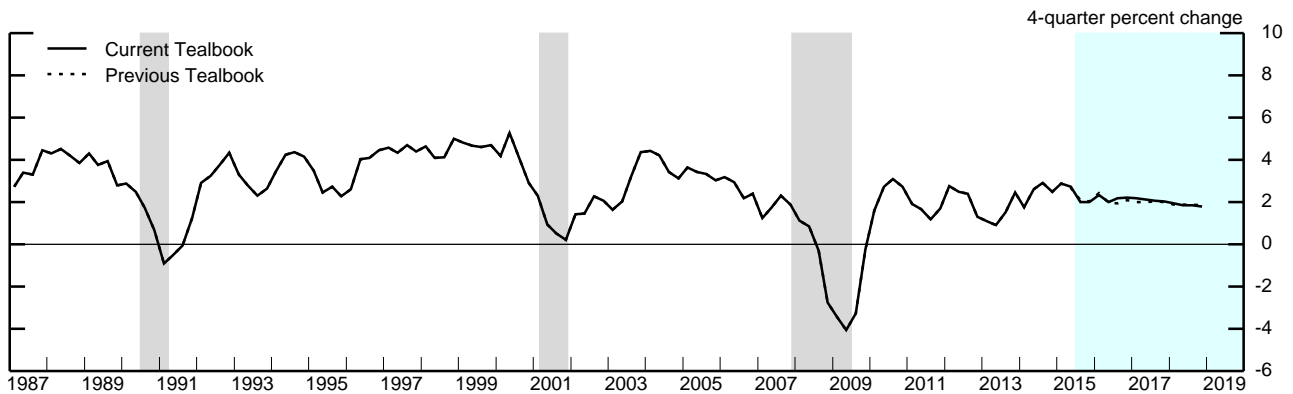
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**Projections of Real GDP and Related Components**  
 (Percent change at annual rate from final quarter  
 of preceding period except as noted)

Measure	2015	2015		2016	2017	2018
		H1	H2			
<b>Real GDP</b>	<b>2.0</b>	<b>2.3</b>	<b>1.7</b>	<b>2.2</b>	<b>2.0</b>	<b>1.8</b>
Previous Tealbook	2.0	2.2	1.9	2.1	2.0	1.8
Final sales	2.0	1.8	2.3	2.3	2.1	2.0
Previous Tealbook	1.9	1.7	2.1	2.2	2.3	2.1
Personal consumption expenditures	2.8	2.7	3.0	3.2	2.6	2.1
Previous Tealbook	2.6	2.4	2.8	3.2	2.6	2.1
Residential investment	6.9	9.7	4.1	11.2	5.3	3.9
Previous Tealbook	7.1	9.7	4.6	10.1	7.3	4.2
Nonresidential structures	.5	-.8	1.9	1.5	2.7	1.2
Previous Tealbook	2.2	-1.0	5.5	1.0	1.9	.8
Equipment and intangibles	5.0	3.9	6.1	5.0	2.6	2.2
Previous Tealbook	4.1	3.6	4.6	4.9	3.5	2.4
Federal purchases	-.5	.5	-1.6	-1.0	-.8	-.6
Previous Tealbook	-.6	.6	-1.7	-1.1	-.8	-.7
State and local purchases	1.7	1.7	1.7	1.5	1.8	1.8
Previous Tealbook	1.4	1.8	1.1	1.5	1.8	1.8
Exports	.3	-.6	1.3	1.1	2.2	4.2
Previous Tealbook	.5	-.6	1.7	.8	2.0	4.3
Imports	5.2	5.1	5.4	6.7	4.0	3.2
Previous Tealbook	5.3	5.0	5.6	6.7	4.0	3.2
Contributions to change in real GDP (percentage points)						
Inventory change	.0	.4	-.5	-.1	-.1	-.2
Previous Tealbook	.2	.5	-.2	-.1	-.3	-.2
Net exports	-.8	-.9	-.7	-.9	-.4	.0
Previous Tealbook	-.8	-.9	-.6	-.9	-.4	.0

Domestic Econ Devel & Outlook

Real GDP

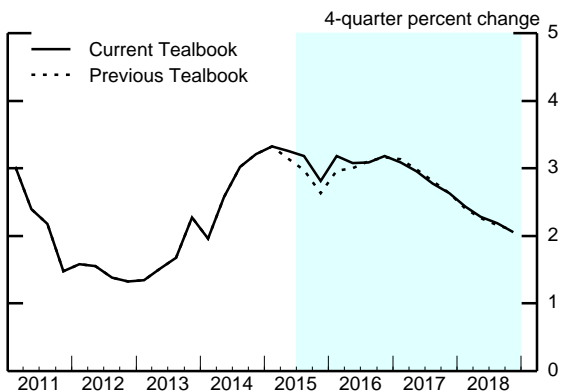


Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

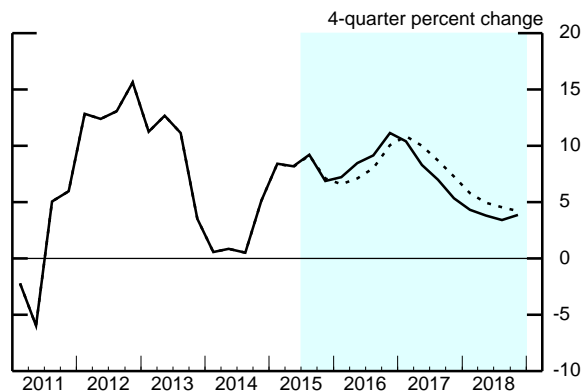
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

### Components of Final Demand

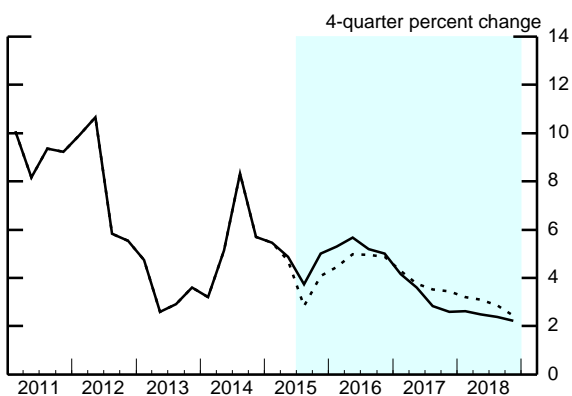
Personal Consumption Expenditures



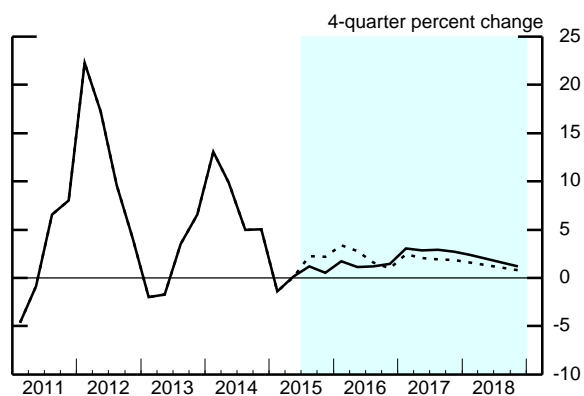
Residential Investment



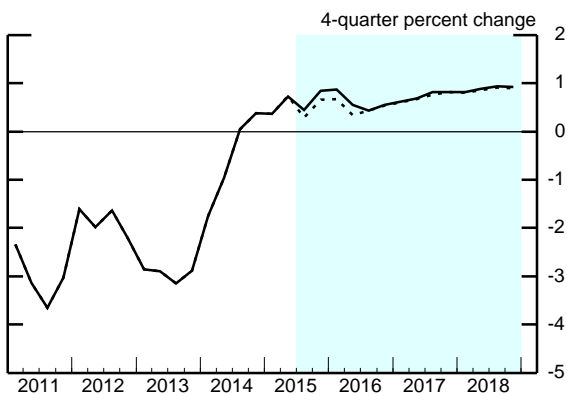
Equipment and Intangibles



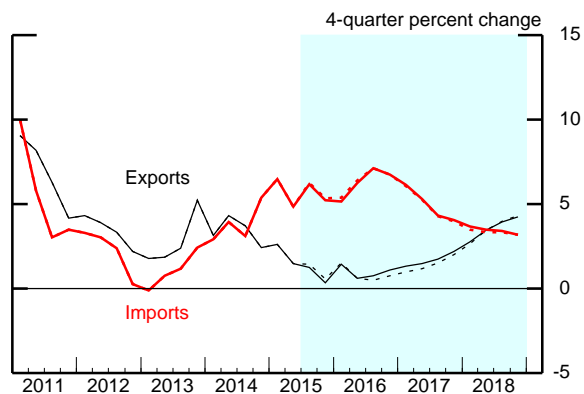
Nonresidential Structures



Government Consumption & Investment



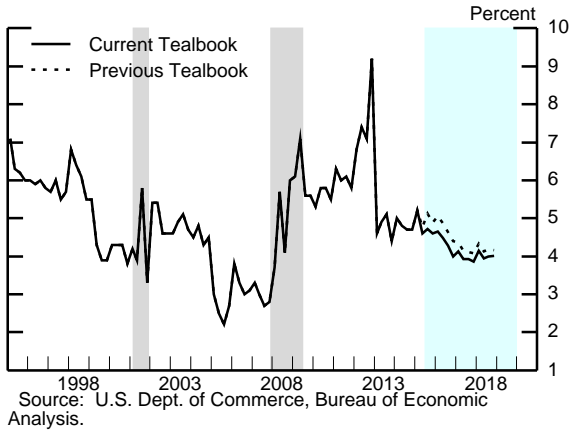
Exports and Imports



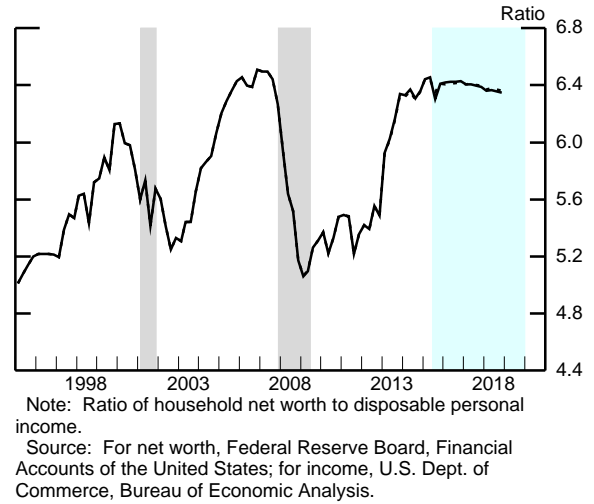
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

## Aspects of the Medium-Term Projection

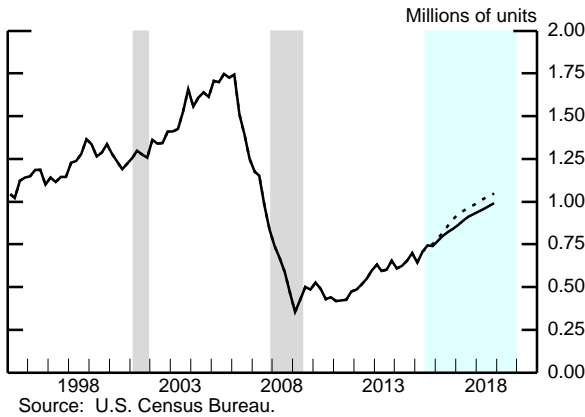
Personal Saving Rate



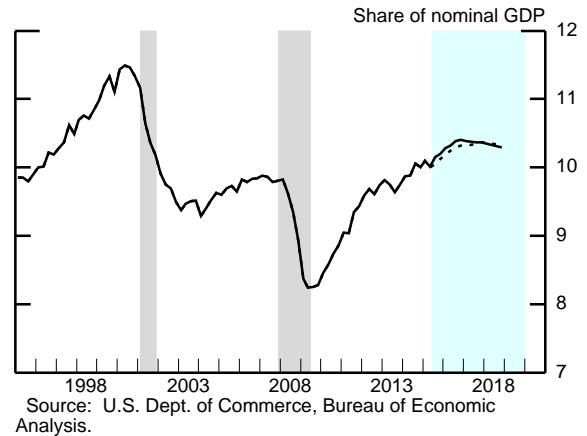
Wealth-to-Income Ratio



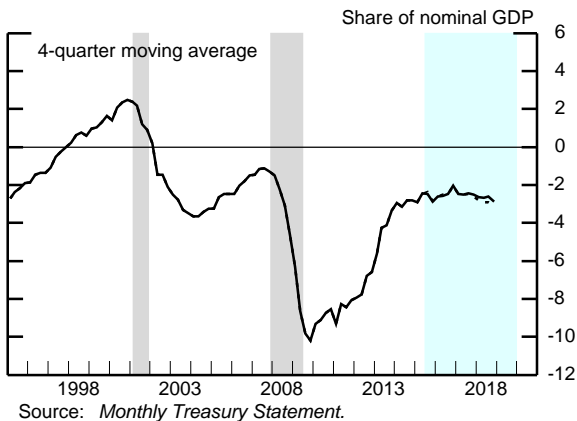
Single-Family Housing Starts



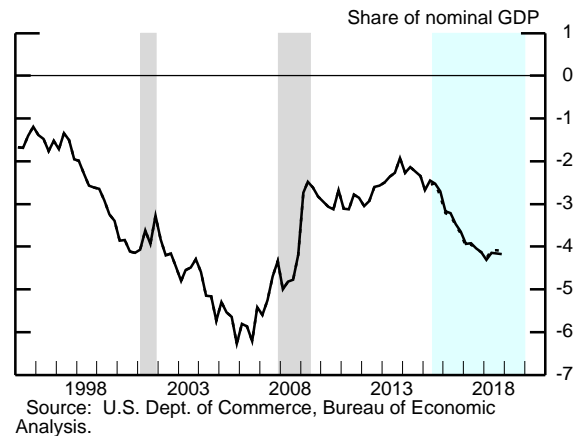
Equipment and Intangibles Spending



Federal Surplus/Deficit



Current Account Surplus/Deficit



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

**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	1.7	1.1	1.3	1.5	1.6	1.7
Previous Tealbook	3.1	3.4	2.6	1.7	1.1	1.3	1.5	1.6	1.7
<i>Selected contributions<sup>1</sup></i>									
Structural labor productivity <sup>2</sup>	1.6	2.9	2.8	1.5	.8	1.2	1.3	1.4	1.5
Previous Tealbook	1.6	2.9	2.8	1.5	.8	1.2	1.3	1.4	1.5
Capital deepening	.7	1.5	1.0	.3	.6	.8	.8	.8	.7
Multifactor productivity	.5	1.0	1.5	1.0	.1	.3	.4	.5	.7
Structural hours	1.6	1.2	.8	-.1	.6	.5	.4	.4	.3
Previous Tealbook	1.6	1.2	.8	-.1	.6	.6	.4	.4	.3
Labor force participation	.4	-.1	-.2	-.5	-.7	-.6	-.5	-.5	-.5
Previous Tealbook	.4	-.1	-.2	-.5	-.7	-.6	-.5	-.5	-.5
Memo:									
GDP gap <sup>3</sup>	-1.9	2.4	.8	-4.4	-.9	-.2	.5	.9	1.0
Previous Tealbook	-1.9	2.4	.8	-4.4	-.9	-.2	.4	.8	.9

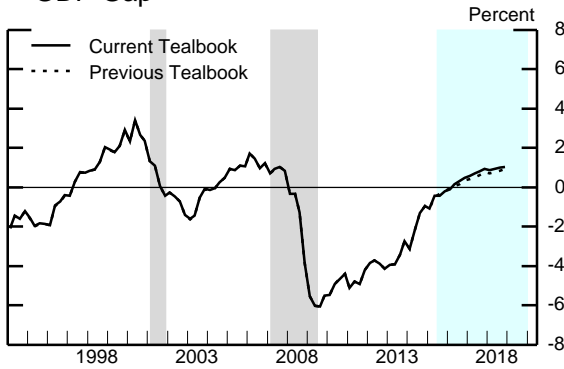
Note: For multiyear periods, the percent change is the annual average from Q4 of the year preceding the first year shown to Q4 of the last year shown.

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.

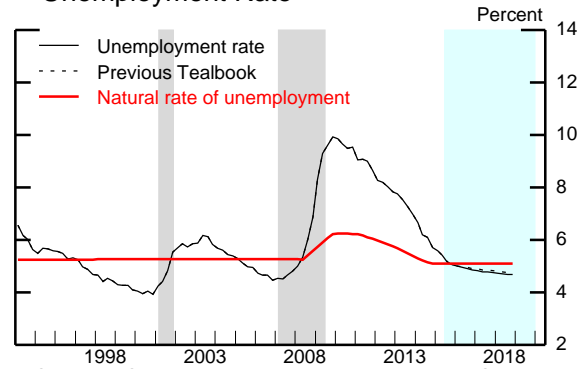
**GDP Gap**



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

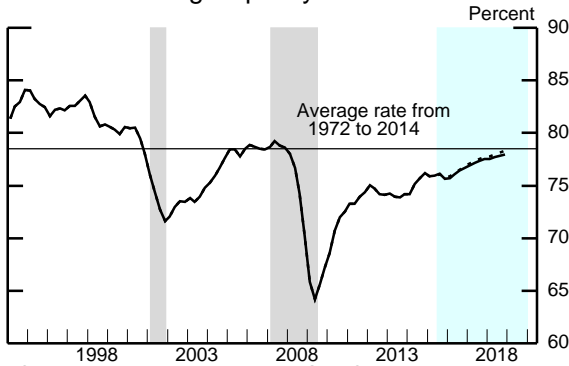
Source: U.S. Department of Commerce, Bureau of Economic Analysis; staff assumptions.

**Unemployment Rate**



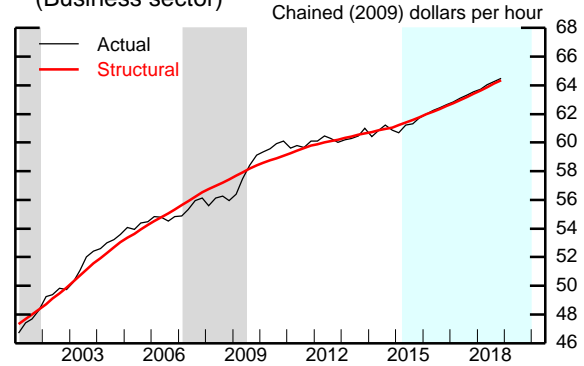
Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.

**Manufacturing Capacity Utilization Rate**



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

**Structural and Actual Labor Productivity (Business sector)**



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

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	2015		2016	2017	2018
		H1	H2			
Output per hour, business <sup>1</sup>	1.4	1.2	1.6	1.5	1.4	1.5
Previous Tealbook	1.2	1.1	1.3	1.6	1.5	1.6
Nonfarm payroll employment <sup>2</sup>	193	213	174	163	139	107
Previous Tealbook	215	213	218	154	130	107
Private employment <sup>2</sup>	180	207	154	150	121	90
Previous Tealbook	204	207	201	141	113	90
Labor force participation rate <sup>3</sup>	62.5	62.8	62.5	62.4	62.3	62.0
Previous Tealbook	62.6	62.8	62.6	62.5	62.3	62.0
Civilian unemployment rate <sup>3</sup>	5.0	5.4	5.0	4.9	4.7	4.7
Previous Tealbook	5.0	5.4	5.0	4.9	4.8	4.7

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)

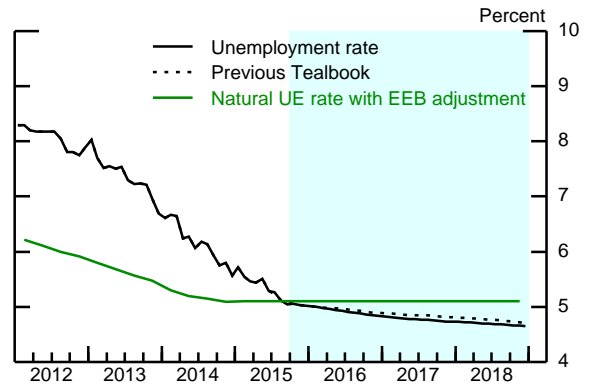
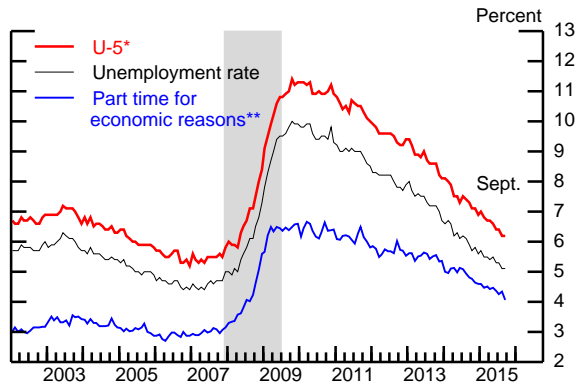
Measure	2015	2015		2016	2017	2018
		H1	H2			
PCE chain-weighted price index	.5	.1	.9	1.4	1.7	1.9
Previous Tealbook	.3	.1	.4	1.5	1.7	1.9
Food and beverages	.7	-.7	2.1	1.8	2.0	2.0
Previous Tealbook	.5	-.7	1.6	1.8	2.0	1.9
Energy	-15.7	-20.0	-11.2	-.9	2.7	1.8
Previous Tealbook	-18.3	-20.0	-16.6	2.7	2.4	1.5
Excluding food and energy	1.4	1.4	1.4	1.4	1.7	1.9
Previous Tealbook	1.3	1.4	1.2	1.4	1.7	1.9
Prices of core goods imports <sup>1</sup>	-3.1	-3.8	-2.3	.4	1.2	1.2
Previous Tealbook	-2.8	-3.8	-1.9	.3	1.3	1.2

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

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

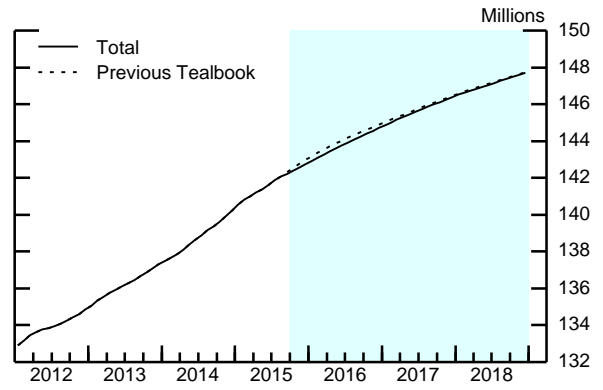
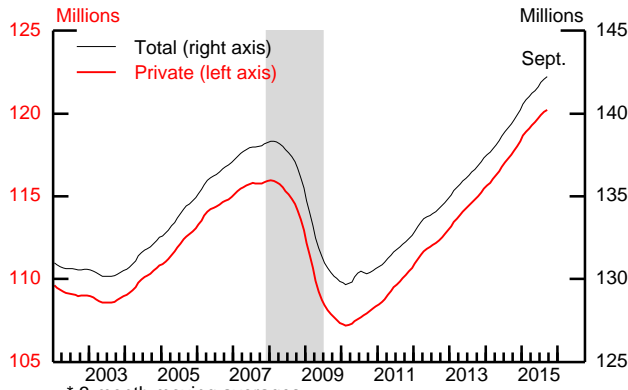
## Labor Market Developments and Outlook (1)

### Measures of Labor Underutilization



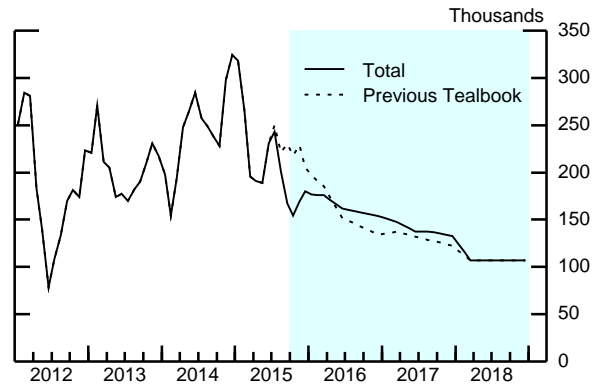
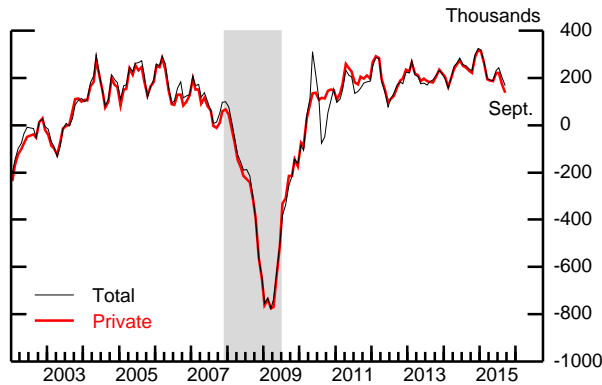
\* U-5 measures total unemployed persons plus all marginally attached to the labor force, as a percent of the labor force plus persons marginally attached to the labor force.  
 \*\* Percent of Current Population Survey employment.  
 EEB Extended and emergency unemployment benefits.  
 Source: U.S. 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\*

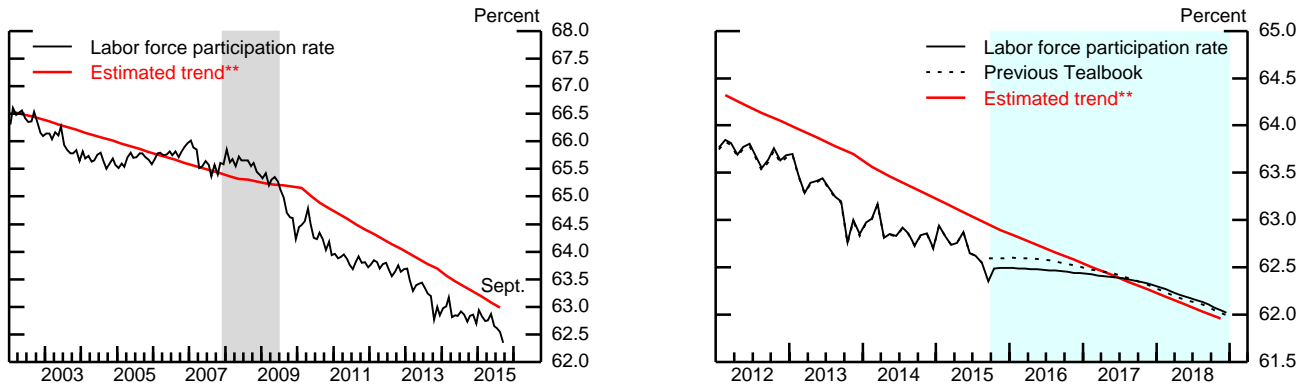


\* 3-month moving averages.  
 Source: U.S. Department of Labor, Bureau of Labor Statistics.

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\*

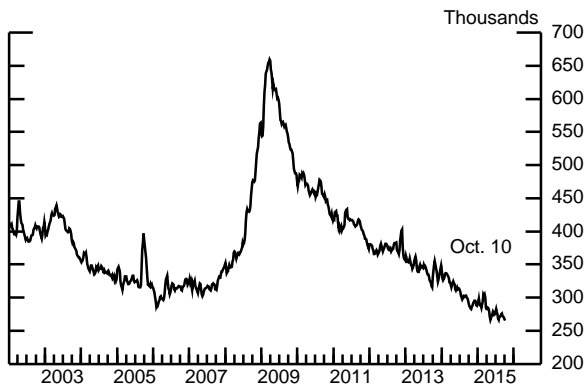


\* Published data adjusted by staff to account for changes in population weights.

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

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

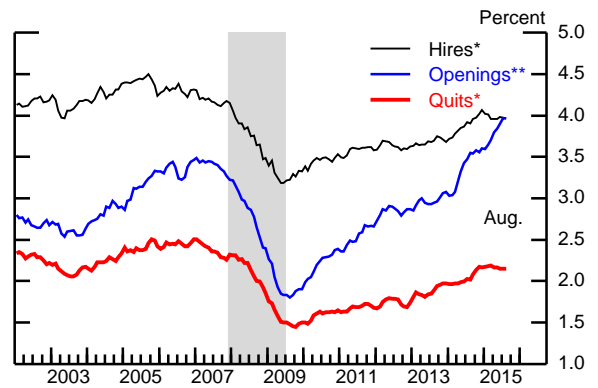
Initial Unemployment Insurance Claims\*



\* 4-week moving average.

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

Private Hires, Quits, and Job Openings

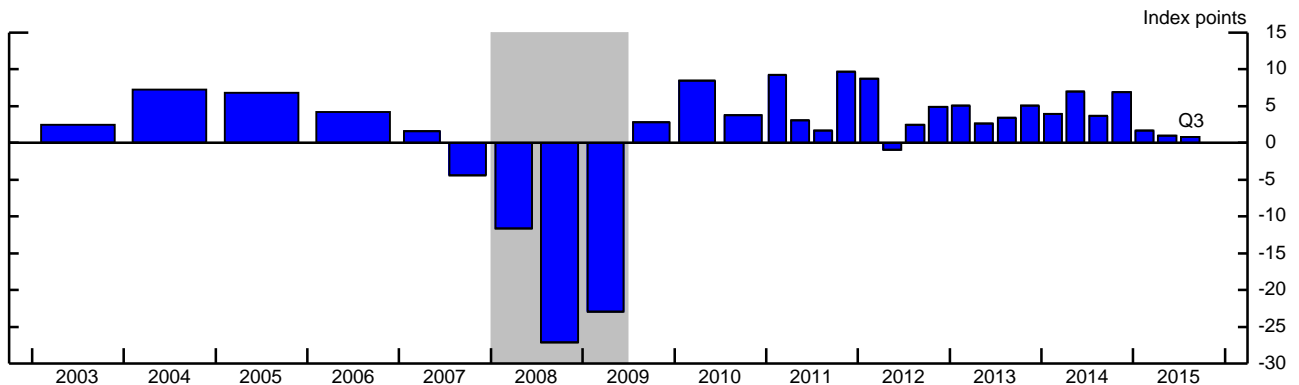


\* Percent of private nonfarm payroll employment, 3-month moving average.

\*\* 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.

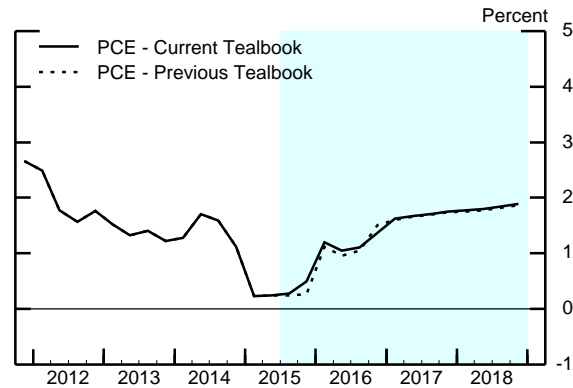
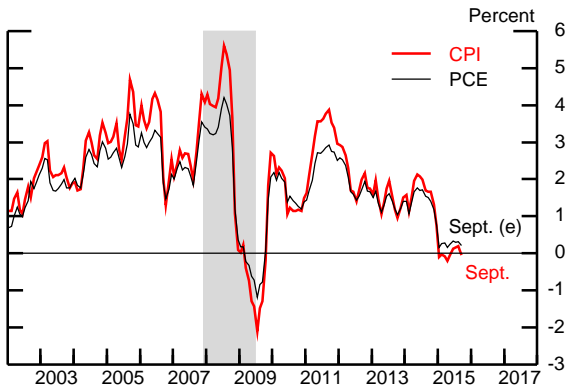
Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.



## Inflation Developments and Outlook (1)

(Percent change from year-earlier period)

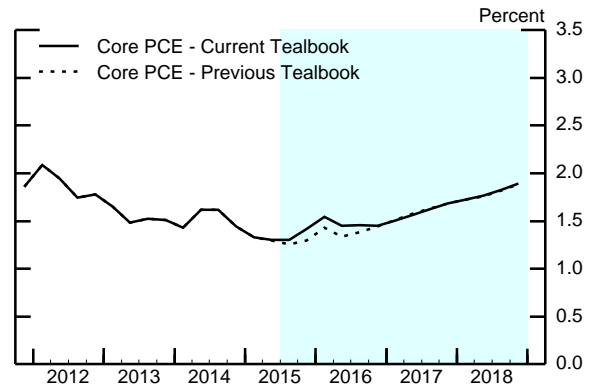
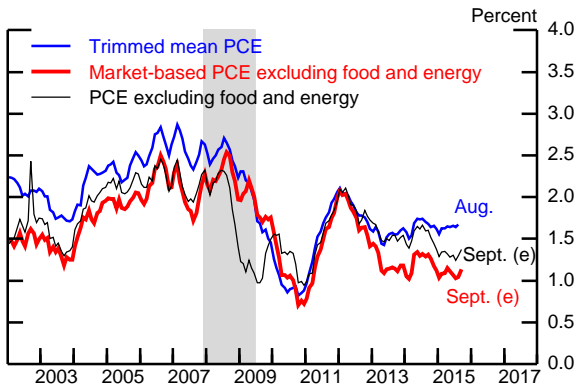
### Headline Consumer Price Inflation



Note: PCE prices from July to September 2015 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.

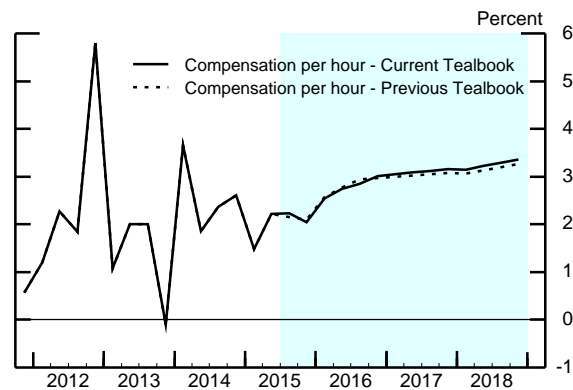
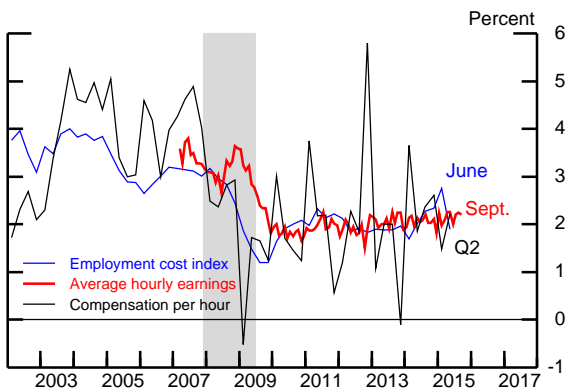
### Measures of Underlying PCE Price Inflation



Note: Core PCE prices from July to September 2015 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.

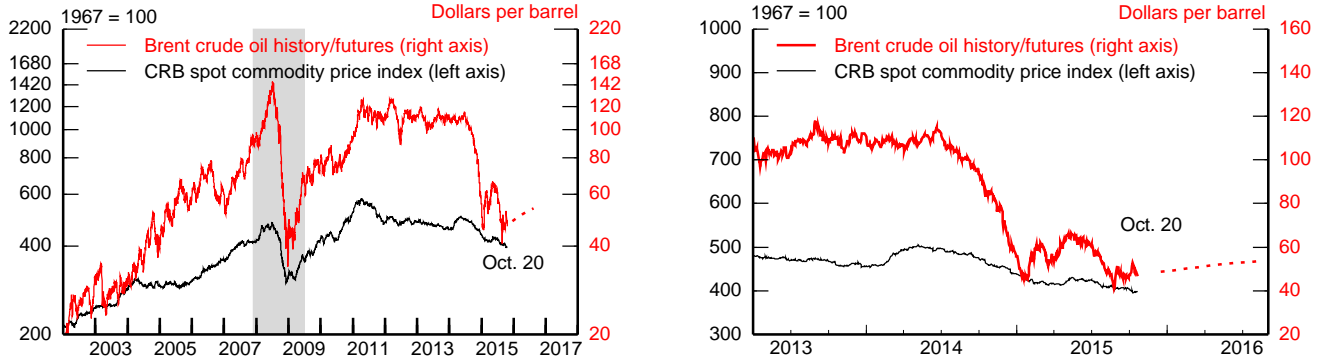
Source: U.S. Department of Labor, Bureau of Labor Statistics.

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)

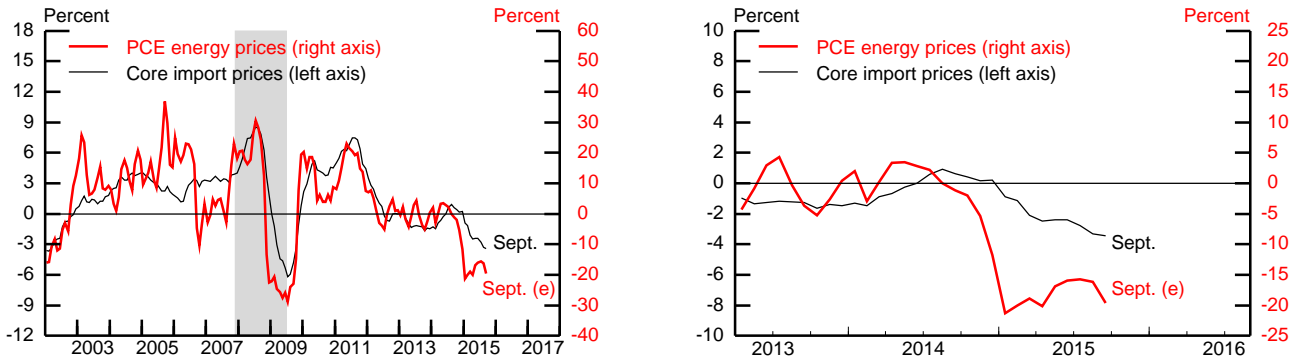
(Percent change from year-earlier period, except as noted)

### Commodity and Oil Price Levels



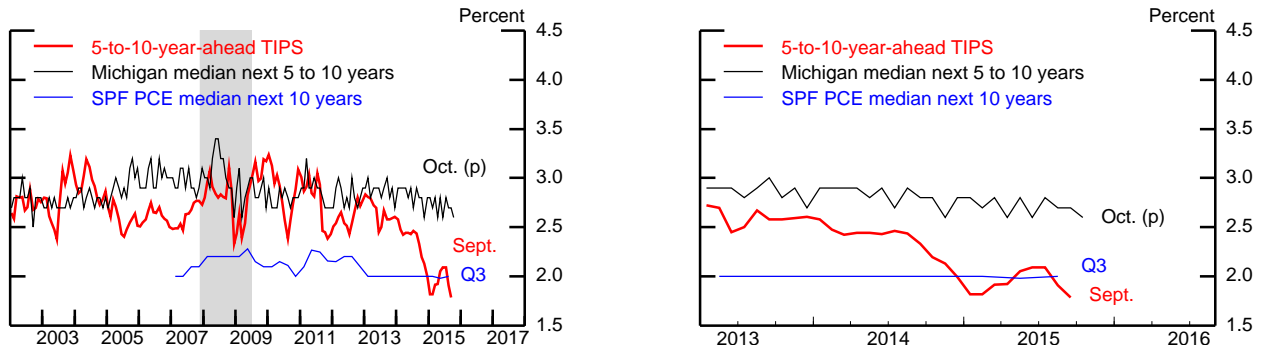
Note: Futures prices (dotted lines) are the latest observations on monthly futures contracts.  
 Source: For oil prices, U.S. Department of Energy, Energy Information Agency; for commodity prices, Commodity Research Bureau (CRB).

### 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.

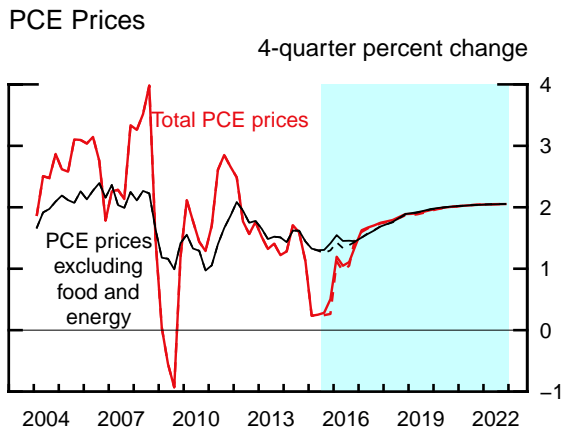
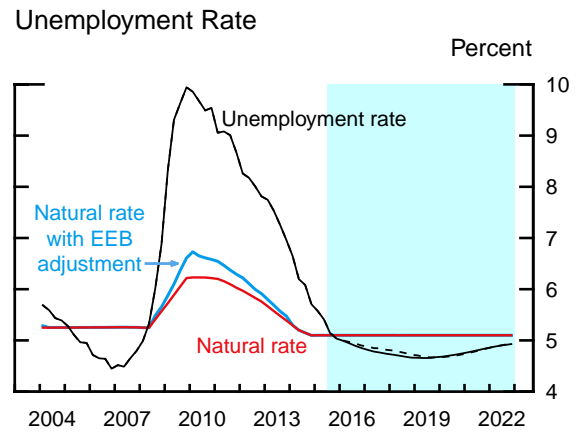
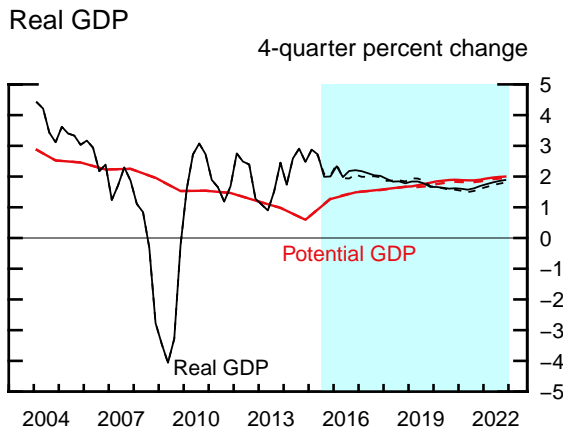
Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

## The Long-Term Outlook

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

Measure	2015	2016	2017	2018	2019	2020	Longer run
Real GDP	2.0	2.2	2.0	1.8	1.7	1.6	1.9
Previous Tealbook	2.0	2.1	2.0	1.8	1.7	1.6	1.9
Civilian unemployment rate <sup>1</sup>	5.0	4.9	4.7	4.7	4.7	4.7	5.1
Previous Tealbook	5.0	4.9	4.8	4.7	4.7	4.7	5.1
PCE prices, total	.5	1.4	1.7	1.9	2.0	2.0	2.0
Previous Tealbook	.3	1.5	1.7	1.9	1.9	2.0	2.0
Core PCE prices	1.4	1.4	1.7	1.9	2.0	2.0	2.0
Previous Tealbook	1.3	1.4	1.7	1.9	2.0	2.0	2.0
Federal funds rate <sup>1</sup>	.2	1.4	2.4	3.1	3.6	3.7	3.3
Previous Tealbook	.4	1.4	2.3	3.0	3.5	3.7	3.3
10-year Treasury yield <sup>1</sup>	2.1	3.2	3.7	4.0	4.1	4.2	4.1
Previous Tealbook	2.6	3.2	3.7	3.9	4.1	4.2	4.1

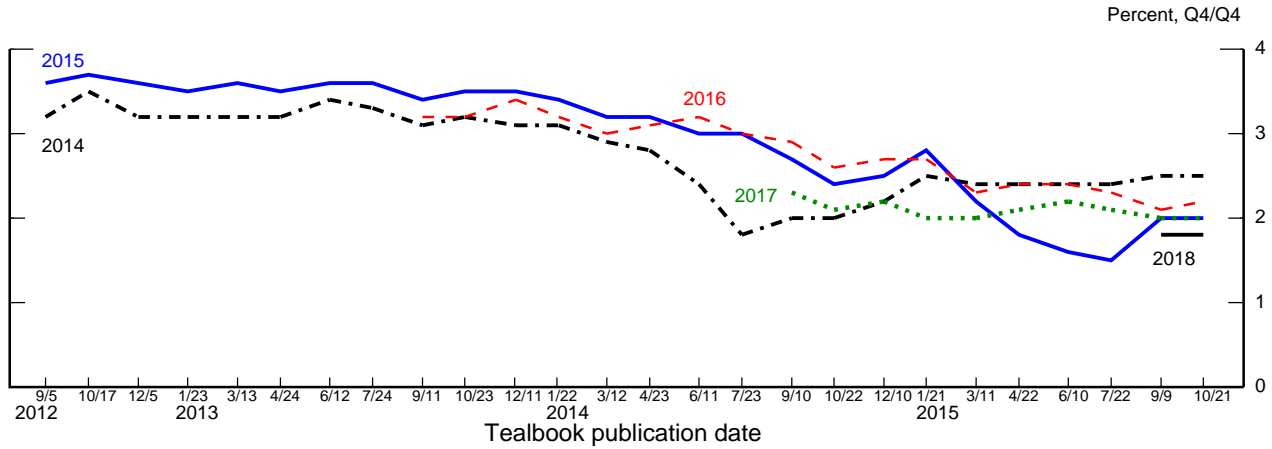
1. Percent, average for the final quarter of the period.



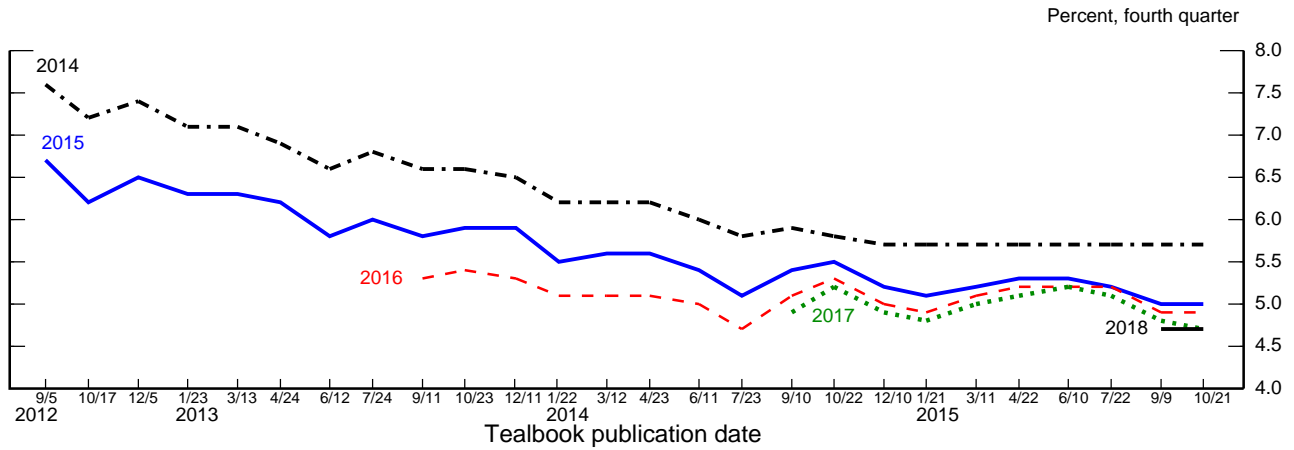
Note: In each panel, shading represents the projection period, and dashed lines are the previous Tealbook.

### Evolution of the Staff Forecast

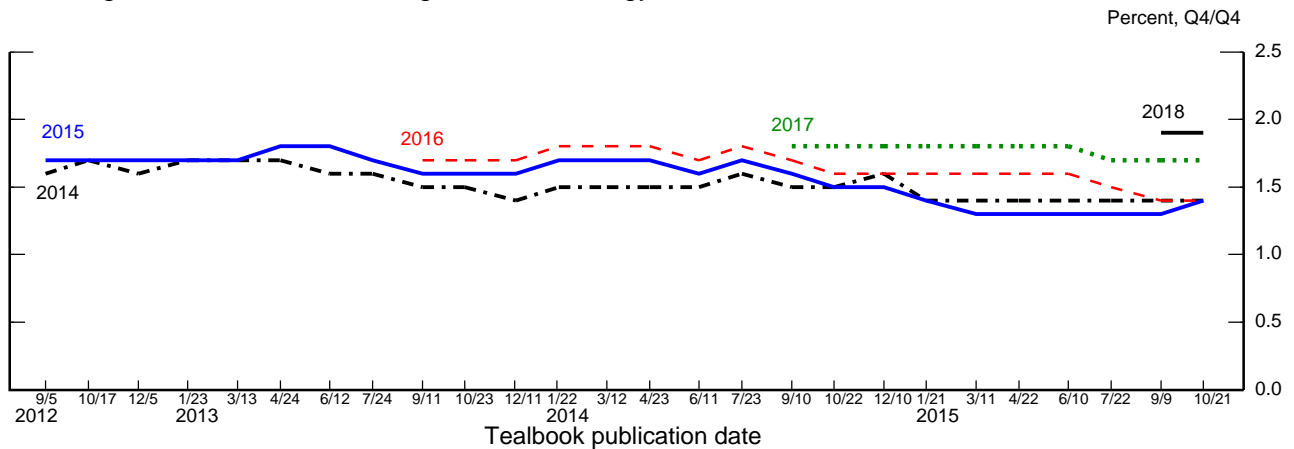
#### Change in Real GDP



#### Unemployment Rate



#### Change in PCE Prices excluding Food and Energy



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## International Economic Developments and Outlook

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Foreign real GDP growth appears to have picked up from a tepid 1 percent annual rate in the second quarter to a still modest 2¼ percent in the third quarter, a touch above our September Tealbook projection. Much of this pickup reflects a rebound in Canada, where energy production recovered from previous disruptions by wildfires and manufacturing exports were boosted by past currency depreciation. In addition, GDP contractions that held down overall growth in the second quarter are expected to moderate in Brazil and Taiwan and to turn to a slight expansion in Japan. Third-quarter Chinese GDP growth came in surprisingly strong.

We continue to expect foreign growth to rise to nearly 3 percent in 2016 and to remain around that pace through 2018. Accommodative monetary policy and low oil prices should support continued recovery in the advanced economies, which in turn boosts exports and growth in the emerging market economies (EMEs).

The projected rate of foreign growth is quite modest by historical standards. Even so, it is possible that we have overestimated the strength of the foreign recovery. Indeed, over 2015 our forecasts for a pickup in foreign growth have repeatedly been too optimistic, as growth initially weakened to 1¾ percent in the first quarter of this year before dropping further in the second quarter. In addition, global trade, one indicator of global growth, remains subdued after falling sharply earlier in the year. Hence, the pace of the foreign expansion could well continue to fall short of our baseline projection. That said, we cannot rule out the possibility that extraordinarily accommodative monetary policy, very low oil prices, and balance sheet repair could boost activity in the advanced economies more than we currently anticipate, which would in turn support EME growth; such a scenario, “Faster Foreign Growth and Weaker Dollar,” is described in the Risks and Uncertainty section.

We still view the risks as tilted to the downside, however. In particular, notwithstanding the easing in market pressures in recent weeks, we cannot discount the possibility of an EME financial crisis. EMEs remain vulnerable to shifts in investor

sentiment against the background of subdued growth and reduced commodity prices (see the box “Emerging Market Stresses and Vulnerabilities”). An adverse shock, such as a financial crisis in Brazil or a sharp slowdown in China, could trigger a resurgence of financial turbulence in EMEs that spills over to the rest of the global economy. (See the scenario “Emerging Market Economy Slump” in the Risks and Uncertainty section.) We do not expect the tightening of U.S. monetary policy itself to precipitate an EME crisis, but rising interest rates and some further appreciation of the dollar could exacerbate stresses on some EMEs.

Falling retail energy prices will likely hold down headline inflation in the advanced foreign economies (AFEs) in the current quarter. We have marked down our fourth-quarter inflation forecast for these economies by nearly  $\frac{1}{2}$  percentage point to  $\frac{1}{2}$  percent. We expect AFE inflation to remain low in the near term, especially in the euro area and Japan, and to then rise to  $1\frac{3}{4}$  percent by 2018 as the effects of past oil price declines wane and economic slack diminishes. Fading drag from energy prices should also result in a pickup of inflation in emerging Asia, from 2 percent in the current quarter to  $2\frac{3}{4}$  percent over the rest of the forecast period. In South America, the decline in commodity prices since mid-2014 has triggered sizable currency depreciations, which in turn have temporarily boosted import prices and inflation. As these effects fade, inflation in the region should decline from  $8\frac{1}{4}$  percent in the current quarter to 6 percent in 2017 and 2018.

In light of persistently low inflation and elevated uncertainty about global growth prospects, we now assume easier macroeconomic policy abroad. We expect the Bank of Japan (BOJ) to expand its asset purchases, and we anticipate that the Bank of England (BOE) will wait longer to begin raising rates. In addition, Taiwan, India, and Singapore eased monetary policy during the intermeeting period, and we expect some further policy easing in emerging Asia.

## EMERGING MARKET ECONOMIES

- **China.** Real GDP grew at a surprisingly robust  $7\frac{1}{2}$  percent rate in the third quarter. This rate is up from  $6\frac{1}{2}$  percent in the first half of the year and about

1 percentage point higher than we had expected at the time of the September Tealbook.<sup>1</sup> Although industrial production and exports were soft for the quarter as a whole, they turned up in September, and the economy was also supported by surprisingly strong growth in services. In response to these signs of stronger momentum, we raised our projection for the current quarter by  $\frac{1}{4}$  percentage point to  $6\frac{1}{2}$  percent. We continue to see growth gradually edging down to 6 percent by the end of the forecast period, in line with a decline in China's potential growth. Inflation rose to  $3\frac{1}{4}$  percent in the third quarter, owing mostly to a rise in pork price inflation that we expect to be short lived. We expect inflation to fall back to  $2\frac{1}{2}$  percent by next year.

***Other Emerging Asia.*** We estimate that growth in the region rose from a mere  $1\frac{1}{2}$  percent rate in the second quarter to a still weak  $2\frac{1}{2}$  percent pace in the third quarter, about  $\frac{1}{2}$  percentage point less than predicted. Growth in the second quarter was held down by the adverse effect of MERS (Middle-East Respiratory Syndrome) in Korea, as well as sharp declines in exports and manufacturing in Singapore and Taiwan. Recent data suggest that these drags diminished somewhat in the third quarter. In Korea, rebounds in the service industry, tourism, and consumer and business confidence since June point to a quick recovery from the MERS outbreak. In Singapore, preliminary third-quarter GDP data indicate that manufacturing activity stabilized and growth improved. Similarly, in Taiwan, a reduced pace of contraction in the manufacturing sector suggests that GDP fell at a slower pace in the third quarter.

We expect growth in the region to rise further to  $3\frac{1}{2}$  percent in the fourth quarter and to 4 percent in 2016, supported by a firming of external demand and accommodative policies. Indeed, central banks in India, Singapore, and Taiwan eased monetary policy during the intermeeting period, and several countries, including Korea and Taiwan, have announced fiscal stimulus

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<sup>1</sup> The release of a new quarterly GDP series by the Chinese authorities led to a downward revision of about  $\frac{1}{2}$  percentage point in our estimate of second-quarter growth and an upward revision by a similar amount in first-quarter growth.



## Emerging Market Stresses and Vulnerabilities

Since mid-May, and particularly following China's surprise devaluation on August 11, emerging market economies (EMEs) have come under increased financial stress, with EME-focused mutual funds experiencing large outflows (the bars in figure 1), and many EMEs suffering sharp currency depreciations and rising CDS premiums on their sovereign bonds (the red line). As shown in the table, EME asset prices have fallen sharply since mid-May, with declines reminiscent of the 2013 "taper tantrum," notwithstanding some recent improvement.

Although financial stresses worsened over the summer, concerns about emerging market vulnerabilities had been building for some time, reflecting a combination of slowing economic activity, declining commodity prices, and rising levels of emerging market corporate debt. These concerns were exacerbated by developments in China, where a string of disappointing data releases in August, a renewed plunge in the stock market, and the unexpected decision to devalue the renminbi led to fears regarding the outlook for the Chinese economy. Given China's importance as a consumer of commodities, this devaluation led to renewed worries regarding the outlook for major commodity exporters, as well as for China's major trade partners.

Anticipation of U.S. monetary policy normalization have likely also played a role, raising concerns about capital outflows, further currency depreciations, and debt servicing burdens of EME corporate borrowers, especially those who have borrowed heavily in U.S. dollars. Indeed, the modest rally in EME assets in recent weeks, as markets have pushed out expectations for a U.S. rate hike, suggest that this has been a contributing factor. But the role of U.S. monetary policy in contributing to the increases in EME stress appears to be smaller than during the taper tantrum. In 2013, CDS spreads rose in tandem with the increase in U.S. Treasury yields (line 4 in the table), and as shown in line 5, the correlation between these two variables was 0.9. During the recent episode, by contrast, this correlation has reversed: U.S. Treasury yields have declined since mid-June, while CDS spreads have risen considerably.

The importance of concerns over Chinese and global growth, and the related decline in commodity prices, can be seen in the greater deterioration in financial conditions for commodity exporters relative to other vulnerable EMEs. Figure 3 presents the evolution of the EME vulnerability index we constructed during the taper tantrum, calculated separately for commodity exporters and commodity importers, with higher values indicating greater vulnerability.<sup>1</sup> According to our index, there has been a large increase in vulnerability since 2012 for commodity exporters (the red line), while for the majority of commodity importers the vulnerability ranking has fallen (the blue line). As shown in figure 4, net commodity exporters have also suffered larger currency depreciations. For example, since mid-May, the currencies of Korea, India, and the Philippines (all commodity importers) have remained relatively stable, while those of commodity-exporting Brazil, Russia, Colombia, and Malaysia have depreciated

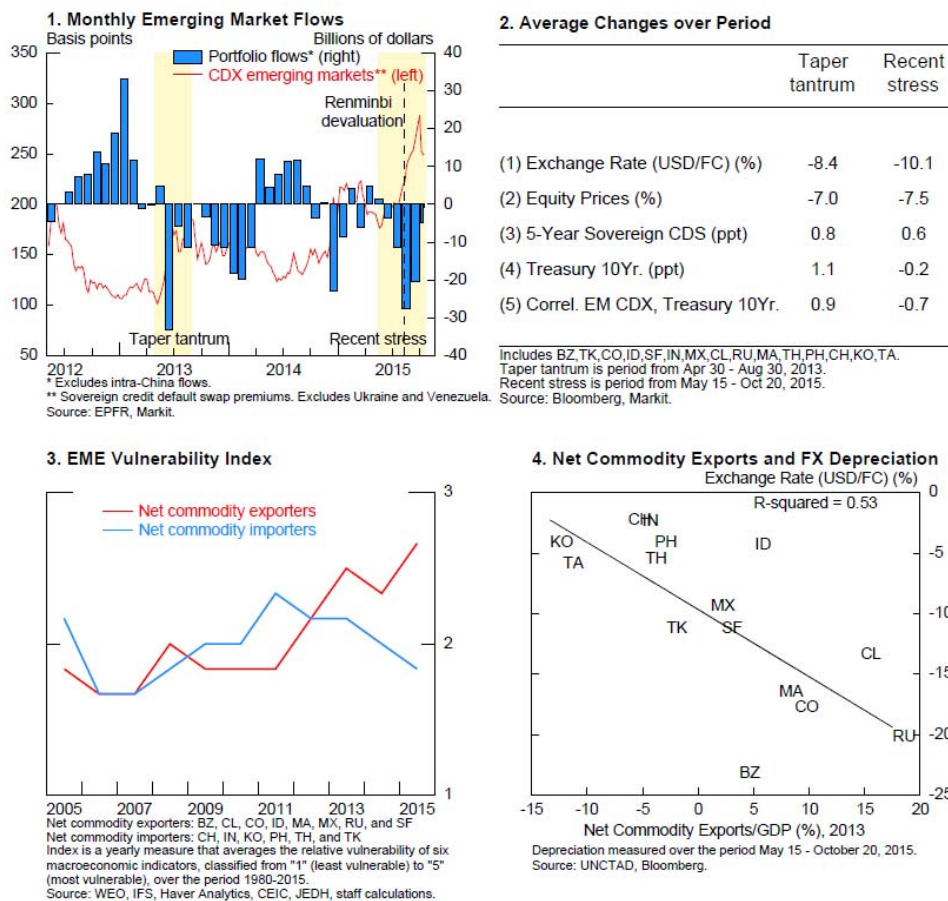
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<sup>1</sup> The vulnerability index is composed of six key macroeconomic and financial indicators: (1) the ratio of the current account to GDP, (2) the ratio of public debt to GDP, (3) the average inflation rate over a three-year window, (4) the ratio of reserves to GDP, (5) the change in the ratio of domestic credit to GDP in the past five years, and (6) the ratio of external debt to total exports (capturing, in part, the risks presented by dollar liabilities). Countries are ranked annually according to these indicators, from "1" (low vulnerability) to "5" (high vulnerability). The index is calculated from 1980 to 2015.

15 percent or more. Idiosyncratic factors have also played an important role in some high-profile EMEs. Political concerns have contributed to the financial market stresses in Malaysia, while the corruption scandal involving the government-owned oil company Petrobras has added to Brazil's stresses. However, many of Brazil's current difficulties are due to structural problems and policy mismanagement, which have resulted in high inflation, excessive credit growth, and high debt levels and have led to its current status as the most vulnerable EME in our sample.

In sum, investor concerns over EMEs appear to reflect a host of factors, including weaker-than-anticipated data releases for EMEs and China, in particular, declines in commodity prices, concerns over emerging market corporate borrowers, and anticipation of U.S. policy normalization. However, the particular strain faced by commodity exporters suggests that concerns over China's growth prospects and those of the global economy more broadly, and over the strength of global commodity demand, likely played the dominant role in driving the recent bout of stress. Going forward, any number of developments could result in additional strains in EMEs, but we are not anticipating a full-blown crisis. That said, we do expect EME growth to remain subdued throughout the forecast, with financial conditions fragile and risks of more disruptive events elevated.

Int'l Econ Devel & Outlook



Note: The following abbreviations are used in the figures: BZ, Brazil; CH, China; CL, Chile; CO, Colombia; ID, Indonesia; IN, India; KO, South Korea; MA, Malaysia; MX, Mexico; PH, Philippines; RU, Russia; SF, South Africa; TA, Taiwan; TH, Thailand; TK, Turkey. The data points for China (CH) and India (IN) overlap in figure 4.

measures in recent months. We have inflation in the region dipping to 1½ percent in the third quarter, reflecting lower retail energy prices and lower food prices in India due to a good harvest. As these effects subside, we expect inflation to rise to around 3¼ percent by the middle of next year.

- **Latin America.** We estimate that in **Mexico**, real GDP edged up to 2¼ percent in the third quarter from 2 percent in the second quarter, as a pickup in U.S. manufacturing production lifted Mexican exports. Indicators of domestic demand were mixed, with vehicle sales strengthening and employment growing despite a continued deterioration in consumer confidence. Overall, we expect growth to remain at 2¼ percent in the fourth quarter and then rise to 3 percent by mid-2016, supported by further growth in U.S. manufacturing, the lagged effects of past currency depreciation, and the 2013 energy-sector reforms.

Mexican inflation edged up to 3 percent in the third quarter, and we expect it to rise a touch further to 3¼ percent by early next year. Given the weak tone of the incoming macro data and subdued inflation, we now expect the Bank of Mexico to wait until the first quarter of 2016 (one quarter later than previously assumed) to hike its policy rate, which currently stands at 3 percent, and we have reduced the pace of tightening thereafter.

In **Brazil**, depressed prices of commodity exports, monetary policy tightening, persistent political tensions, and the associated uncertainty about the fiscal outlook continued to weigh on economic activity. While exports and the PMI improved somewhat late in the third quarter, industrial production, retail sales, and consumer and business confidence fell further. Accordingly, we estimate that real GDP contracted at an annual rate of 4 percent in the third quarter following a 7¼ percent decline in the second quarter. We expect growth to turn positive next year and to pick up to a still sluggish 2 percent in 2017, as the weaker *real* and firming global growth boost exports and monetary policy begins to ease by mid-2016. Despite the weak economy, the substantial depreciation of the *real* and increases in administered prices kept inflation at a

10 percent annual rate in the third quarter. We expect inflation to decline to 5½ percent by mid-2017, reflecting past policy tightening and lower pressure from administered prices.

## ADVANCED FOREIGN ECONOMIES

- **Canada.** Earlier this year, real GDP contracted as low oil prices weighed heavily on investment in the energy sector and wildfires temporarily disrupted energy production. More recently, energy production rebounded and manufacturing activity picked up, leading July monthly GDP to surge at a 4 percent annual rate. Accordingly, we now estimate that GDP grew at a 2½ percent pace in the third quarter, stronger than in the September Tealbook. Looking ahead, we expect growth to average a bit more than 2 percent through 2016, as investment recovers, exports are supported by past currency depreciation, and monetary policy remains accommodative. Thereafter, growth should edge down to a near-potential pace of 1¾ percent by the end of 2017.

We estimate that inflation held steady at 2½ percent in the third quarter, as past currency depreciation boosted core inflation, offsetting the drag from falling retail energy prices. We expect inflation to moderate to 1½ percent in the fourth quarter and then rise to the Bank of Canada's (BOC) 2 percent target by 2017 as the output gap closes and energy prices pick up. With inflation pressures contained, we continue to anticipate that the BOC will not start raising rates until the first quarter of 2017.

On October 19, Canada's Liberal Party was elected to a majority government, ending nearly a decade of Conservative Party rule. Prime Minister-designate Justin Trudeau's platform included stimulating the economy by boosting infrastructure spending and running modest deficits. However, the extent and timing of any additional fiscal stimulus is unclear at this stage.

- **Japan.** We project that real GDP rose  $\frac{1}{2}$  percent in the third quarter following a contraction in the second quarter. Consumption bounced back in August, and the BOJ's Tankan survey indicated that business confidence held up relatively well. However, we marked down our third-quarter growth estimate by  $\frac{3}{4}$  percentage point relative to the September Tealbook, as industrial production unexpectedly declined in August for a second consecutive month. Looking ahead, we continue to expect that GDP growth will rise to 1 percent in 2016, supported by ongoing monetary easing and low oil prices, before a second hike in the consumption tax stalls the expansion in 2017.

The consumer price index appears to have remained flat in the third quarter, and we forecast mild deflation in the current quarter. However, these low inflation readings largely reflect falling retail energy prices. As the effects of past declines in oil prices dissipate and the output gap narrows, we project that inflation (excluding the direct effect of the consumption tax hike) will rise to 1 percent in 2016 and to  $1\frac{1}{4}$  percent in 2017 and 2018. With inflation persistently below the BOJ's 2 percent inflation target, we now anticipate that the Japanese central bank will further expand its asset purchase program in early 2016 and continue to accumulate assets through the end of 2017, one year longer than previously assumed. However, since 10-year sovereign yields have already fallen to about 30 basis points, it is unclear how much scope remains for additional asset purchases to compress yields and boost inflation.

- **Euro Area.** Our GDP forecast for the euro area is little changed. Recent indicators suggest that growth edged up to just above  $1\frac{1}{2}$  percent in the third quarter, supported by firming domestic demand. We expect GDP to grow at about a 2 percent pace over the next three years, supported by ongoing monetary stimulus, past currency depreciation, low oil prices, and easing credit conditions. Headline inflation dropped from  $2\frac{1}{4}$  percent in the second quarter to negative  $\frac{1}{4}$  percent in the third quarter, reflecting a sharp decline in retail energy prices; core inflation remained stable at  $1\frac{1}{4}$  percent. As the drag

from energy prices moderates and the output gap narrows, we expect headline inflation to rise to a  $\frac{1}{4}$  percent pace in the fourth quarter and then to  $1\frac{3}{4}$  percent by the end of 2018. This projection is about  $\frac{1}{2}$  percentage point lower for the fourth quarter and little changed thereafter. We continue to expect the European Central Bank to purchase assets for at least a few months beyond September 2016, the originally intended end date for the asset purchase program, and to keep its main policy rate near zero until the second half of 2018.<sup>2</sup>

In **Greece**, Prime Minister Alexis Tsipras's Syriza party won national parliamentary elections by a surprisingly large margin and formed a new government. Subsequently, the Greek government legislated a new package of fiscal consolidation measures and began preparing a new legal framework for bank recapitalization. Both are important steps toward unlocking another disbursement of official financing, but negotiations over the disbursement have not yet concluded.

- **United Kingdom.** Recent economic indicators have been mixed, with industrial production growing robustly while the services PMI and consumer confidence have weakened. All told, we estimate that GDP growth remained at a  $2\frac{1}{2}$  percent pace in the third quarter, and we expect growth to continue near that pace throughout the forecast period. Consumer prices rose at a 1 percent pace in the third quarter,  $\frac{3}{4}$  percentage point below our September Tealbook projection, as retail energy prices fell more sharply than expected. Given recent declines in retail energy prices, we project inflation to slow to  $\frac{1}{2}$  percent in the fourth quarter. Inflation should rise to the BOE's 2 percent target by 2017, as the effects of past oil price declines dissipate and slack in the economy is eliminated. With recent improvements in productivity boosting potential output and suggesting that resource slack may erode more

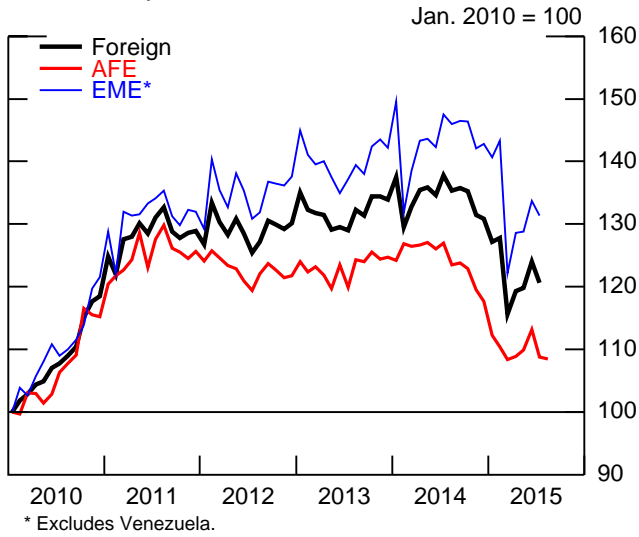
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<sup>2</sup> When President Draghi announced the expanded asset purchase program on January 22, 2015, he said asset purchases "are intended to be carried out until end-September 2016 and will in any case be conducted until we see a sustained adjustment in the path of inflation which is consistent with our aim of achieving inflation rates below, but close to, 2 percent over the medium term."

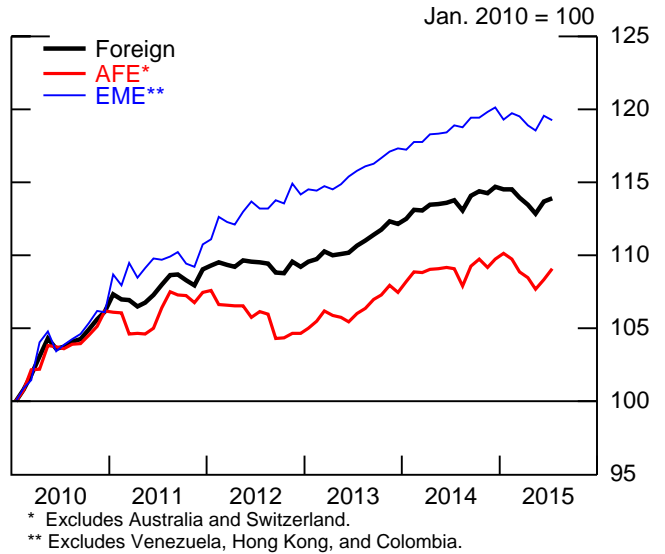
slowly than previously expected, we now assume that the BOE will wait until the second quarter of 2016 to raise its policy rate, one quarter later than previously assumed.

### Recent Foreign Indicators

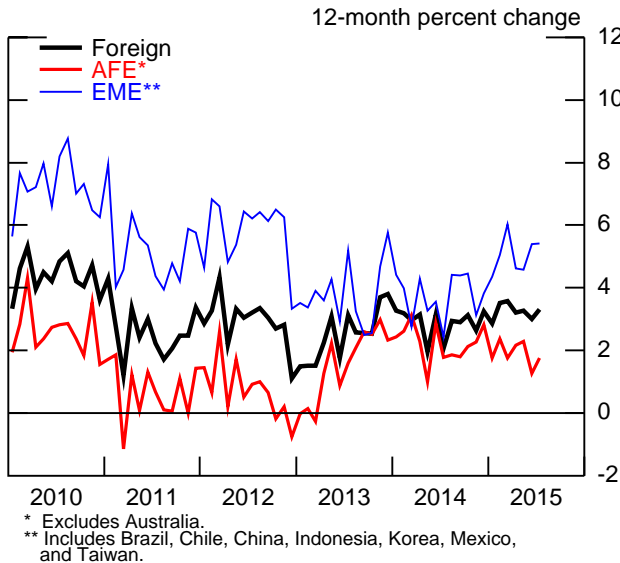
Nominal Exports



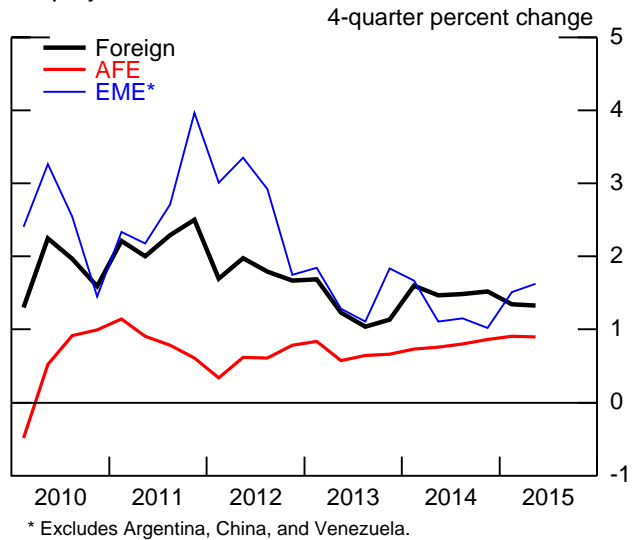
Industrial Production



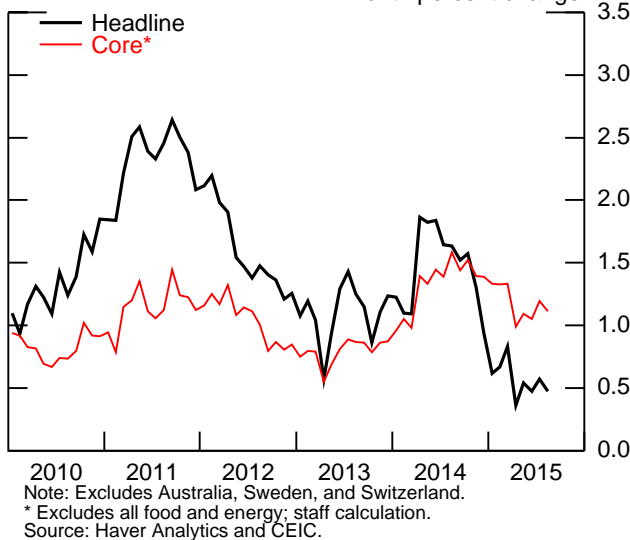
Retail Sales



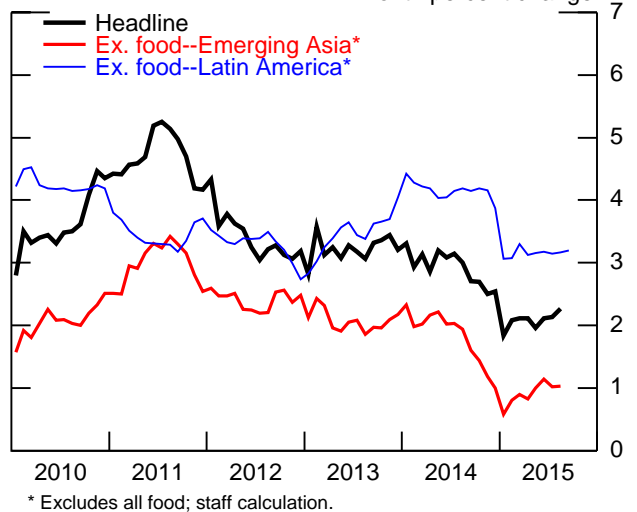
Employment



Consumer Prices: Advanced Foreign Economies



Consumer Prices: Emerging Market Economies



Int'l Econ Devel & Outlook



# The Foreign GDP Outlook

**Real GDP\***

Percent change, annual rate

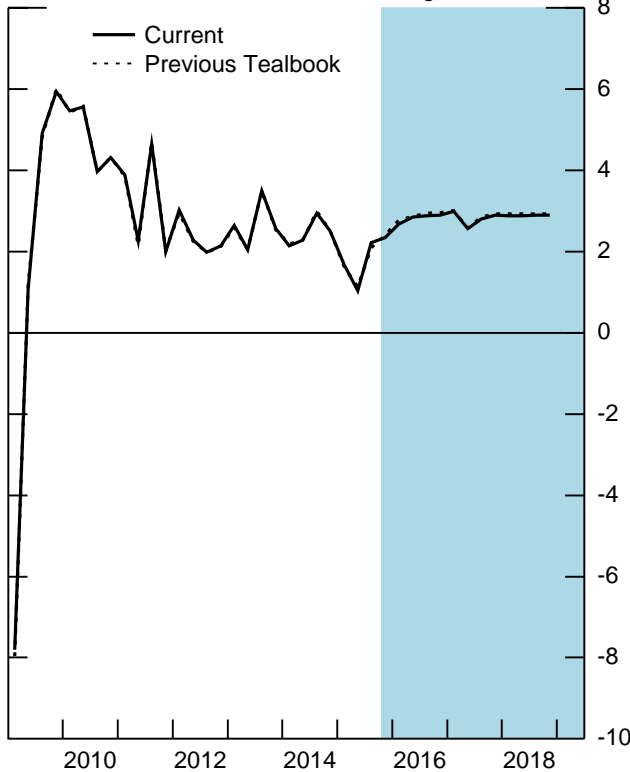
	2014	2015			2016		2017	2018
		H1	Q3	Q4	H1	H2		
<b>1. Total Foreign</b>	<b>2.5</b>	<b>1.4</b>	<b>2.2</b>	<b>2.3</b>	<b>2.8</b>	<b>2.9</b>	<b>2.8</b>	<b>2.9</b>
<i>Previous Tealbook</i>	2.5	1.4	2.1	2.4	2.8	3.0	2.8	2.9
<b>2. Advanced Foreign Economies</b>	<b>1.7</b>	<b>0.6</b>	<b>1.9</b>	<b>1.7</b>	<b>2.0</b>	<b>2.1</b>	<b>1.8</b>	<b>1.9</b>
<i>Previous Tealbook</i>	1.7	0.6	1.7	1.8	2.0	2.1	1.8	1.9
3. Canada	2.5	-0.7	2.4	2.0	2.2	2.2	1.9	1.8
4. Euro Area	0.9	1.8	1.6	1.6	1.8	2.0	2.0	2.0
5. Japan	-0.8	1.6	0.4	0.7	1.0	1.2	-0.3	1.0
6. United Kingdom	3.0	2.1	2.5	2.5	2.7	2.7	2.4	2.4
<b>7. Emerging Market Economies</b>	<b>3.2</b>	<b>2.0</b>	<b>2.5</b>	<b>2.9</b>	<b>3.5</b>	<b>3.7</b>	<b>3.8</b>	<b>3.9</b>
<i>Previous Tealbook</i>	3.2	2.1	2.5	3.0	3.6	3.8	3.8	3.9
8. China	7.2	6.5	7.4	6.5	6.2	6.2	6.1	6.0
9. Emerging Asia ex. China	3.4	2.5	2.5	3.6	4.0	4.1	4.1	4.0
10. Mexico	2.6	1.9	2.3	2.2	2.9	3.1	3.1	3.2
11. Brazil	-0.3	-5.1	-4.1	-0.9	0.7	1.2	2.0	2.1

\* GDP aggregates weighted by shares of U.S. merchandise exports.  
 ... Not applicable.

Int'l Econ Devel & Outlook

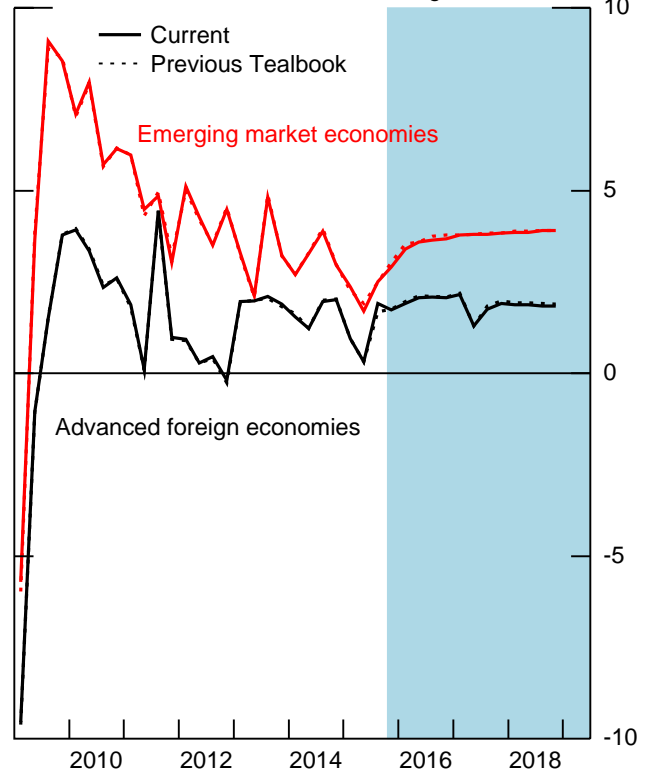
**Total Foreign GDP**

Percent change, annual rate



**Foreign GDP**

Percent change, annual rate



# The Foreign Inflation Outlook

## Consumer Prices\*

Percent change, annual rate

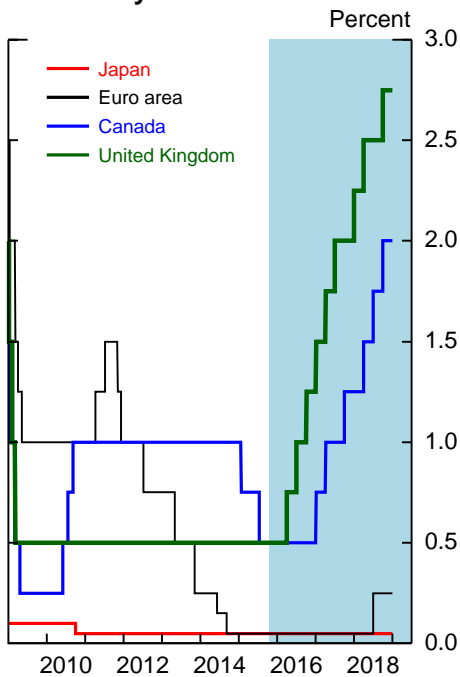
	2014	2015			2016		2017	2018
		H1	Q3	Q4	H1	H2		
<b>1. Total Foreign</b>	<b>2.0</b>	<b>1.3</b>	<b>2.0</b>	<b>1.7</b>	<b>2.3</b>	<b>2.4</b>	<b>2.6</b>	<b>2.5</b>
<i>Previous Tealbook</i>	2.0	1.2	2.3	2.0	2.3	2.4	2.6	2.5
<b>2. Advanced Foreign Economies</b>	<b>1.2</b>	<b>0.6</b>	<b>0.7</b>	<b>0.5</b>	<b>1.3</b>	<b>1.5</b>	<b>1.9</b>	<b>1.7</b>
<i>Previous Tealbook</i>	1.2	0.6	0.6	0.9	1.3	1.5	1.9	1.7
3. Canada	1.9	1.1	2.4	1.5	1.6	1.8	2.0	2.0
4. Euro Area	0.2	0.5	-0.3	0.3	1.3	1.5	1.5	1.6
5. Japan	2.5	0.7	0.0	-0.5	0.6	1.0	2.5	1.3
6. United Kingdom	0.9	-0.2	1.0	0.6	1.7	1.9	2.0	2.0
<b>7. Emerging Market Economies</b>	<b>2.6</b>	<b>1.9</b>	<b>3.0</b>	<b>2.7</b>	<b>3.1</b>	<b>3.1</b>	<b>3.1</b>	<b>3.1</b>
<i>Previous Tealbook</i>	2.6	1.7	3.6	2.9	3.0	3.1	3.1	3.1
8. China	1.5	1.4	3.3	1.9	2.5	2.5	2.5	2.5
9. Emerging Asia ex. China	2.2	1.4	1.6	2.6	3.0	3.2	3.3	3.3
10. Mexico	4.2	1.8	2.9	3.1	3.3	3.3	3.3	3.3
11. Brazil	6.6	10.6	10.1	7.6	6.4	6.2	5.5	5.4

\* CPI aggregates weighted by shares of U.S. non-oil imports.  
 ... Not applicable.

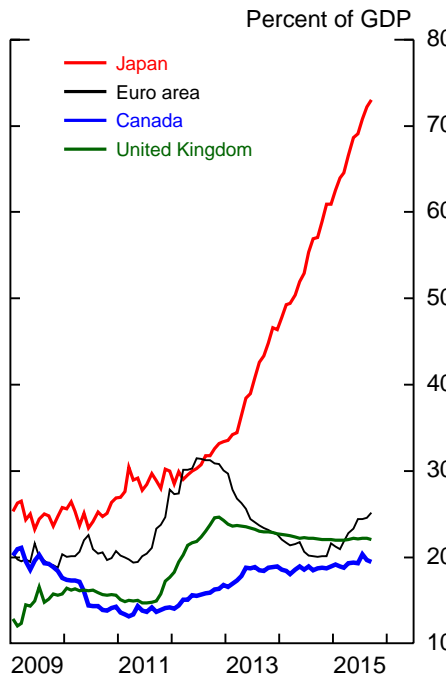
Int'l Econ Devel & Outlook

## Foreign Monetary Policy

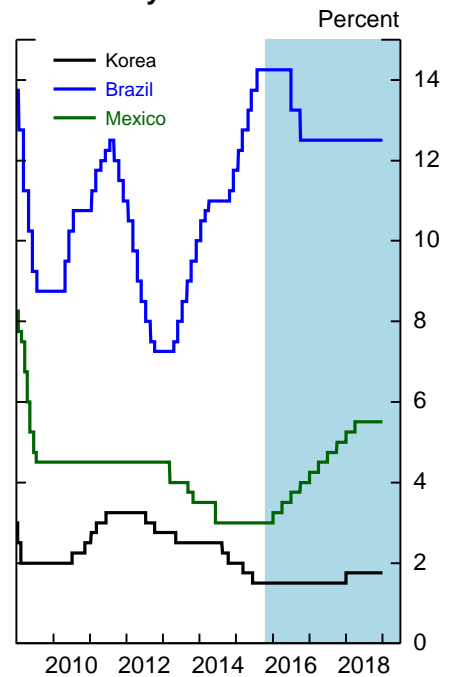
**AFE Policy Rates**



**AFE Central Bank Balance Sheets**

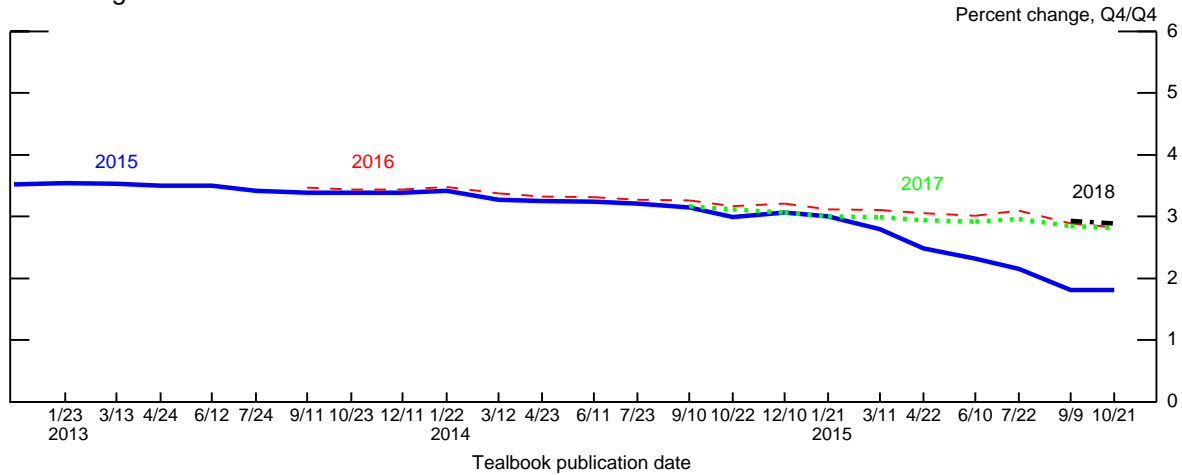


**EME Policy Rates**

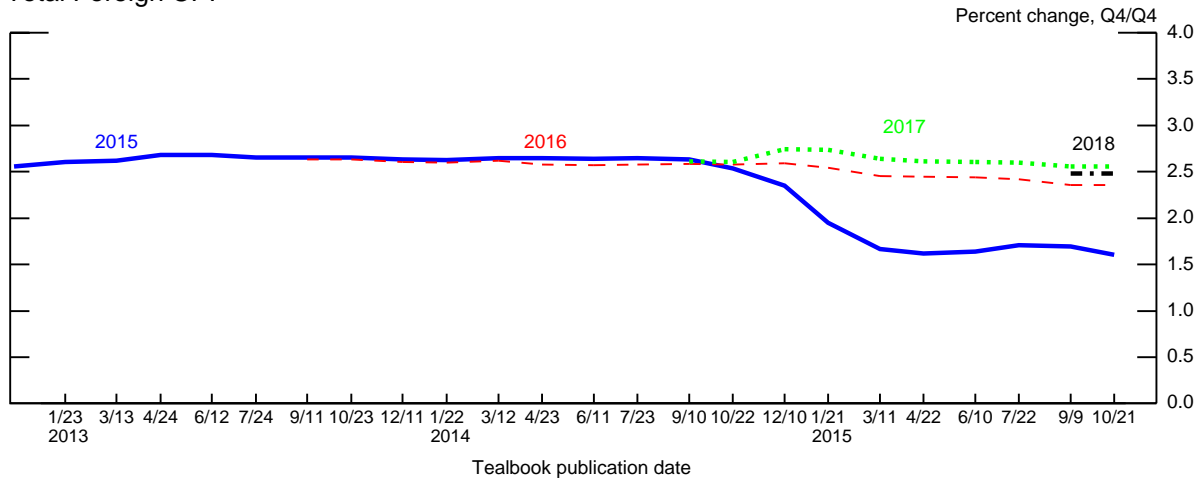


### Evolution of Staff's International Forecast

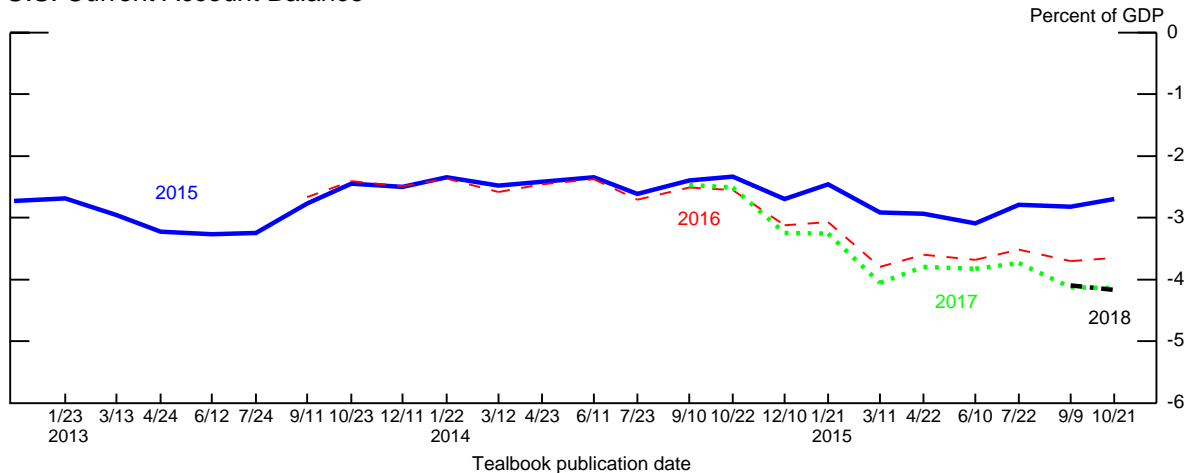
Total Foreign GDP



Total Foreign CPI



U.S. Current Account Balance



## Financial Developments

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Continued concerns about the global growth outlook weighed on market sentiment early in the intermeeting period, but sentiment improved somewhat in recent weeks. Following the weaker-than-expected September employment report, market participants shifted their expectations toward a later timing of policy rate liftoff as well as a more accommodative path for monetary policy further out. Financing conditions for most businesses and households remained generally accommodative but tightened somewhat for businesses with lower credit quality.

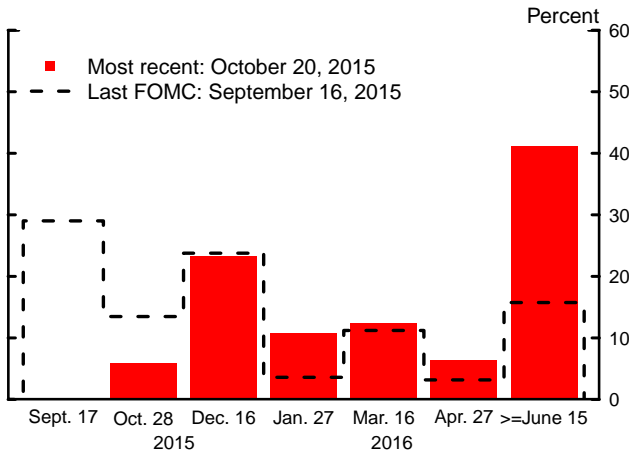
- The odds that market participants assigned to an initial increase in the federal funds rate target range occurring by year-end declined notably, and the expected path of the federal funds rate over the next few years implied by OIS quotes flattened.
- TIPS-based measures of inflation compensation declined on net. The 5-to-10-year measure of TIPS-based inflation compensation hit a new post-crisis low early in the period but bounced back somewhat in recent weeks (see the box on inflation compensation later in this section).
- The staff's broad index of the foreign exchange value of the dollar declined about 1 percent on net.
- The VIX moved down, on balance, and ended the period near the middle of its range over the past few years. The S&P 500 index was up slightly on net.
- Spreads on investment-grade bonds rose a bit, while those on speculative-grade bonds increased notably, reaching near the top of their range since mid-2012.
- On net, banks reportedly eased lending standards for several categories of loans to households and experienced increased loan demand across most major loan portfolios during the third quarter.<sup>1</sup>
- Reflecting the possibility of the Treasury Department exhausting its extraordinary measures and cash in mid-November, Treasury bill yields for securities maturing around the estimated breach date have begun to increase (see the box on the debt ceiling later in this section).

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<sup>1</sup> See Rebecca Zarutskie (2015), "The October 2015 Senior Loan Officer Opinion Survey on Bank Lending Practices," memorandum to the FOMC, October 22.

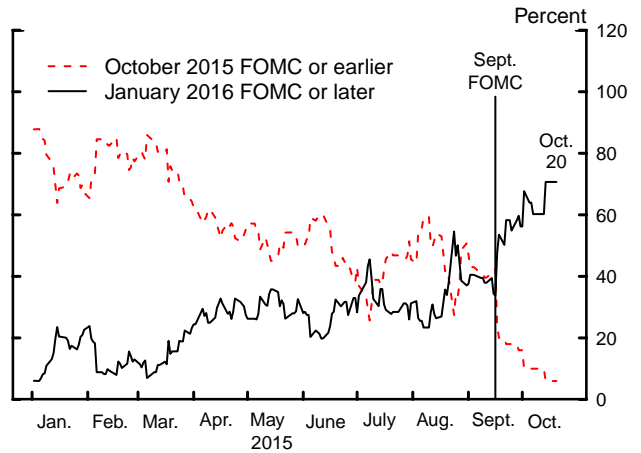
### Policy Expectations

Implied Probability Distribution of Liftoff



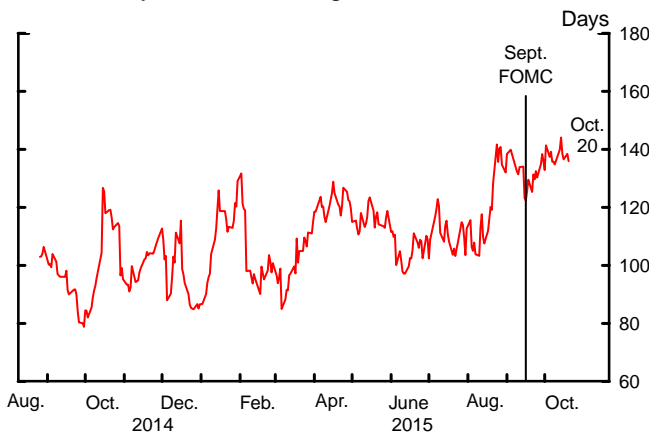
Note: Implied by federal funds futures. Assumes that investors expect the federal funds rate to trade around 37.5 basis points after liftoff.  
Source: CME Group.

Implied Probability of Liftoff



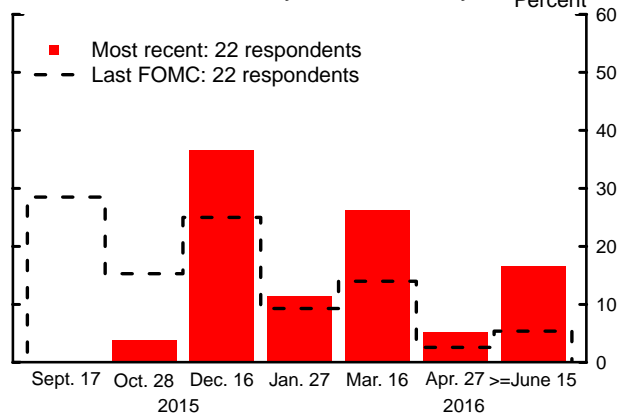
Note: Implied by federal funds futures. Assumes that investors expect the federal funds rate to trade around 37.5 basis points after liftoff.  
Source: CME Group.

Uncertainty of Liftoff Timing



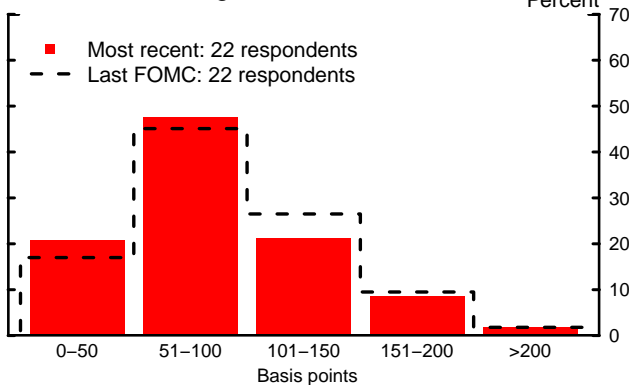
Note: Implied by federal funds futures. Standard deviation (in days) of the date of liftoff as implied by rates on federal funds futures contracts.  
Source: CME Group.

Distribution of Expected Timing of First Rate Increase from the Desk's Primary Dealer Survey



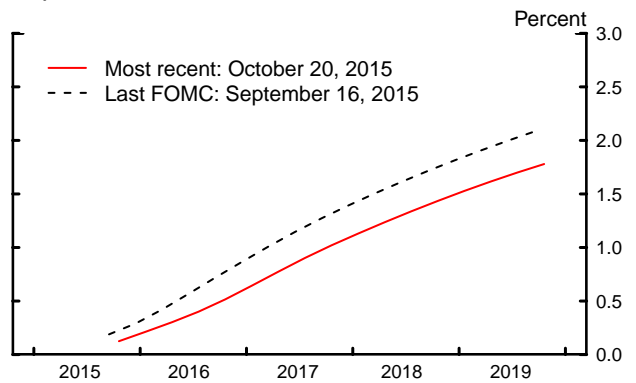
Note: Average across dealers of their individual probabilities attached to the first tightening occurring at a particular meeting. For June 2016, expected timing is during or after that meeting.  
Source: Desk's primary dealer survey from October 20, 2015.

Conditional Pace of Tightening, First Year following Liftoff



Note: Distribution conditional on the federal funds rate not returning to its zero lower bound.  
Source: Desk's primary dealer survey from October 20, 2015.

Implied Federal Funds Rate



Note: Path is estimated using overnight index swap quotes with a spline approach and a term premium of zero basis points.  
Source: Bloomberg; staff estimates.

## POLICY EXPECTATIONS AND TREASURY YIELDS

Federal Reserve communications and economic data releases over the intermeeting period appeared to have led investors to scale back their expectations of liftoff before year-end. September FOMC communications were viewed by market participants as more accommodative than expected. Although the FOMC's decision to retain the target range of 0 to ¼ percent for the federal funds rate was largely consistent with investors' modal expectations, material odds had been attached to a September liftoff. Investors also apparently interpreted the statement as signaling increased concerns among FOMC members about downside risks to the U.S. economic outlook associated with recent global and financial developments. Although market participants took note of comments by several policymakers over the intermeeting period, including the Chair's remarks on September 24, that a first interest rate increase remained likely by year-end, the weaker-than-expected employment report and retail sales release for September and subsequent communications by FOMC members led investors to further revise down expectations for an interest rate hike this year.

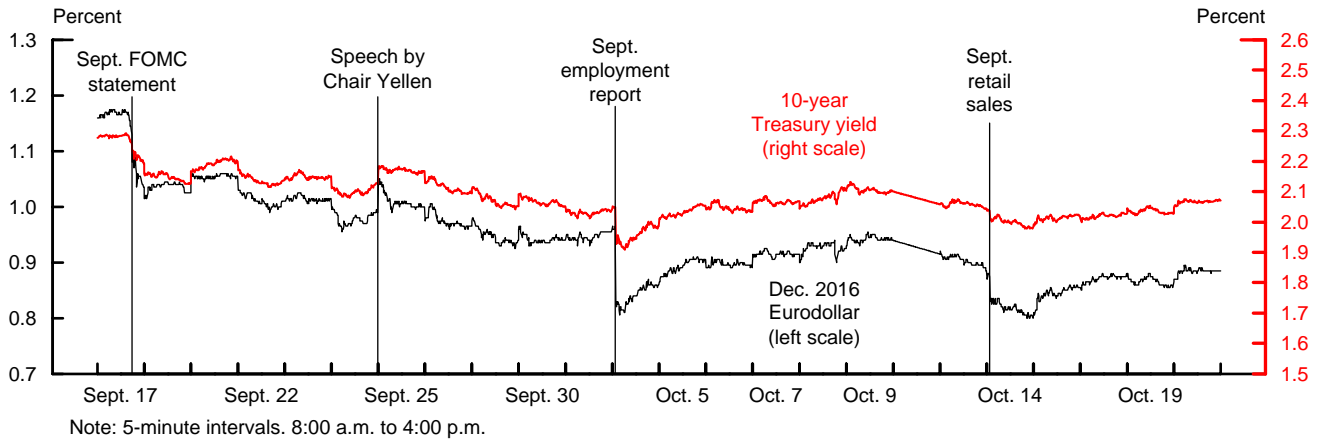
According to federal funds futures quotes, investors now see about a 30 percent chance of liftoff occurring before year-end, down from about 65 percent just prior to the September FOMC meeting, while the likelihood of liftoff occurring at or after the March 2016 meeting rose. The expected federal funds rate path implied by OIS quotes flattened notably over the intermeeting period, with the expected rate at the end of 2016 and at the end of 2017 declining 27 basis points and 30 basis points, respectively.

Similar to financial market quotes, the average probability distribution from the Desk's October surveys of primary dealers and market participants shifted toward later liftoff dates relative to the September surveys. The average probability assigned to a December liftoff increased to 35 percent from 27 percent, and the average probability assigned to liftoff in March or later increased to 50 percent from 21 percent. The average pace of tightening in the first two years following liftoff, conditioned on not returning to the zero lower bound, declined somewhat.

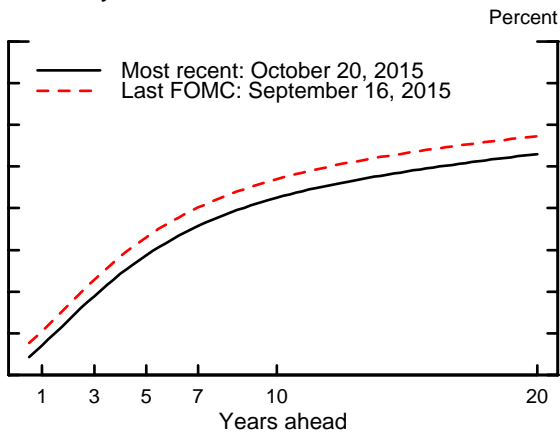
Nominal Treasury yields fell further over the intermeeting period, reflecting the overall more-accommodative-than-anticipated FOMC communications, global growth concerns, and the generally weaker-than-expected economic data releases. Yields on 2-, 5-, and 10-year nominal Treasury securities declined 18, 21, and 22 basis points,

### Treasury Yields

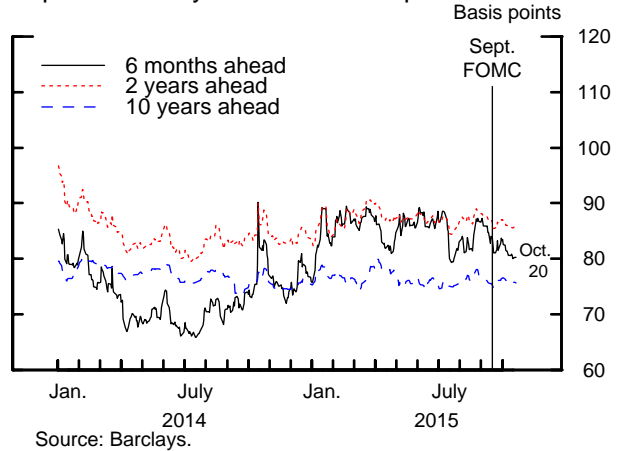
#### Selected Interest Rates



#### Treasury Yield Curve



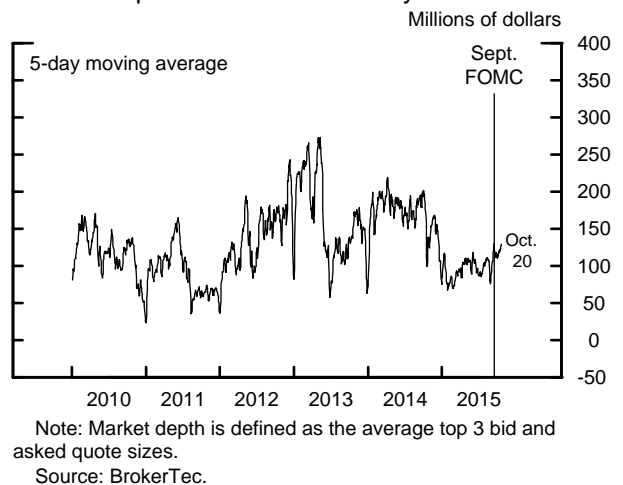
#### Implied Volatility on 10-Year Swap Rate



#### Inflation Compensation



#### Market Depth in 10-Year Treasury



Financial Developments

respectively. Near-term uncertainty about longer-term interest rates, measured by 6-month-ahead swaption-implied volatilities on the 10-year swap rate, edged down.

The 5- and 5-to-10-year measures of TIPS-based inflation compensation posted further declines on net. Early in the intermeeting period amid global growth concerns, the 5-to-10-year measure hit a new post-crisis low before bouncing back somewhat, together with risk asset prices. (See the box “The Recent Decline in Longer-Horizon Inflation Compensation.”) Inflation compensation measures based on inflation swaps posted similar changes.

MBS yields declined about in line with the 10-year Treasury yield, while option-adjusted spreads on production-coupon MBS posted somewhat mixed changes. Liquidity conditions in the Treasury and MBS markets remained stable over the intermeeting period.<sup>2</sup>

Market participants were attentive to Treasury Secretary Lew’s announcement that the Treasury expects to exhaust extraordinary measures that allow it to operate under the statutory debt limit no later than November 3, at which point it anticipates having less than \$30 billion in cash on hand. The staff anticipates that the Treasury can continue operations with these funds until mid-November without breaching the debt ceiling. At present, Treasury bill yields for securities maturing around that time have begun to increase. However, CDS spreads on U.S. government debt have been little changed, and the gross notional amount of U.S. government CDS outstanding has continued to edge down. Even so, the Treasury’s reduction in bill issuance to keep under the debt ceiling has reportedly put some downward pressure on secured money market rates. Moreover, considerable uncertainty remains as to the resolution of the debate and its potential effects on financial markets. (See the box “Debt Ceiling Update and Review of 2013 Episode.”)

## FOREIGN DEVELOPMENTS

The dollar waxed and waned over the intermeeting period as markets alternately focused on concerns about growth abroad and changing expectations for U.S. monetary policy. On net, the dollar depreciated 1 percent against the currencies in the staff’s broad

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<sup>2</sup> Since the September FOMC meeting, the Treasury has auctioned \$148 billion of Treasury nominal fixed-rate securities, \$13 billion in Treasury Inflation-Protected Securities, and \$13 billion of two-year Floating Rate Notes.

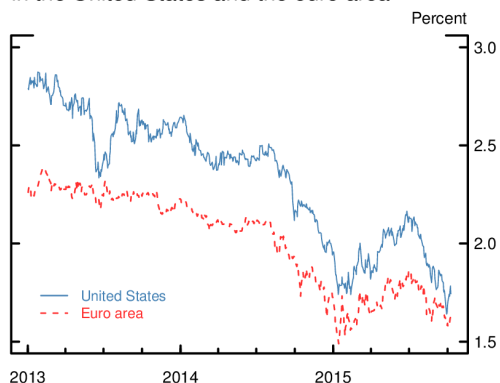


## The Recent Decline in Longer-Horizon Inflation Compensation

Measures of 5-to-10-year inflation compensation from TIPS and from inflation swaps have declined notably, on net, since August 2014. After rebounding somewhat earlier this year, they have fallen further since early July and reached new historic lows in late September. Similar movements are observed for longer-horizon inflation compensation in the euro area (figure 1). Over the same period, the price for oil declined more than 50 percent, and the dollar strengthened significantly (figure 2).

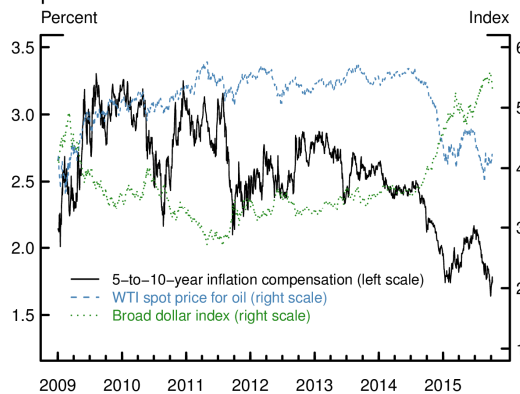
The positive co-movement between the price for oil and longer-horizon inflation compensation and the negative relationship between inflation compensation and the dollar are puzzling, as one would expect lower energy or import prices to affect near- to intermediate-term inflation expectations but not those further out. One explanation is that these correlations may reflect a common factor—risk sentiment—that drives all three asset prices.<sup>1</sup> Indeed, a closer look at the daily price movements since mid-2014 indicates that the positive correlation between oil prices and inflation compensation occurred mostly on days when oil and equity prices and Treasury yields showed large declines and the dollar appreciated, likely reflecting deteriorating risk sentiment.<sup>2</sup> In addition, a regression of daily changes in longer-horizon inflation compensation on daily changes in oil prices and in the VIX—a popular proxy for time-varying risk aversion—shows that changes in the VIX have significant explanatory power for changes in inflation compensation, and the estimated sensitivity of inflation compensation to oil price changes is substantially reduced once the VIX is included.<sup>3</sup>

Figure 1: 5-to-10-year inflation compensation in the United States and the euro area



Source: Barclays.

Figure 2: 5-to-10-year inflation compensation, price for oil and the dollar



Note: Shows standardized values of WTI spot price for oil and the nominal broad dollar index.

Source: Barclays; Bloomberg.

<sup>1</sup> According to some market participants, another possible reason for the pass-through from lower oil prices and a stronger dollar to longer-horizon inflation compensation is that, in response to changes in the near-term inflation outlook, investors are more likely to adjust their positions in the more liquid longer-term TIPS, resulting in changes in inflation compensation further out.

<sup>2</sup> Alejandro Perez-Segura and Robert Vigfusson's October 15, 2015, staff memo, "The Relationship between Oil Prices and Inflation Compensation," refers to oil price changes on days when oil, stock, and metal prices move in the same direction as those that are "demand-induced."

<sup>3</sup> Use of daily S&P 500 returns instead of the VIX leads to qualitatively similar results. Moreover, the correlation between VIX/equity prices and inflation compensation has gotten stronger lately amid ongoing concerns about the global outlook, especially China.

There are two mechanisms through which shifting risk sentiment could affect 5-to-10-year inflation compensation. First, safe-haven flows into nominal Treasury securities amid rising risk aversion could push down nominal Treasury yields and inflation compensation. This effect would be captured as a decline in the “other risk premium” component of inflation compensation, reflecting mostly technical factors such as the relative liquidity of, and the relative supply of and demand for, nominal and TIPS securities. Second, episodes of deteriorating risk sentiment may also be accompanied by increasing concerns about the tail risk of persistent deflation, which could be associated with declines in inflation expectations and inflation risk premium.

To disentangle these two channels, we estimate a structural vector autoregression (VAR) model on measures of the macroeconomic outlook for the United States and for emerging market economies (EME), the VIX, and inflation compensation from the United States and euro area.<sup>4</sup> A decomposition based on the model suggests that shocks to the EME economic outlook and flight-to-safety shocks each explain about one-fourth of the decline in 5-to-10-year U.S. inflation compensation since August 2014. Residual shocks to U.S. and euro-area inflation compensation also explain a sizable portion, possibly reflecting, in part, global deflationary pressures weighing on inflation expectations and inflation risk premiums.<sup>5</sup> These assessments seem largely consistent with results from the staff’s standard term structure model, which indicate that three basic components of 5-to-10-year inflation compensation—inflation expectations, inflation risk premiums, and other risk premiums—declined about 11, 20, and 42 basis points, respectively, since August 2014.

On balance, both the empirical analysis reported here and the staff’s standard term structure model suggest that long-term inflation expectations embedded in asset prices may have edged down modestly over the past year. Other factors such as changes in risk sentiment seem to account for the bulk of the observed decline in inflation compensation over this period. However, conclusions on this score can be sensitive to model assumptions. In particular, the staff’s standard term structure model assumes that inflation will ultimately revert to its average value during the period over which the model is estimated, thereby constraining the degree to which long-horizon inflation expectations can decline. An alternative version of the staff’s term structure model that allows some of the shocks to have permanent effects on inflation produces estimates of a decline in longer-term inflation expectations since August of 2014 of around 50 basis points—much larger than the 11 basis point decline from the standard model. While this estimate should probably be regarded as an upper bound on the decline in the “true” underlying longer-term inflation expectations embedded in asset prices, the results suggest that the decline in longer-term inflation compensation observed over recent quarters could reflect a larger decline in inflation expectations than many other model- or survey-based measures would suggest.

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<sup>4</sup> The variables are the Citigroup Economic Surprise indexes for the United States and the BRIC countries (Brazil, Russia, India, and China), the log of VIX, and 5-to-10-year inflation compensation for the United States and the euro area. The VAR is estimated using weekly data from January 2009 to October 2015 and includes one lag of each variable. We assume that the VAR is driven by three structural shocks—shocks to both the domestic and emerging economy economic outlooks, and a flight-to-safety shock—as well as two shocks reflecting fluctuations in U.S. and euro-area inflation compensation not explained by the structural shocks. For example, the residual shock to euro-area inflation compensation might reflect revisions in the euro-area growth and inflation outlook as well as ECB monetary policy shocks.

<sup>5</sup> The staff’s March 2015 memorandum to the FOMC, “Recent Declines in Long-Term Interest Rates: Causes and Possible Implications,” also finds evidence that flight-to-safety shocks and concerns about global growth were important contributors to the decline in U.S. nominal long-term rates in 2014.

## Debt Ceiling Update and Review of 2013 Episode

The U.S. Treasury is operating under a debt issuance suspension period (DISP) and using extraordinary measures to avoid breaching the statutory debt limit of \$18.1 trillion.<sup>1</sup> The Treasury has announced that it expects to exhaust extraordinary measures on November 3. According to Board staff estimates, the Treasury can continue operations with the cash it has on hand without breaching the debt ceiling until mid-November. However, forecasts for the breach date are inherently uncertain, in part reflecting difficulties in predicting the issuance of nonmarketable Treasury debt.<sup>2</sup>

Strains in the Treasury bill market may be starting to emerge, with yields of Treasury bills maturing around mid-to-late November moving up roughly 10 basis points this week. Other signs of stress are not yet evident; in past debt limit episodes, stresses in broader markets did not emerge until around one to two weeks before the debt limit breach appeared imminent. Financial market effects observed in the 2013 episode included the following:

- Treasury bill yields of at-risk securities rose; notably, those securities maturing a few weeks after the projected debt-breach date of October 17, 2013, saw yields spike almost 50 basis points. Treasury bill auctions saw reduced demand, and liquidity in the T-bill market reportedly deteriorated.
- In secured dollar funding markets, overnight and term general collateral repo rates on Treasury and agency mortgage-backed securities (MBS) collateral rose markedly. Rates on unsecured commercial paper (CP) rose sharply as well, and financial CP outstanding declined in the days immediately before the deadline. By contrast, federal funds and Eurodollar markets showed little reaction to debt ceiling concerns.
- U.S. sovereign credit default swap (CDS) spreads increased notably, and the gross notional amount of U.S. CDS outstanding rose.
- Outflows from institutional taxable money market funds (MMFs) accelerated in the two weeks before the deadline, amounting to \$70 billion in aggregate. Market participants noted that the sharp rise in short-dated T-bill yields likely was due in part to MMFs offloading at-risk securities. MMFs' aggregate

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<sup>1</sup> On March 16, 2015, the Treasury declared a five-month DISP that was extended by three months on July 30, 2015. The Treasury is allowed to use extraordinary measures to avoid breaching the statutory debt limit. The Treasury has announced that the measures include suspending daily reinvestment of the Treasury securities held by the Government Securities Investment Fund (\$194 billion), redeeming existing investments and suspending new investment in the Civil Service Retirement and Disability Fund (\$170 billion), suspending the daily reinvestment of dollar balances held by the Exchange Stabilization Fund (\$23 billion), and suspending new investment in the Postal Service Retiree Health Benefits Fund (\$5 billion).

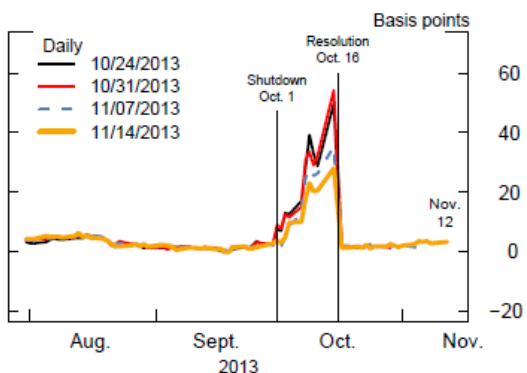
<sup>2</sup> Nonmarketable debt includes the Federal Old-Age and Survivors Insurance Trust Fund (Social Security) and the Civil Service Retirement and Disability Fund.

holdings of Treasury securities declined notably leading up to the deadline; MMFs also pared back their holdings of CP.

- Consistent with these MMF outflows, deposit and reserve balances rose sharply at custodian banks, as custodian bank deposits appeared to serve as a temporary investment vehicle during this time.
- With respect to operational issues, reports emerged of market participants, including central clearing counterparties, considering amending legal documentation to exclude certain at-risk securities from eligibility as collateral. Three exchanges announced other margin and haircut changes.<sup>3</sup> In addition, analysts expressed some uncertainties about the eligibility of at-risk securities at the Federal Reserve’s discount window and in open market operations.

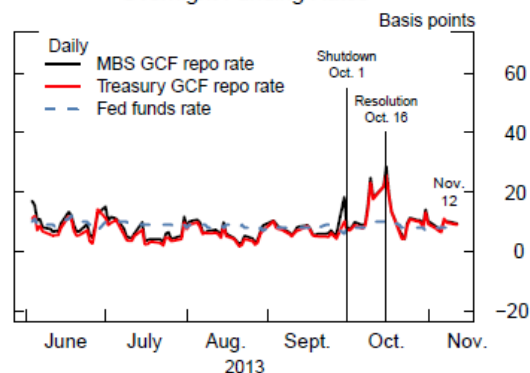
Before an agreement was reached, the FOMC held a videoconference meeting on October 16, 2013, to discuss contingencies in the event that the debt limit was not raised. The minutes of this meeting were included in the October 2013 FOMC minutes and noted that “Meeting participants saw no legal or operational need in the event of delayed payments on Treasury securities to make changes to the conduct or procedures employed in currently authorized Desk operations, such as open market operations, large-scale asset purchases, or securities lending, or to the operation of the discount window. They also generally agreed that the Federal Reserve would continue to employ prevailing market values of securities in all its transactions and operations, under the usual terms.”<sup>4</sup>

Treasury Bill Yields Maturing over Projected Breach Date



Note: Daily average of all Treasury bill yields maturing on the listed days.  
Source: Federal Reserve Bank of New York.

Overnight Funding Rates



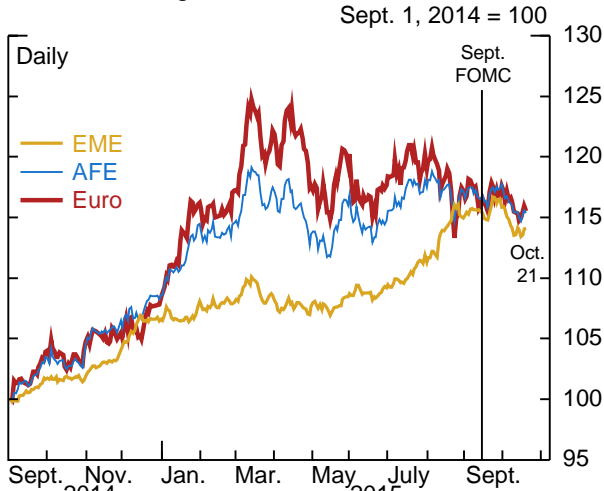
Note: GCF is General Collateral Finance.  
Source: Depository Trust & Clearing Corporation; Bloomberg; Federal Reserve.

<sup>3</sup> The Hong Kong Exchange increased haircuts on U.S. Treasury bills from 1 percent to 3 percent on October 10, 2013, while the Intercontinental Exchange raised haircuts on U.S. Treasury notes and bonds on October 17, 2013. On October 15, 2013, the Chicago Mercantile Exchange announced a temporary increase in margin requirements on over-the-counter interest rate swaps.

<sup>4</sup> The minutes also noted that “Supervisory policy would take into account and make appropriate allowance for unusual market conditions.” For the full text, see the October 2013 FOMC minutes, [www.federalreserve.gov/monetarypolicy/fomcminutes20131030.htm](http://www.federalreserve.gov/monetarypolicy/fomcminutes20131030.htm).

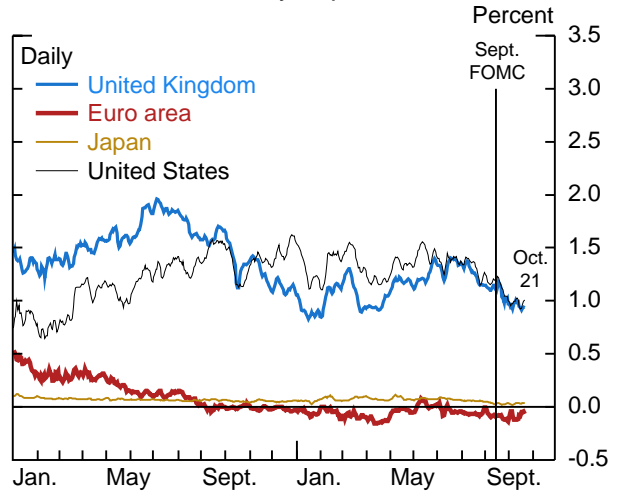
### Foreign Developments

Dollar Exchange Rate Indexes



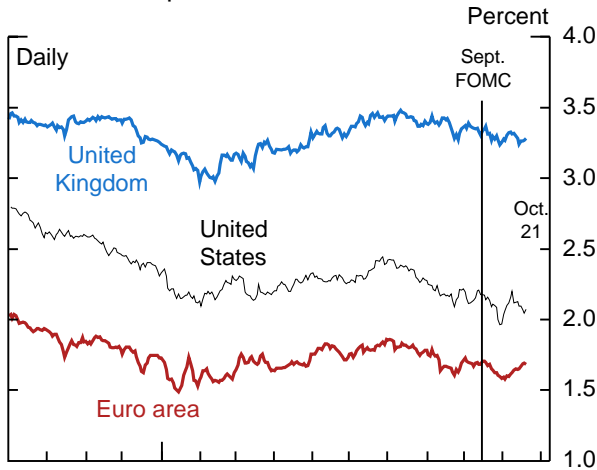
Source: Federal Reserve Board; Bloomberg.

24-Month-Ahead Policy Expectations



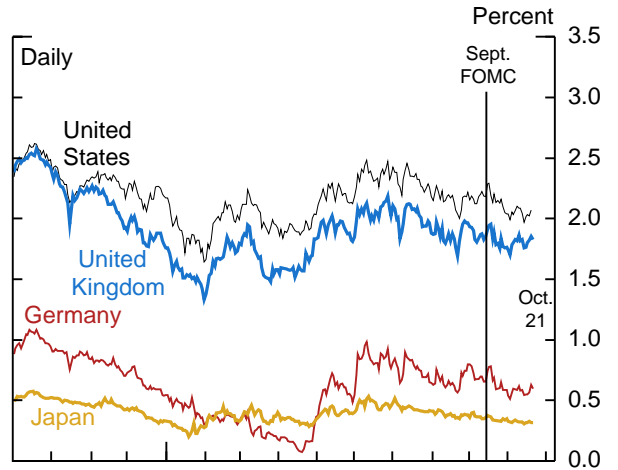
Note: 1-month forward rates from OIS quotes, 3-day moving average. Source: Bloomberg.

Inflation Compensation: 5-Year, 5-Year Forward



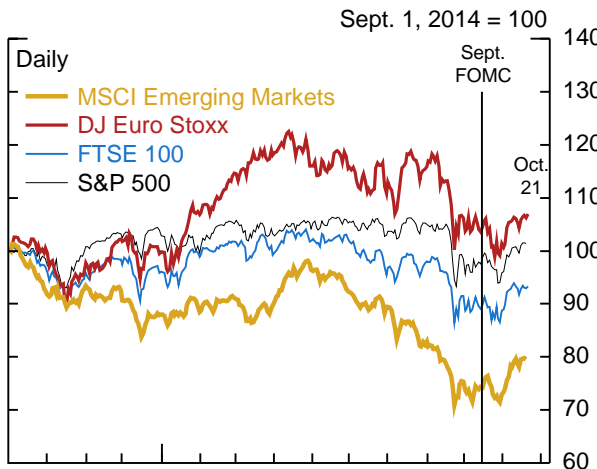
Source: Barclays.

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



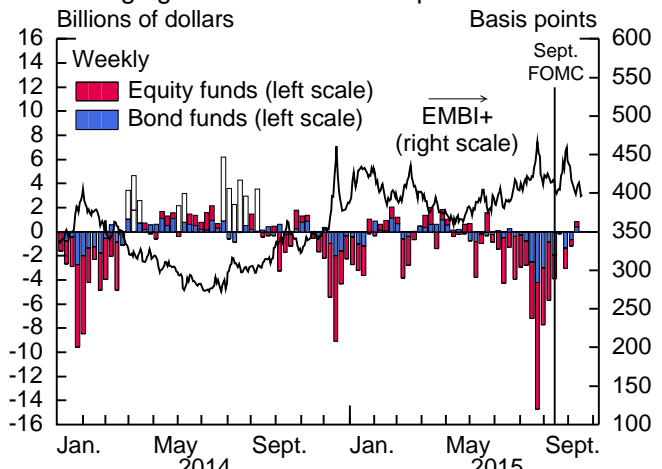
Source: Bloomberg.

Stock Price Indexes



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.

Financial Developments

dollar index. The appreciation of the dollar early in the period amid global growth concerns was more than offset by the depreciation following the release of the weaker-than-expected U.S. employment report. After significant and broad-based depreciation earlier this year, EME currencies rebounded against the dollar and ended the period 1 percent higher.

Tepid incoming data on output and inflation led to anticipation of greater accommodation in a number of major foreign economies. Even though the Bank of Japan left monetary policy unchanged at its October meeting, expectations for additional accommodation increased following the unexpected decline in August of industrial production in Japan. The Bank of England also left its policy stance unchanged in October, but, against the background of falling inflation, higher productivity, and concerns about global growth, policy expectations in the United Kingdom trended down, in tandem with those in the United States. Inflation compensation continued to decline in the United Kingdom but, after falling early in the period, was little changed, on net, in the euro area. Ten-year sovereign yields declined 21 basis points in Germany, 12 basis points in the United Kingdom, and 4 basis points in Japan.

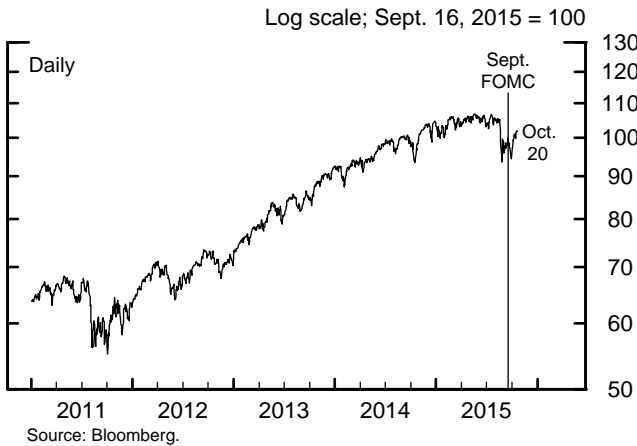
Consistent with risk-off behavior of investors amid global growth concerns early in the period, prices of foreign equities and commodities generally declined and emerging market sovereign credit spreads widened further. But these moves were more than retraced later in the period as the U.S. employment report led markets to push back expectations for U.S. monetary policy liftoff and as investors became less worried about prospects for the Chinese economy and its implications for the renminbi. Over the period, outflows from emerging market equity and bond funds slowed notably, and emerging market equities ended the period 5 percent higher. Movements in equity markets in the advanced economies were mixed.

## **CORPORATE ASSET PRICES AND EARNINGS**

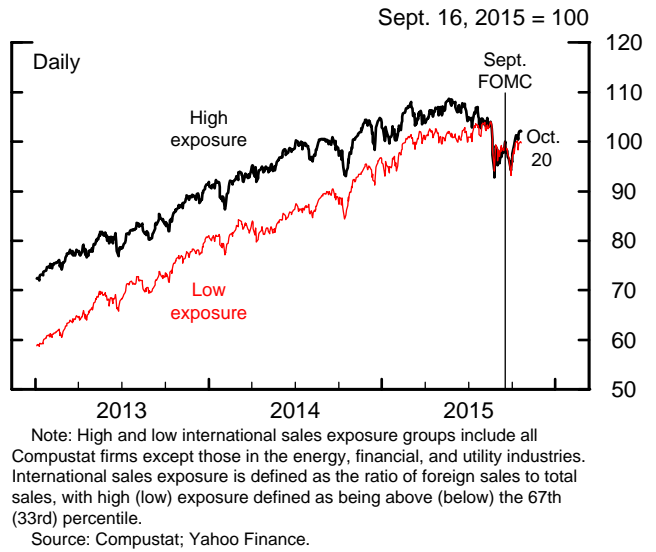
Over the intermeeting period, broad U.S. equity price indexes were up slightly on net. Equity prices fell in the first few weeks after the September FOMC meeting but recovered after the release of the September employment report, which led investors to anticipate a flatter path for monetary policy. The one-month-ahead option-implied volatility on the S&P 500 index—the VIX—moved down, on net, and ended the period near the middle of its range over the past few years.

### Corporate Asset Prices and Earnings

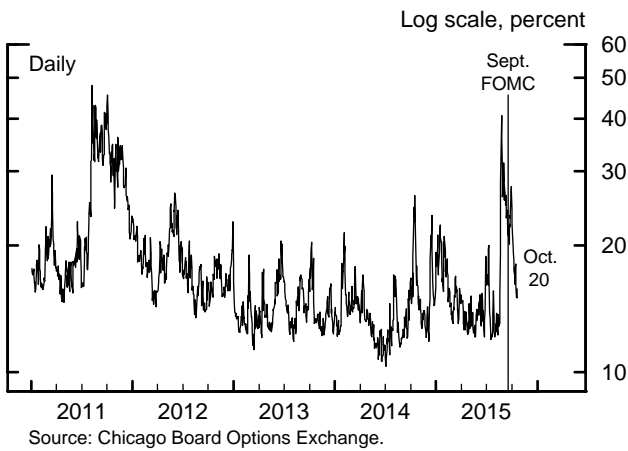
S&P 500 Stock Price Index



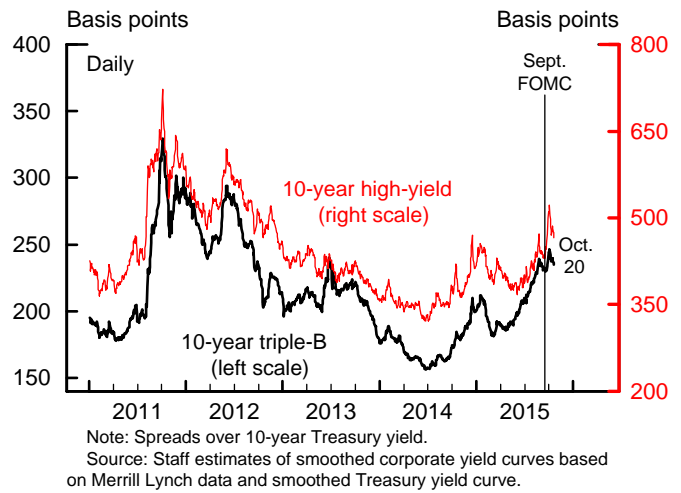
Equity Performance, by International Sales Exposure



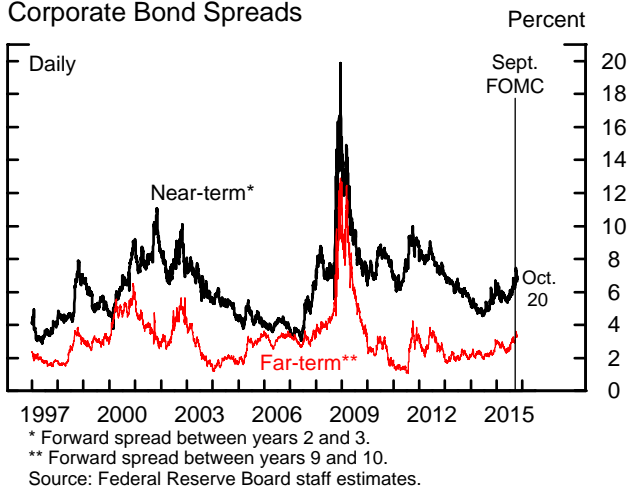
Implied Volatility on S&P 500 (VIX)



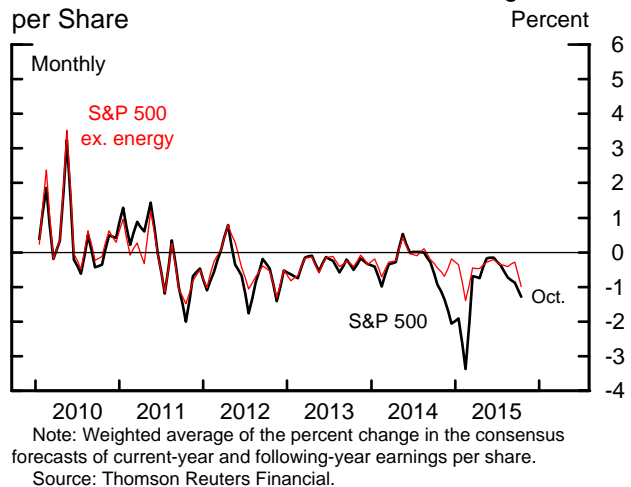
Corporate Bond Spreads



Far- and Near-Term Forward High-Yield Corporate Bond Spreads



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



Financial Developments

Spreads of yields on triple-B-rated corporate bonds over comparable-maturity Treasury securities rose slightly, on balance, since the September FOMC meeting, and those on speculative-grade corporate bonds widened notably across sectors. Across the credit spectrum, spreads reached their highest levels in several years and ended the period above their historical medians, likely reflecting declines in risk tolerance among bond investors and somewhat higher concerns about the credit outlook of the corporate sector. Indeed, expected year-ahead default rates implied by the Moody's KMV model increased slightly in September, largely because of higher estimated asset volatility, and the aggregate ratio of debt to assets continued to inch up in the second quarter, reaching its highest level since 2000. Spreads on leveraged loans increased in August and have moved up, on balance, since the September FOMC meeting.

With earnings reports of roughly 20 percent of S&P 500 companies in hand and analyst estimates for the rest, aggregate earnings per share in the third quarter are expected to have decreased slightly from year-ago levels. In October, Wall Street analysts have downgraded their projections for year-ahead earnings somewhat further.

## **BUSINESS AND MUNICIPAL FINANCE**

Overall, financing conditions for nonfinancial businesses remained generally accommodative but tightened somewhat for lower-rated firms. Corporate bond issuance rebounded in September from a slowdown in August, with a much larger-than-usual share of the issuance coming from investment-grade firms. Early indications suggest that speculative-grade bond issuance has remained subdued in October. Public equity issuance was modest in the third quarter, in part reflecting heightened market volatility.

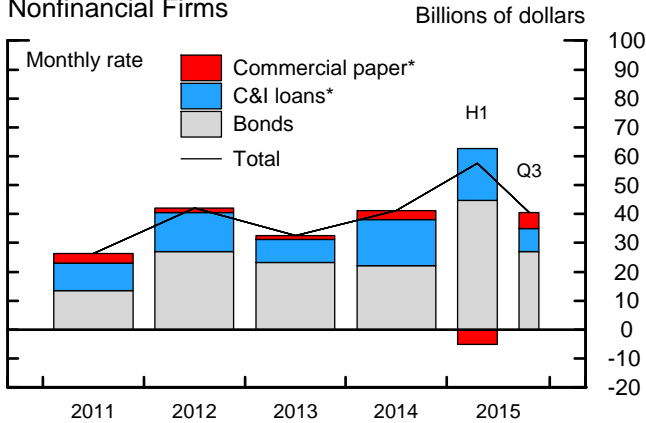
C&I loan growth on banks' books moderated slightly during the third quarter, though lending standards were little changed, on net, according to the October SLOOS. Financing conditions for small businesses continued to improve, with loan originations maintaining their upward trend, although indicators of small business owners' optimism have declined in recent months.

CMBS spreads have continued to widen through early October, suggesting that CMBS investors may be reassessing the riskiness of the sector following several years of strong demand to purchase these securities. In addition, respondents in the SLOOS reported that standards on CRE loans were little changed in the third quarter, marking the second quarter in a row of unchanged standards following several years of easing.



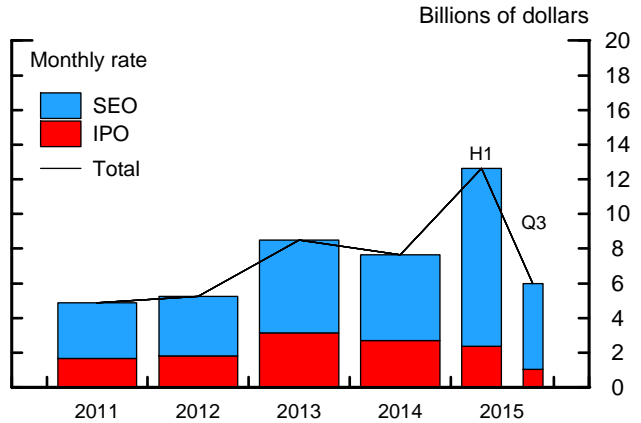
## Business and Municipal Finance

Selected Components of Net Debt Financing, Nonfinancial Firms



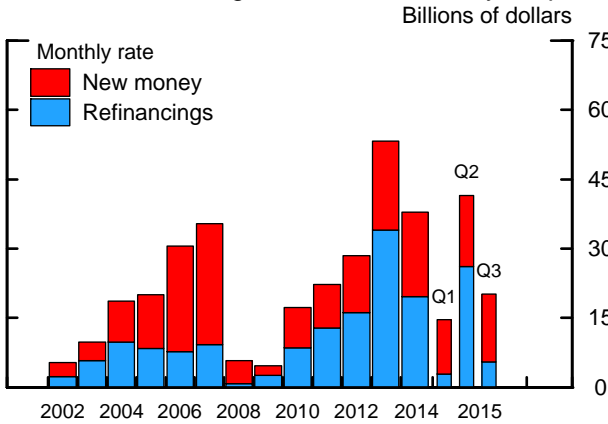
\* Period-end basis, seasonally adjusted.  
Source: Depository Trust & Clearing Corporation; Mergent Fixed Investment Securities Database; Federal Reserve Board.

Nonfinancial Equity Issuance: IPO and SEO



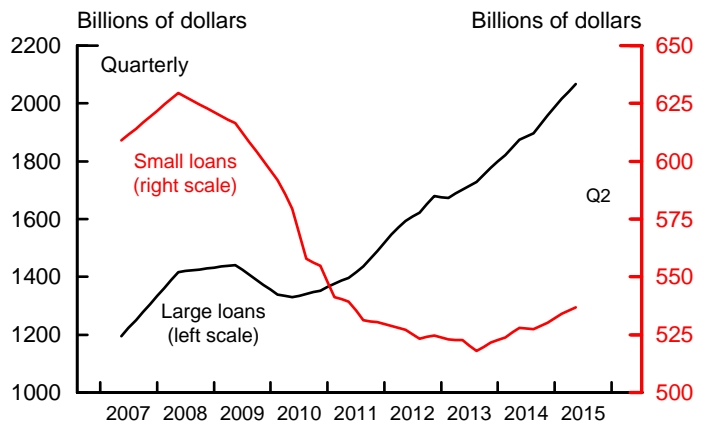
Note: IPO is initial public offering; SEO is seasoned equity offering.  
Source: Securities Data Company.

Institutional Leveraged Loan Issuance, by Purpose



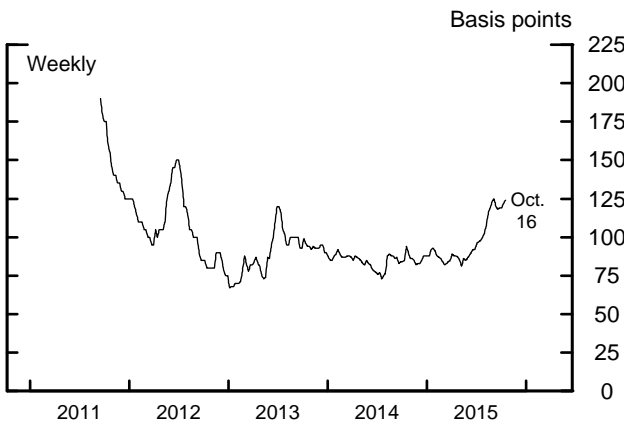
Source: Thomson Reuters LPC LoanConnector.

Outstanding Bank Loans to Businesses



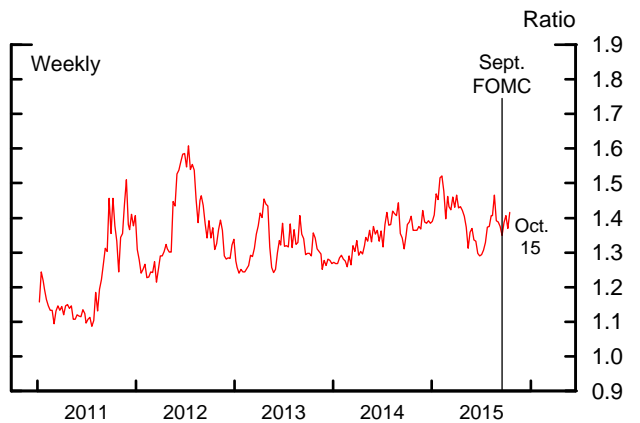
Note: Data are annual through 2009 and quarterly thereafter. Small loans (a proxy for loans to small businesses) are those with an origination amount of \$1 million or less; large loans are those with an origination amount of more than \$1 million.  
Source: Call Reports.

10-Year Triple-A CMBS Spreads over Swaps



Source: J.P. Morgan.

Municipal Bond Spread



Note: Bond Buyer GO 20-year index over 20-year Treasury yields.  
Source: Bond Buyer; Merrill Lynch.

Nonetheless, financing for commercial real estate (CRE) appears to have remained broadly available to date, with all major categories of CRE loans on banks' balance sheets growing robustly through September, consistent with reports of stronger demand for such loans in the SLOOS.

On balance, financing conditions for municipalities remained accommodative. Gross issuance of municipal bonds was solid in the third quarter, and declines in yields on general obligation municipal bonds roughly followed those on long-term Treasury securities, leaving their ratio little changed.

## **HOUSEHOLD FINANCE**

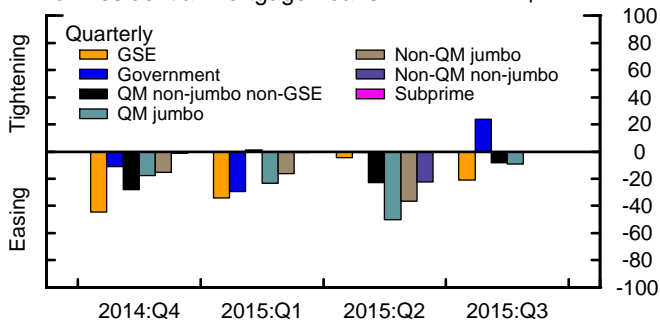
Credit conditions for residential mortgages were little changed, on net, over the intermeeting period. In the third quarter, a moderate net fraction of SLOOS respondents continued to ease standards on GSE-eligible and qualified mortgage loans, but standards on government-backed loans tightened somewhat. Despite the gradual net easing that has occurred for several years, credit remains tight for borrowers with low credit scores, hard-to-document income, or high debt-to-income ratios. Meanwhile, interest rates on 30-year fixed-rate mortgages declined 20 basis points (roughly in line with a decline in MBS yields).

Financing conditions in consumer credit markets changed little over the intermeeting period and remained accommodative on balance. Outstanding credit card balances expanded further in August, and a moderate net fraction of banks in the SLOOS indicated that standards eased on such loans during the third quarter. However, credit card limits remained mostly flat overall and were fairly tight for subprime borrowers. The growth of auto and student loans stayed robust, and both loan types continued to be broadly available, even to borrowers with subprime credit histories. Delinquencies on both credit card loans and auto loans remained relatively unchanged over the intermeeting period.

Conditions in the consumer ABS market were largely unchanged, on net, over the intermeeting period. ABS spreads remained wide across collateral and credit rating categories, with triple-A-rated credit card and auto ABS spreads nearing their post-crisis highs. Despite elevated yield spreads and heightened volatility in financial markets in the summer, ABS issuance in the third quarter softened only a bit.

## Household Finance

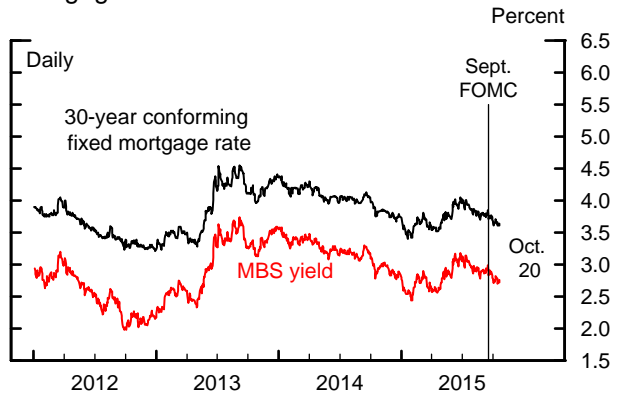
Net Percentage of Respondents Tightening Standards for Residential Mortgage Loans



Note: Individual bank responses are weighted by residential real estate loans outstanding as of the end of the prior quarter. Loans eligible for purchase by government-sponsored enterprises (GSEs) meet Fannie Mae and Freddie Mac underwriting guidelines. Qualified mortgages (QMs) satisfy the Consumer Financial Protection Board mortgage rules. Jumbo loans have origination amounts exceeding GSE loan limits.

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

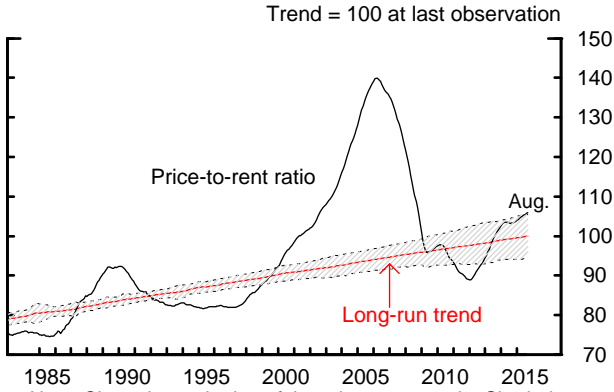
Mortgage Rate and MBS Yield



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

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

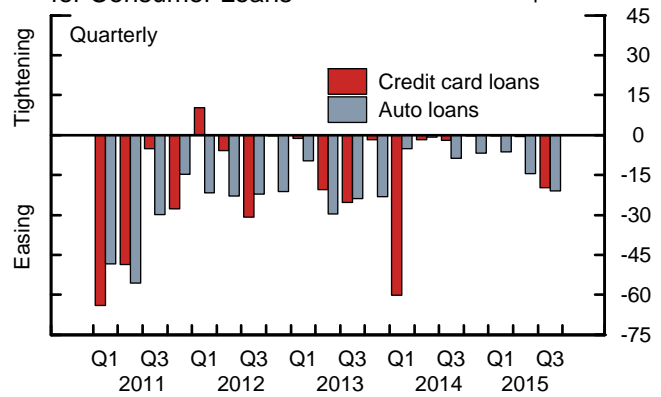
Price-to-Rent Ratio



Note: Chart shows the log of the price-to-rent ratio. Shaded area shows 95 percent confidence interval for the long-run trend, which is estimated using data from 1978 to 2001 and includes the effect of carrying costs on the expected price-to-rent ratio.

Source: For prices, CoreLogic; for rents, U.S. Dept. of Labor, Bureau of Labor Statistics.

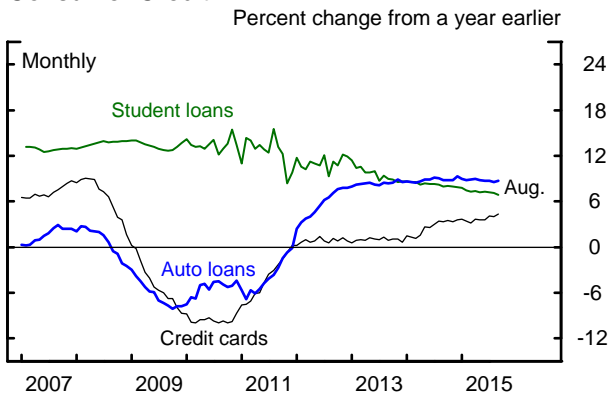
Net Percentage of Banks Tightening Standards for Consumer Loans



Note: Responses are weighted by survey respondents' holdings of relevant loan types as reported on Call Reports.

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

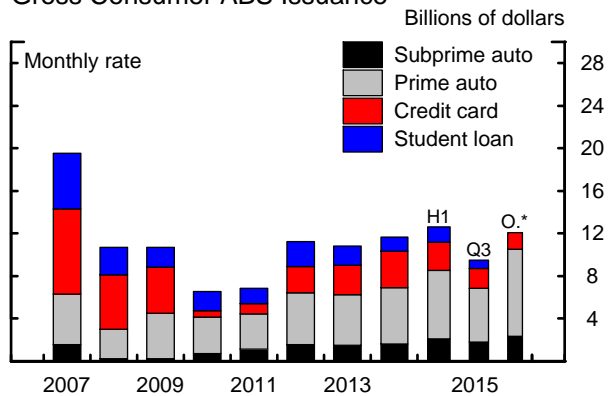
Consumer Credit



Note: The data are not seasonally adjusted.

Source: Federal Reserve Board.

Gross Consumer ABS Issuance



\* Includes scheduled issuance through October 28, 2015.

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

## **BANKING DEVELOPMENTS AND MONEY**

Bank lending continued to expand during the third quarter amid somewhat faster growth in consumer loans. Meanwhile, banks continued to adjust the composition of holdings of high-quality liquid assets in response to changes in capital and liquidity regulations as well as higher agency MBS yields relative to Treasury yields. In particular, cash assets fell for the second consecutive quarter, while sales of Treasury securities were more than offset by purchases of agency MBS.

Over the intermeeting period, credit spreads widened notably for large U.S. banks, and their equity prices underperformed broad equity market indexes, in part reflecting concerns about bank profitability amid a shift down in the yield curve and concerns about downside risks to the economic outlook. Third-quarter earnings reports for large banks were mixed. Compressed net interest margins continued to limit bank profitability, and trading and mortgage revenues declined; however, a number of banks reported further reductions in noninterest expenses to offset lower revenues.

M2 grew at an average annual rate of around 7½ percent in September. The monetary base expanded by nearly 13½ percent in September, primarily reflecting an increase in reserve balances of depository institutions that, in turn, stemmed from a decline in balances held in the Treasury's General Account. The drawdown in Treasury account balances was due largely to the Treasury's reliance on cash to make payments in light of the constraints on debt issuance associated with the debt ceiling.

## **FEDERAL RESERVE OPERATIONS AND SHORT-TERM FUNDING MARKETS**

Testing of the Federal Reserve's RRP operations continued over the intermeeting period. In September, the Desk conducted two term RRP auctions that crossed quarter-end.<sup>3</sup> Both auctions were oversubscribed, and the competitively determined award rate at each operation was 7 basis points. Consistent with past quarter-ends, the majority of investments in the first term RRP were a substitution from the ON RRP, while the second term RRP operation saw more new cash inflows.<sup>4</sup> On the September quarter-end, total

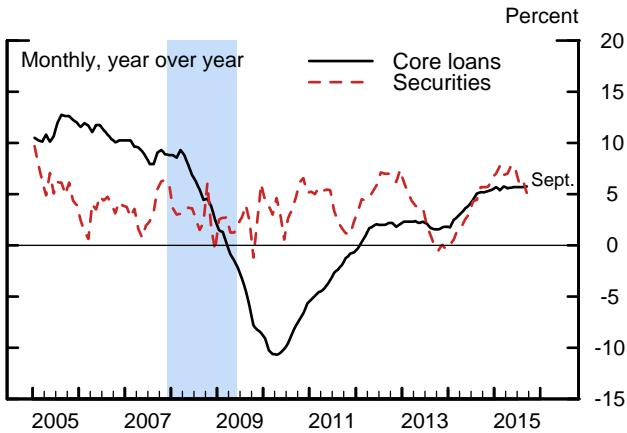
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<sup>3</sup> The first operation was held on September 24, with an offered amount of \$100 billion, and matured on October 1; the second operation, with an offered amount of \$150 billion, was conducted on September 30 and matured on October 2.

<sup>4</sup> Of note, the amount of new cash inflows in the first term RRP operation was similar to that observed on previous quarter-ends. However, in contrast to prior experience, total RRP take-up was about

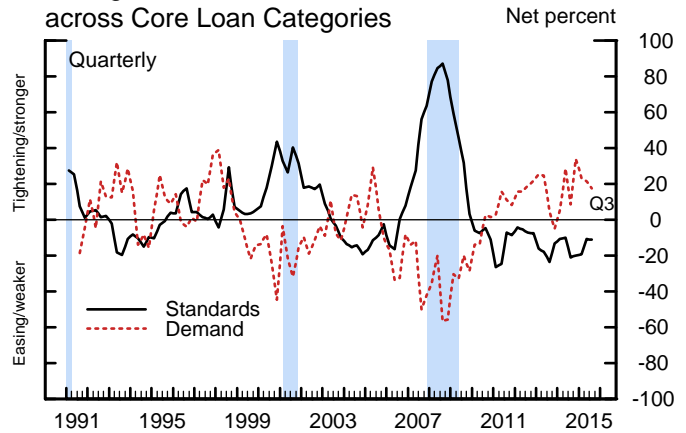
### Banking Developments and Money

Core Loans and Securities



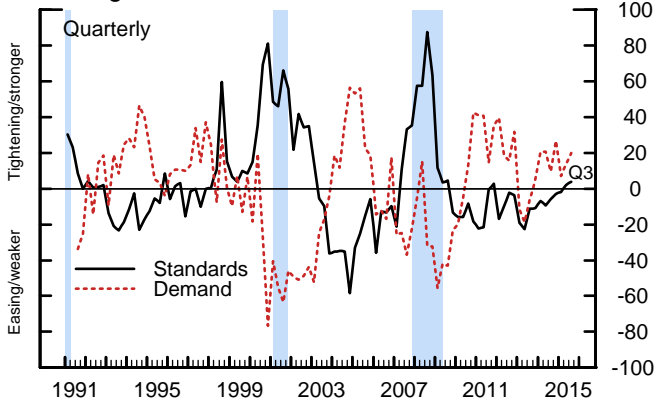
Note: Growth rates based on average monthly levels, which are not seasonally adjusted.  
 Source: Federal Reserve Board, FR 2644, Weekly Report of Selected Assets and Liabilities of Domestically Chartered Commercial Banks and U.S. Branches and Agencies of Foreign Banks.

Changes in Standards and Demand across Core Loan Categories



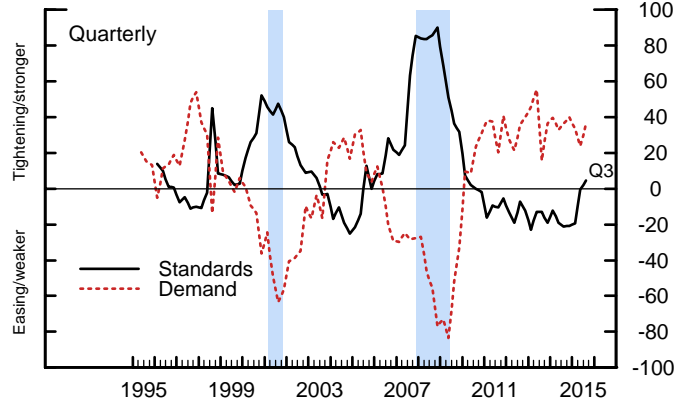
Note: A composite index that represents the net percentage of loans on respondents' balance sheets that were in categories for which banks reported tighter lending standards or stronger loan demand over the past 3 months, with results weighted by survey respondents' holdings of loans in each category.  
 Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices.

Changes in Standards and Demand for C&I Loans to Large and Middle-Market Firms



Note: Responses are weighted by survey respondents' holdings of relevant loan types as reported on Call Reports.  
 Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices.

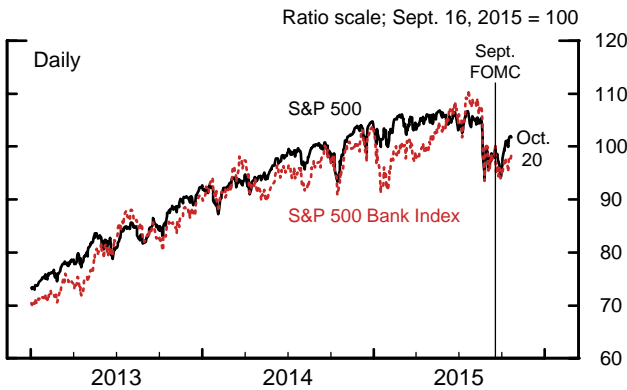
Changes in Standards and Demand for Commercial Real Estate Loans



Note: Responses are weighted by survey respondents' holdings of relevant loan types as reported on Call Reports.  
 Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices.

Financial Developments

S&P 500 Stock Price Indexes



Source: Bloomberg.

Growth of M2 and Its Components

	Percent, s.a.a.r.				
	M2	Liquid deposits	Small time deposits	Retail MMFs	Curr.
2014	5.8	7.1	-8.1	-2.8	7.5
2014:H2	5.2	6.6	-8.8	-2.8	6.2
2015:Q1	7.6	9.1	-9.8	-4.0	9.8
2015:Q2	4.7	6.7	-20.5	-5.3	5.1
2015:Q3	6.2	7.9	-24.9	3.5	6.4

Note: Retail MMFs are retail money market funds.  
 Source: Federal Reserve Board.

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

RRP take-up was \$450 billion, which marked the highest take-up experienced during testing so far. The larger-than-usual contraction in Eurodollar borrowing, combined with the relative attractiveness of RRP rates over Treasury bill yields, likely contributed to the increase in take-up, mostly by money market mutual funds.

The effective federal funds and Eurodollar rates stayed within a range of 13 to 14 basis points, although they dipped to 7 basis points and 5 basis points, respectively, on the September quarter-end.<sup>5</sup> The overnight repo rate for Treasury collateral, as surveyed by the Desk, stayed above the ON RRP offer rate of 5 basis points. On quarter-end, the survey repo rate increased several basis points to 17 basis points, while the GCF repo rate for Treasury collateral increased 22 basis points to a level of 35 basis points.

Over the intermeeting period, spreads on A2/P2 nonfinancial CP, a gauge for CP credit quality, were little changed on net. Domestic nonfinancial CP outstanding dropped sharply at the quarter-end but has since rebounded, following its typical seasonal pattern.

The Desk purchased about \$26 billion of 15- and 30-year MBS under the reinvestment program and rolled \$0.6 billion in expected settlements over the period. The ratio of monthly settlements for these reinvestment operations relative to gross issuance of MBS was about unchanged in September at 30.4 percent.

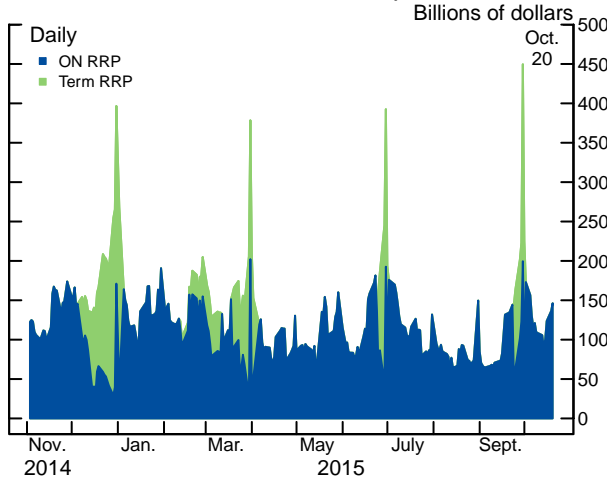
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unchanged on September 24 because the inflows of new cash into the term operation were coincidentally offset by a significant reduction in ON RRP take-up by one GSE.

<sup>5</sup> The effective federal funds rate averaged 13 basis points over the intermeeting period, with the intraday standard deviation averaging 4.0 basis points.

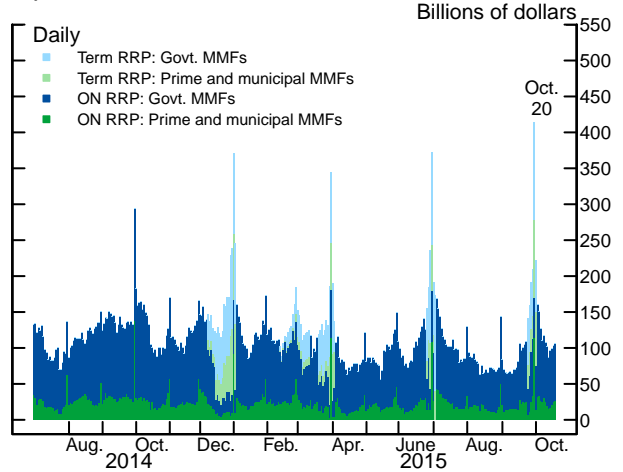
# Federal Reserve Operations and Short-Term Funding Markets

ON RRP and Term RRP Take-Up



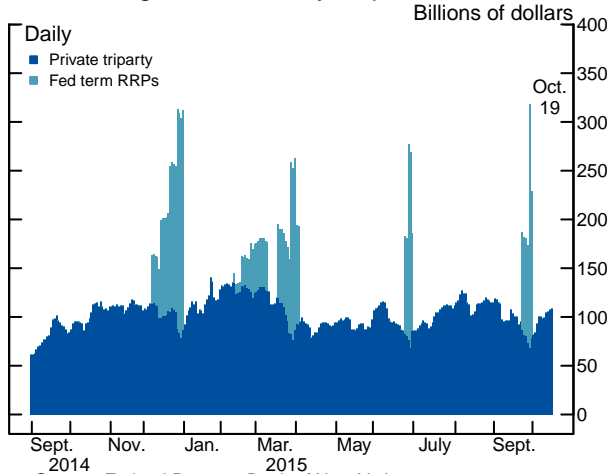
Note: ON RRP is overnight reverse repurchase agreement; term RRP is term reverse repurchase agreement.  
Source: Federal Reserve Bank of New York.

MMF Participation in ON and Term RRP Operations



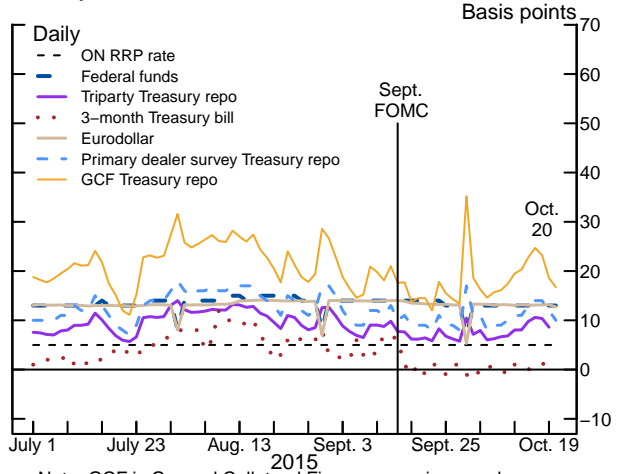
Note: Data are through October 20, 2015. MMF is money market fund.  
Source: Depository Trust & Clearing Corporation; Federal Reserve Bank of New York.

Outstanding Term Treasury Repo



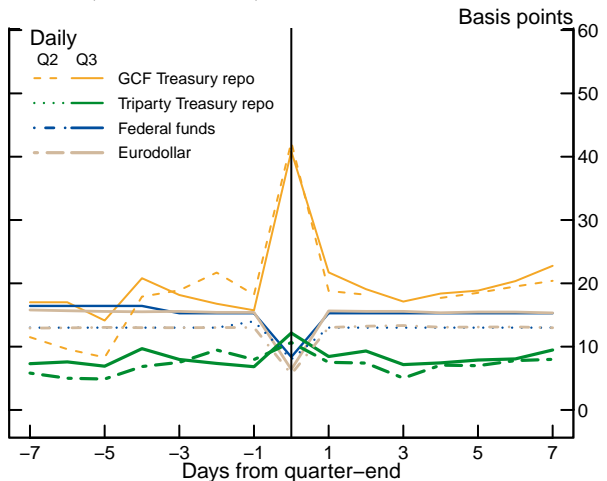
Source: Federal Reserve Bank of New York.

Money Market Rates



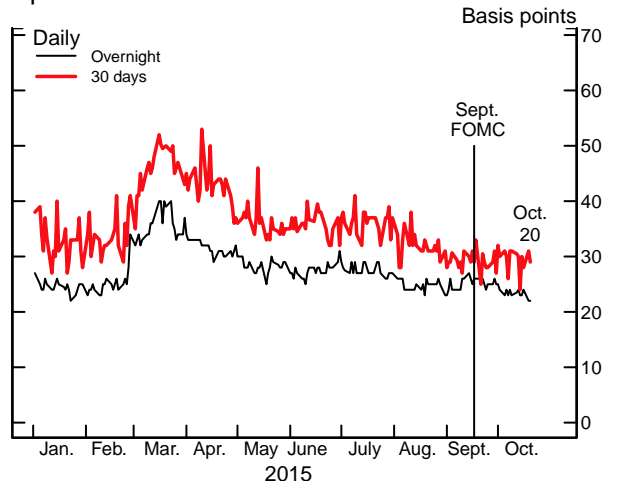
Note: GCF is General Collateral Finance; repo is repurchase agreement.  
Source: Depository Trust & Clearing Corporation; Federal Reserve Bank of New York; Federal Reserve Board.

Money Market Rates around Quarter-Ends: 2015:Q2 and 2015:Q3



Note: GCF is General Collateral Finance; repo is repurchase agreement.  
Source: Depository Trust & Clearing Corporation; Federal Reserve Bank of New York; Federal Reserve Board.

Nonfinancial A2/P2 Commercial Paper Spreads



Source: Depository Trust & Clearing Corporation.

## Risks and Uncertainty

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### 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. In the first scenario, the recent better-than-expected readings on consumption and business fixed investment signal a stronger pace for the economic expansion and higher inflation over the projection period. In contrast, the second scenario illustrates potential consequences of persistently weaker aggregate demand. In the third scenario, the trajectory of long-term inflation expectations is lower than in the baseline, leading to a shallower path of actual inflation in the coming years. The fourth scenario considers the possibility that increased financial strain raises corporate risk premiums and reduces economic activity. In the fifth scenario, a broad-based selloff of EME assets severely depresses activity in emerging market economies. The final scenario illustrates the potential effects of faster-than-expected foreign growth and a weaker dollar.

We generate the first scenario using the EDO model and the fourth scenario using a DSGE model developed by staff members from the Federal Reserve Bank of New York that explicitly incorporates financial frictions. Scenarios two and three are generated using the FRB/US model, and the final two using the multicountry SIGMA model. In all cases, once the federal funds rate has risen above its current target range, its movements are governed—as in the baseline forecast—by an inertial version of the Taylor (1999) rule.<sup>1</sup> In addition, all scenarios assume that the size and composition of the SOMA portfolio follow their baseline paths.

### Faster Growth with Higher Inflation

Although some of the recent incoming data have been lackluster, private domestic final demand—notably, consumer spending and business fixed investment—has been solid. In this scenario, these data are a harbinger of greater underlying strength in aggregate demand. We also assume that inflation is more sensitive to reductions in

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<sup>1</sup> For the scenarios run in SIGMA, we assume a policy rule broadly similar to the FRB/US and EDO simulations. One key difference relative to the FRB/US and EDO simulations is that the policy rule in SIGMA uses 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. The policy rule in the New York Fed model also responds to such a measure of slack.



**Alternative Scenarios**

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

Measure and scenario	2015	2016	2017	2018	2019-20
	H2				
<i>Real GDP</i>					
Extended Tealbook baseline	1.7	2.2	2.0	1.8	1.6
Faster growth with higher inflation	3.2	2.9	1.7	1.5	1.5
Weak consumer demand	1.6	1.6	1.6	1.4	1.7
Lower long-term inflation expectations	1.7	2.2	2.0	1.8	1.7
Financial turbulence	1.7	.6	2.6	2.2	1.8
Emerging market economy slump	1.6	1.0	1.5	2.1	2.0
Faster foreign growth and weaker dollar	1.8	2.8	2.3	1.7	1.4
<i>Unemployment rate<sup>1</sup></i>					
Extended Tealbook baseline	5.0	4.9	4.7	4.7	4.7
Faster growth with higher inflation	4.8	4.4	4.4	4.5	4.6
Weak consumer demand	5.1	5.1	5.2	5.4	5.6
Lower long-term inflation expectations	5.0	4.9	4.7	4.6	4.6
Financial turbulence	5.0	5.5	5.2	4.9	4.9
Emerging market economy slump	5.1	5.3	5.5	5.4	5.2
Faster foreign growth and weaker dollar	5.0	4.7	4.4	4.2	4.4
<i>Total PCE prices</i>					
Extended Tealbook baseline	.9	1.4	1.7	1.9	2.0
Faster growth with higher inflation	1.1	1.9	2.1	2.2	2.2
Weak consumer demand	.9	1.4	1.7	1.8	1.9
Lower long-term inflation expectations	.8	1.1	1.3	1.4	1.6
Financial turbulence	.9	1.3	1.7	1.8	1.9
Emerging market economy slump	.6	.2	1.2	1.8	2.0
Faster foreign growth and weaker dollar	1.1	1.9	2.0	2.1	2.0
<i>Core PCE prices</i>					
Extended Tealbook baseline	1.4	1.4	1.7	1.9	2.0
Faster growth with higher inflation	1.6	1.9	2.0	2.2	2.2
Weak consumer demand	1.4	1.4	1.7	1.8	1.9
Lower long-term inflation expectations	1.4	1.2	1.2	1.4	1.6
Financial turbulence	1.4	1.4	1.6	1.8	1.9
Emerging market economy slump	1.3	.8	1.1	1.6	1.9
Faster foreign growth and weaker dollar	1.5	1.8	1.9	2.1	2.1
<i>Federal funds rate<sup>1</sup></i>					
Extended Tealbook baseline	.2	1.4	2.4	3.1	3.7
Faster growth with higher inflation	.2	2.2	3.5	4.1	4.5
Weak consumer demand	.2	1.2	1.8	2.2	2.4
Lower long-term inflation expectations	.2	1.3	2.1	2.6	3.4
Financial turbulence	.2	.6	1.3	2.2	3.1
Emerging market economy slump	.2	1.0	.9	1.5	2.9
Faster foreign growth and weaker dollar	.2	1.6	2.9	3.7	4.2

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

resource slack than in the standard version of the EDO model, consistent with the estimates of some other DSGE models.

Real GDP rises 3 percent in 2016, compared with 2¼ percent in the baseline projection. The unemployment rate falls below 4½ percent in 2016; it then edges up over the remainder of the forecast period but remains lower than in the baseline. With resource utilization running tight and under the steeper Phillips curve we have assumed, inflation rises by more than in the baseline, reaching 2¼ percent in 2018.<sup>2</sup> The federal funds rate rises more steeply, passing 4 percent in 2018 and reaching 4½ percent in 2020. Given enough time, this path for the federal funds rate would eventually drive the unemployment rate up to its assumed natural rate and bring inflation back down to 2 percent.

### **Weak Consumer Demand**

Although recent indications have been more positive, household spending has been disappointing over most of the past several years. Gains in personal consumption expenditures have been smaller than the staff anticipated, while residential construction has remained below levels that we judge to be consistent with population growth and other fundamentals. In this scenario, the recent strength in household spending proves short lived and the earlier pattern of subpar gains reasserts itself. Specifically, the slow wage growth and high burden of student debt experienced by the millennial generation—adults currently between the ages of 18 and 34, now the largest cohort in the U.S. workforce—is assumed to weigh on residential investment and consumer spending to a greater degree than is assumed in the baseline. As a result, residential construction is flat over the medium term and real PCE rises ½ percentage point per year, on average, less than in the staff forecast, before gradually returning to baseline growth rates.

The reduction in household spending growth implies a significantly weaker economy. Real GDP rises only about 1½ percent per year, on average, over the 2016–18 period. Consequently, the unemployment rate remains above 5 percent in 2016 and rises slightly above 5½ percent by the end of 2020. The federal funds rate moves up more

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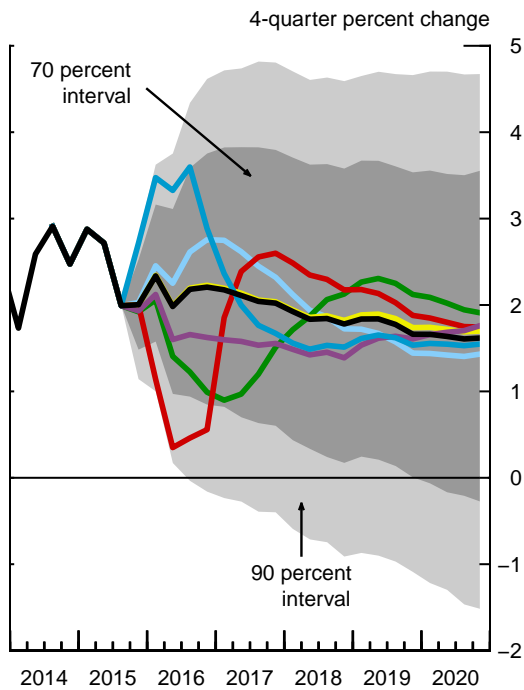
<sup>2</sup> The larger rise in inflation depends importantly on the substantially smaller adjustment costs for wages and prices in this scenario, which imply a larger reaction of inflation to changes in resource utilization. Had we used our standard coefficients in these equations, inflation would have peaked at 2 percent, about the same as in the baseline.

# Forecast Confidence Intervals and Alternative Scenarios

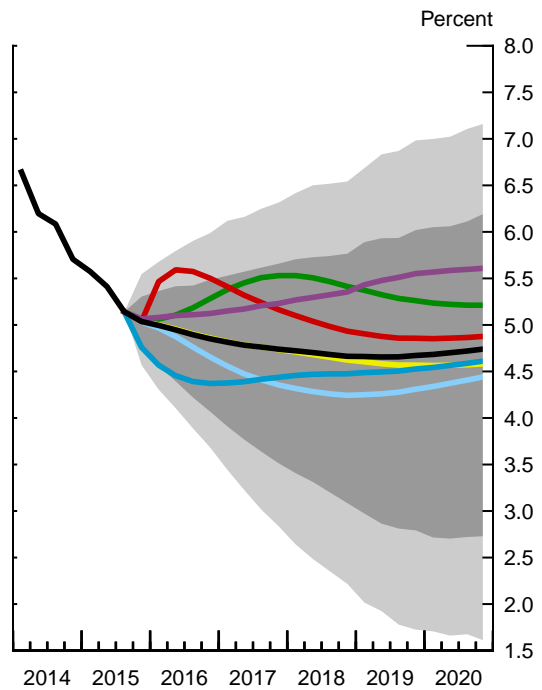
## Confidence Intervals Based on FRB/US Stochastic Simulations

- Extended Tealbook baseline
- Lower long-term inflation expectations
- Emerging market economy slump
- Faster growth with higher inflation
- Financial turbulence
- Faster foreign growth and weaker dollar
- Weak consumer demand

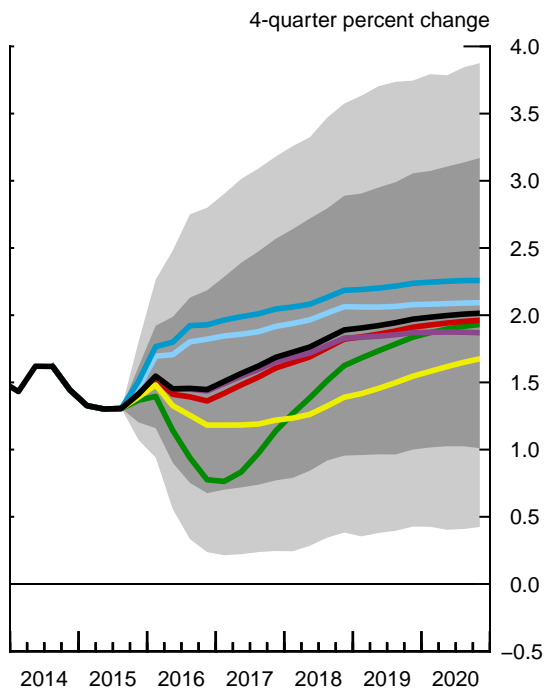
### Real GDP



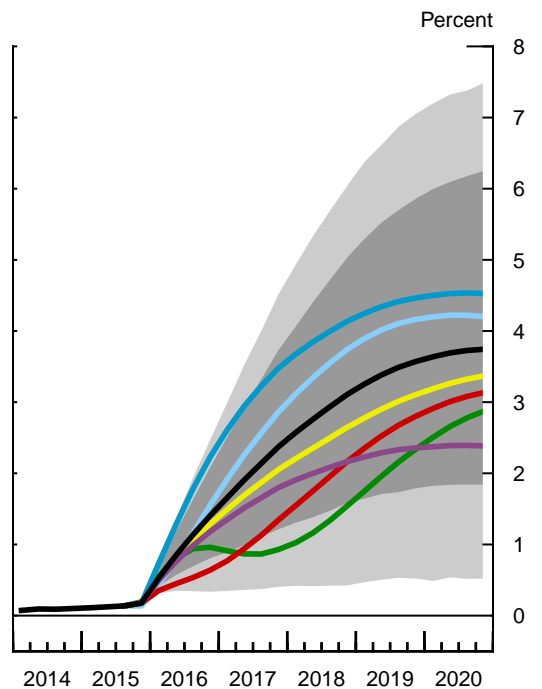
### Unemployment Rate



### PCE Prices excluding Food and Energy



### Federal Funds Rate



Risks & Uncertainty

gradually than in the baseline, reaching 2 percent by early 2018 and 2½ percent by the end of 2020. Inflation is a touch below the baseline.

### **Lower Long-Term Inflation Expectations**

In the baseline projection, consumer price inflation is projected to increase gradually to the Committee's longer-run target of 2 percent. A key assumption behind this projection is that the level of long-term inflation expectations is currently consistent with PCE inflation of 1.8 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 models the staff consults suggest that expectations are currently consistent with lower inflation. In this scenario, we assume that long-term inflation expectations are currently 1.5 percent and that, going forward, households and businesses form these expectations adaptively based on past inflation.

The subdued inflation expectations and low actual inflation in the coming years are mutually reinforcing. Inflation falls to 1 percent in 2016 and does not rise above 1½ percent until the second half of 2019. 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 in this scenario. (Other macroeconomic models—for example, models with a pronounced “debt deflation” channel—could yield a significant negative effect of low inflation on the real economy.)

### **Financial Turbulence**

Measures of financial market volatility, such as the VIX, spiked in late summer and remain elevated in comparison to the past several years. Market commentary has cited, among other contributing factors, uncertainty about the economic strength of EMEs as well as about U.S. economic policy. The spread of Baa-rated corporate bonds over Treasury securities, another measure of financial market stress, has risen about 75 basis points since the beginning of the year. In this alternative scenario, we explore the consequences of a larger increase in corporate bond spreads.<sup>3</sup> We assume that household and investor risk aversion rises, pushing up the corporate bond spread a further 200 basis points above baseline in the first quarter of 2016, roughly one-half the observed increase

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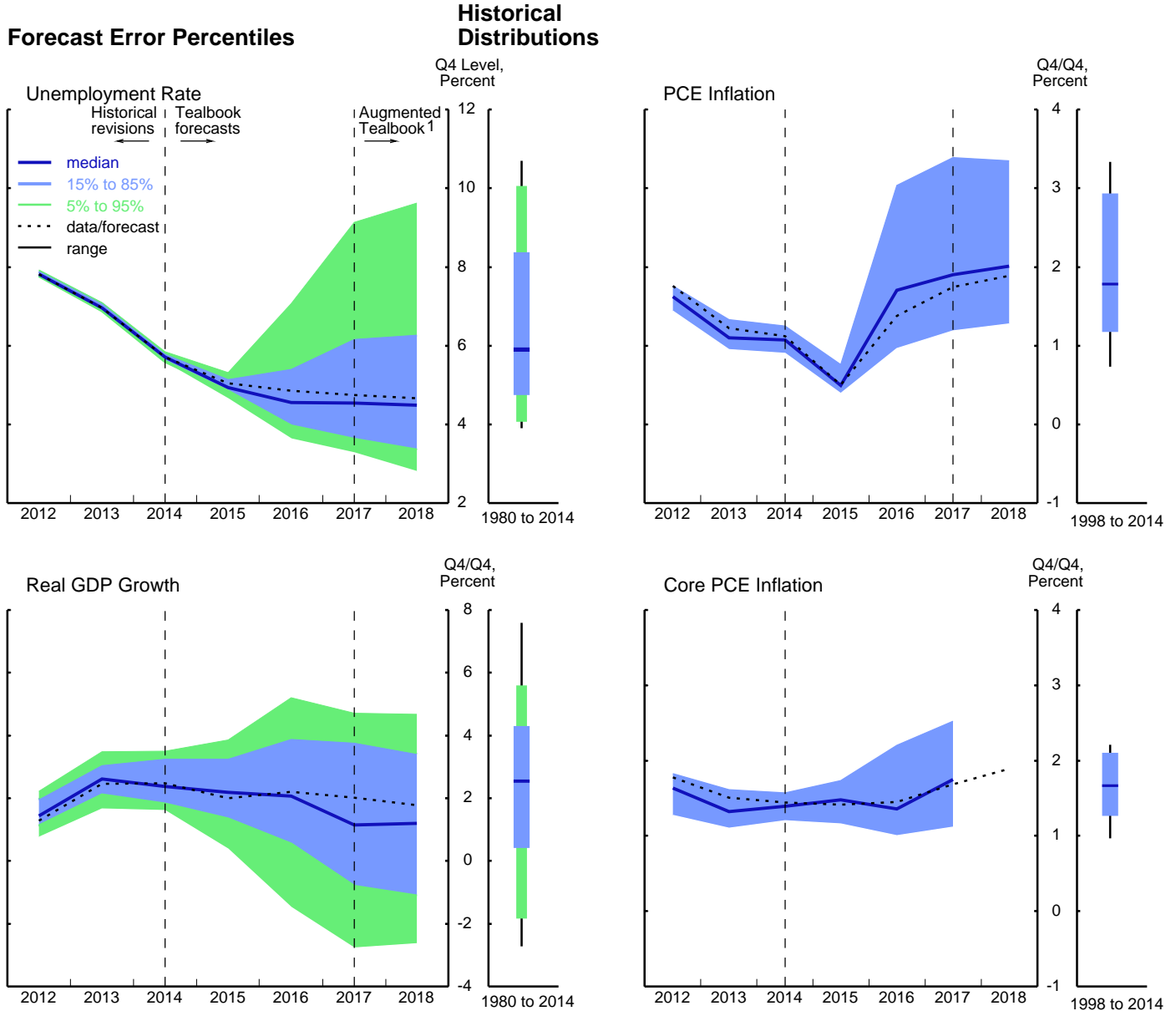
<sup>3</sup> The New York Fed's DSGE model has an explicit role for credit spreads and is estimated using data on these spreads.

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

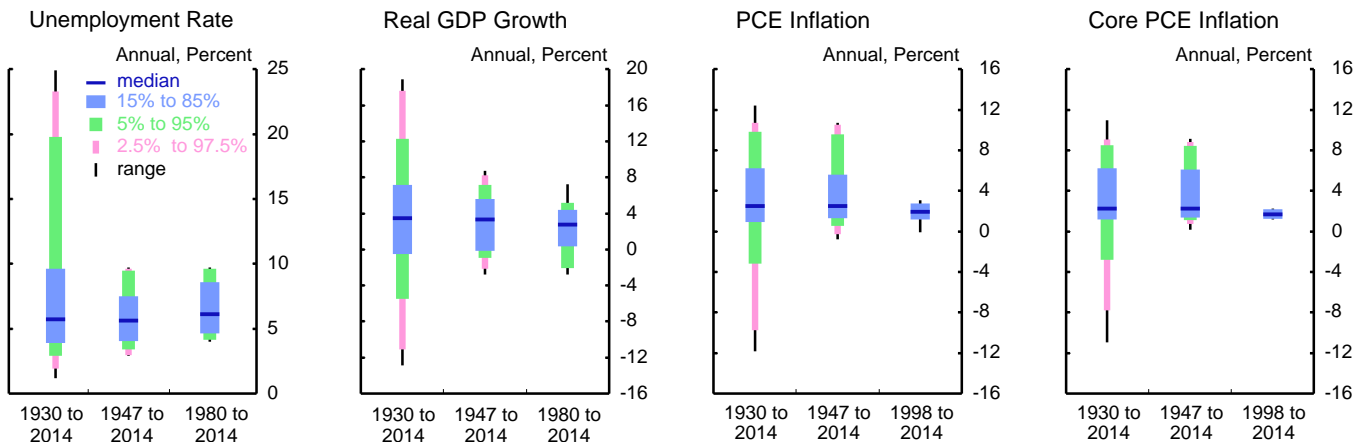
Measure	2015	2016	2017	2018	2019	2020
<i>Real GDP</i>						
<i>(percent change, Q4 to Q4)</i>						
Projection	2.0	2.2	2.0	1.8	1.7	1.6
Confidence interval						
Tealbook forecast errors	1.3–3.2	.5–3.9	-.8–3.8	-1.1–3.4	...	...
FRB/US stochastic simulations	1.5–2.5	.8–3.8	.6–3.8	.2–3.6	.0–3.5	-.3–3.6
<i>Civilian unemployment rate</i>						
<i>(percent, Q4)</i>						
Projection	5.0	4.9	4.7	4.7	4.7	4.7
Confidence interval						
Tealbook forecast errors	4.8–5.1	4.0–5.4	3.6–6.2	3.3–6.3	...	...
FRB/US stochastic simulations	4.7–5.3	4.1–5.5	3.5–5.7	3.1–5.8	2.8–6.0	2.7–6.2
<i>PCE prices, total</i>						
<i>(percent change, Q4 to Q4)</i>						
Projection	.5	1.4	1.7	1.9	2.0	2.0
Confidence interval						
Tealbook forecast errors	.4–.8	1.0–3.0	1.2–3.4	1.3–3.3	...	...
FRB/US stochastic simulations	.2–.8	.6–2.2	.7–2.7	.8–3.0	.9–3.1	.9–3.3
<i>PCE prices excluding food and energy</i>						
<i>(percent change, Q4 to Q4)</i>						
Projection	1.4	1.4	1.7	1.9	2.0	2.0
Confidence interval						
Tealbook forecast errors	1.2–1.7	1.0–2.2	1.1–2.5	...	...	...
FRB/US stochastic simulations	1.2–1.6	.7–2.2	.8–2.6	1.0–2.9	1.0–3.1	1.0–3.2
<i>Federal funds rate</i>						
<i>(percent, Q4)</i>						
Projection	.2	1.4	2.4	3.1	3.6	3.7
Confidence interval						
FRB/US stochastic simulations	.2–.2	.8–2.1	1.2–3.7	1.6–5.0	1.8–5.9	1.8–6.3

Note: Shocks underlying FRB/US stochastic simulations are randomly drawn from the 1969–2014 set of model equation residuals. Intervals derived from Tealbook forecast errors are based on projections made from 1980 to 2014 for real GDP and unemployment and from 1998 to 2014 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



### Historical Distributions



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

1. Augmented Tealbook prediction intervals use 2- and 3-year-ahead forecast errors from Blue Chip, CBO, and CEA to extend the Tealbook prediction intervals through 2018.

between 2007 and 2008.<sup>4</sup> Spreads then gradually return to a more normal level. The rise in spreads raises financing costs for firms' capital expenditures. The underlying increase in risk aversion also depresses household spending relative to the baseline, further reducing aggregate demand.

Under these circumstances, the economy contracts in the first half of 2016 and the unemployment rate rises slightly above 5½ percent by the middle of next year before a gradual recovery begins. Core PCE inflation is only slightly below baseline for the entire simulation period because the model has a fairly high estimate of price rigidity. The path of the federal funds rate is substantially lower, remaining roughly 1 percentage point below baseline in 2017 and 2018.

### **Emerging Market Economy Slump**

Our baseline projection envisions some pickup in EME growth over the next year from its current tepid pace. However, the substantial capital outflows, currency depreciation, and rising credit spreads experienced by a number of these economies over the past few months highlight the risks to our outlook. This scenario considers a more broad-based selloff of EME assets that might be triggered by any number of factors, including a wave of corporate defaults, deepening difficulties in a major EME such as Brazil or China, or perhaps U.S. policy rate liftoff. The selloff severely depresses activity and confidence in the EMEs and has sizable spillovers to global financial markets. EME GDP declines 5 percent below baseline, while flight-to-safety flows cause the dollar to appreciate 8 percent and modestly depress the term premiums on U.S. Treasury securities and AFE government bonds.<sup>5</sup>

U.S. activity declines relative to baseline as the stronger dollar and weaker foreign output depress U.S. real net exports and as some tightening of U.S. financial conditions restrains domestic demand. All told, U.S. real GDP expands at an annual rate of about 1 percent in 2016, and the unemployment rate climbs above 5¼ percent by late 2016, nearly ½ percentage point higher than in the baseline. Core PCE inflation declines to less than 1 percent in 2016 owing to the stronger dollar and lower resource utilization.

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<sup>4</sup> In the estimated model, underlying structural shocks of this magnitude or larger have occurred roughly once every 20 years. However, estimates of the underlying frequency of such rare adverse shocks are highly uncertain.

<sup>5</sup> The broad real dollar appreciated by around 12 percent during the Asian and Russian default crises of 1997 to 1998, while EME GDP growth fell more sharply relative to its pre-crisis trend than in this scenario.

Greater resource slack and subdued inflation imply that U.S. monetary policy accommodation is removed more gradually.

### **Faster Foreign Growth and Weaker Dollar**

Although we think the risks to the global outlook are predominantly on the downside, there are upside risks as well. In this scenario, we consider the possibility that the accumulated effects of accommodative monetary policy, balance sheet repair, and lower oil prices generate stronger tailwinds in the AFEs than in our Tealbook projection. As a result, the level of AFE GDP rises 2 percent above the baseline by 2018, while EME GDP rises 1 percent above the baseline as confidence improves and EME exports strengthen. Diminished concerns about the prospects for the global economy reduce the demand for dollar-denominated assets, leading the broad real dollar to fall about 7 percent relative to the baseline.

Stronger foreign growth and the weaker dollar lead to greater U.S. real net exports relative to the baseline. Consequently, U.S. real GDP expands  $2\frac{3}{4}$  percent in 2016, about  $\frac{1}{2}$  percentage point more than in the baseline, and the unemployment rate falls to  $4\frac{1}{4}$  percent by the end of 2018. The boost to import prices from the weaker dollar and heightened resource pressures cause core PCE inflation to rise to above  $1\frac{3}{4}$  percent in 2016. The inertial Taylor rule prescribes that the federal funds rate rises more quickly than in the baseline, reaching  $3\frac{3}{4}$  percent by the end of 2018.



## Assessment of Key Macroeconomic Risks (1)

### Probability of Inflation Events

(4 quarters ahead—2016:Q3)

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	.02	.02	.12	.04
Previous Tealbook	.02	.02	.12	.06
<i>Less than 1 percent</i>				
Current Tealbook	.46	.46	.26	.21
Previous Tealbook	.48	.48	.28	.19

### Probability of Unemployment Events

(4 quarters ahead—2016:Q3)

Probability that the unemployment rate will...	Staff	FRB/US	EDO	BVAR
<i>Increase by 1 percentage point</i>				
Current Tealbook	.04	.04	.25	.01
Previous Tealbook	.04	.04	.25	.01
<i>Decrease by 1 percentage point</i>				
Current Tealbook	.13	.06	.02	.20
Previous Tealbook	.12	.05	.02	.29

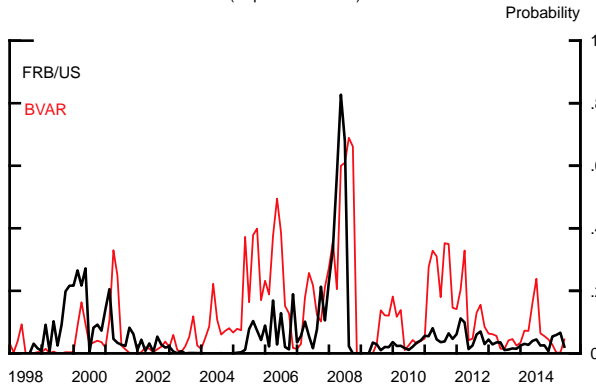
### Probability of Near-Term Recession

Probability that real GDP declines in each of 2015:Q4 and 2016:Q1	Staff	FRB/US	EDO	BVAR	Factor Model
Current Tealbook	.05	.05	.02	.03	.18
Previous Tealbook	.06	.04	.03	.02	.11

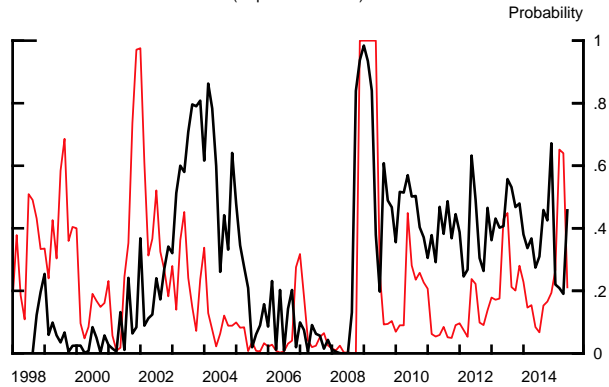
Note: "Staff" represents Tealbook forecast errors applied to the Tealbook baseline; baselines for FRB/US, BVAR, EDO, and the factor model are generated by those models themselves, up to the current-quarter estimate. Data for the current quarter are taken from the staff estimate for the second Tealbook 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)

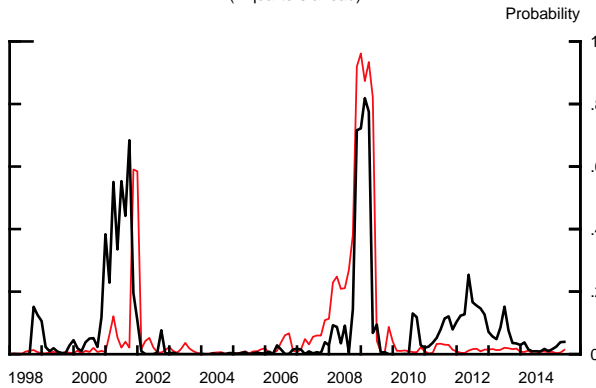
Probability that Total PCE Inflation Is above 3 Percent  
(4 quarters ahead)



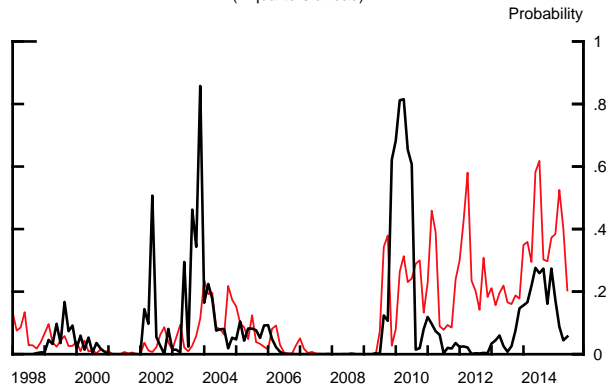
Probability that Total PCE Inflation Is below 1 Percent  
(4 quarters ahead)



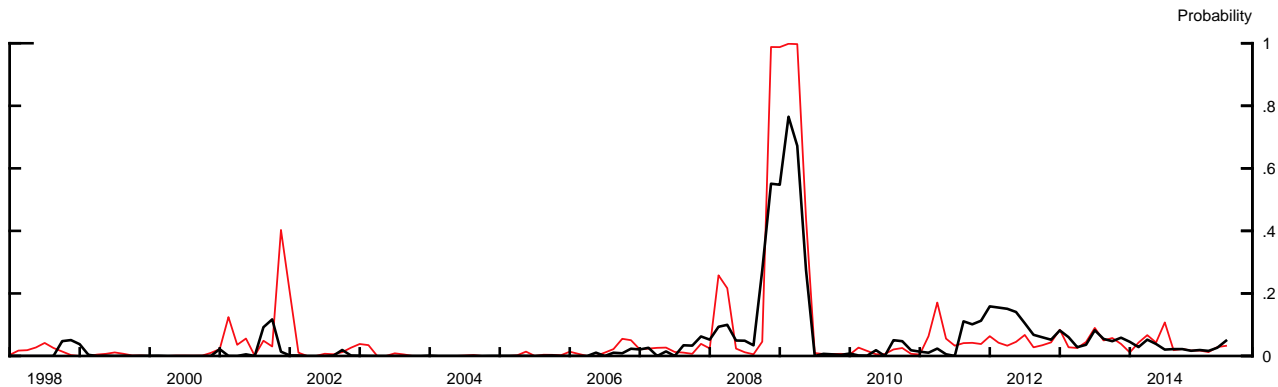
Probability that the Unemployment Rate Increases 1 ppt  
(4 quarters ahead)



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.

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## Appendix

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### 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.

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<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)

Interval	Nominal GDP		Real GDP		PCE price index		Core PCE price index		Unemployment rate <sup>1</sup>	
	09/09/15	10/21/15	09/09/15	10/21/15	09/09/15	10/21/15	09/09/15	10/21/15	09/09/15	10/21/15
<i>Quarterly</i>										
2015:Q1	.8	.8	.6	.6	-1.9	-1.9	1.0	1.0	5.6	5.6
Q2	5.9	6.1	3.7	3.9	2.2	2.2	1.8	1.9	5.4	5.4
Q3	3.8	2.9	1.9	1.4	1.2	1.3	1.2	1.4	5.2	5.1
Q4	1.9	3.0	1.9	2.1	-4	.4	1.2	1.4	5.0	5.0
2016:Q1	3.9	2.8	2.1	2.0	1.5	.8	1.5	1.5	5.0	5.0
Q2	3.6	4.3	1.9	2.5	1.6	1.6	1.5	1.5	5.0	4.9
Q3	3.5	3.8	1.9	2.2	1.5	1.6	1.4	1.4	4.9	4.9
Q4	4.0	3.9	2.4	2.2	1.5	1.5	1.4	1.4	4.9	4.9
2017:Q1	3.9	3.9	1.8	1.8	1.8	1.8	1.7	1.7	4.9	4.8
Q2	3.7	4.1	1.9	2.2	1.8	1.8	1.7	1.7	4.8	4.8
Q3	3.7	3.7	1.9	1.9	1.7	1.7	1.6	1.6	4.8	4.8
Q4	4.0	3.9	2.3	2.1	1.7	1.7	1.6	1.6	4.8	4.7
<i>Two-quarter<sup>2</sup></i>										
2015:Q2	3.3	3.4	2.2	2.3	.1	.1	1.4	1.4	-3	-3
Q4	2.9	2.9	1.9	1.7	.4	.9	1.2	1.4	-4	-4
2016:Q2	3.7	3.5	2.0	2.2	1.5	1.2	1.5	1.5	.0	-1
Q4	3.8	3.9	2.1	2.2	1.5	1.5	1.4	1.4	-1	.0
2017:Q2	3.8	4.0	1.9	2.0	1.8	1.8	1.7	1.7	-1	-1
Q4	3.9	3.8	2.1	2.0	1.7	1.7	1.6	1.6	.0	-1
<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	3.1	3.2	2.0	2.0	.3	.5	1.3	1.4	-7	-7
2016:Q4	3.8	3.7	2.1	2.2	1.5	1.4	1.4	1.4	-1	-1
2017:Q4	3.8	3.9	2.0	2.0	1.7	1.7	1.7	1.7	-1	-2
2018:Q4	3.8	3.8	1.8	1.8	1.9	1.9	1.9	1.9	-1	.0
<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	3.4	2.4	2.4	.2	.3	1.3	1.3	5.3	5.3
2016	3.5	3.5	2.1	2.2	1.2	1.2	1.4	1.5	5.0	4.9
2017	3.8	3.9	2.0	2.1	1.7	1.7	1.6	1.6	4.8	4.8
2018	3.8	3.8	1.9	1.8	1.8	1.8	1.8	1.8	4.8	4.7

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.

**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>	2018 <sup>1</sup>
	Q2	Q3	Q4		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Real GDP	3.9	1.4	2.1		2.0	2.5	2.2	2.2	1.8	2.2	1.9	2.1	2.0	2.2	2.0	1.8
<i>Previous Tealbook</i>	3.7	1.9	1.9		2.1	1.9	1.9	2.4	1.8	1.8	1.9	2.3	2.0	2.1	2.0	1.8
Final sales	3.9	2.8	1.7		1.8	2.6	2.2	2.7	1.8	2.4	2.1	2.3	2.0	2.3	2.1	2.0
<i>Previous Tealbook</i>	3.6	2.3	1.9		1.5	2.6	2.1	2.6	2.0	2.4	2.2	2.4	1.9	2.2	2.3	2.1
Priv. dom. final purch.	3.9	3.8	2.9		3.6	3.9	3.7	3.5	3.0	2.8	2.6	2.6	3.2	3.7	2.7	2.1
<i>Previous Tealbook</i>	3.4	3.3	3.1		3.4	3.8	3.6	3.5	3.4	2.9	2.7	2.7	3.0	3.6	2.9	2.2
Personal cons. expend.	3.6	3.2	2.8		3.2	3.2	3.2	3.2	2.8	2.6	2.4	2.6	2.8	3.2	2.6	2.1
<i>Previous Tealbook</i>	3.1	2.8	2.9		3.1	3.3	3.2	3.1	3.0	2.6	2.5	2.4	2.6	3.2	2.6	2.1
Durables	8.0	8.3	4.1		6.0	6.7	6.8	6.0	4.6	4.2	3.8	3.7	5.6	6.4	4.1	3.7
Nondurables	4.3	3.7	3.6		2.4	2.6	2.5	2.8	2.6	2.3	2.1	2.7	3.0	2.6	2.4	2.2
Services	2.7	2.2	2.3		3.0	2.8	2.8	2.9	2.6	2.5	2.4	2.4	2.3	2.9	2.5	1.7
Residential investment	9.3	7.4	.9		11.5	14.5	10.2	8.5	8.5	6.0	5.0	2.1	6.9	11.2	5.3	3.9
<i>Previous Tealbook</i>	9.2	7.4	2.0		7.9	11.4	11.1	10.1	11.1	8.0	5.7	4.5	7.1	10.1	7.3	4.2
Nonres. priv. fixed invest.	4.1	6.4	4.0		3.6	4.7	4.9	3.7	2.4	2.8	2.6	2.7	4.0	4.2	2.6	2.0
<i>Previous Tealbook</i>	3.6	5.0	4.5		3.8	4.7	3.8	3.8	3.2	2.6	3.0	3.6	3.7	4.0	3.1	2.1
Equipment & intangibles	3.5	7.6	4.7		5.5	5.0	5.6	3.9	2.2	2.7	2.6	2.8	5.0	5.0	2.6	2.2
<i>Previous Tealbook</i>	2.9	4.5	4.7		5.8	5.0	4.3	4.4	3.4	2.8	3.4	4.1	4.1	4.9	3.5	2.4
Nonres. structures	6.2	2.1	1.8		-3.0	3.7	2.3	3.0	3.1	3.0	2.4	2.2	.5	1.5	2.7	1.2
<i>Previous Tealbook</i>	5.9	6.9	4.1		-3.1	3.5	2.0	1.9	2.4	1.9	1.4	1.8	2.2	1.0	1.9	.8
Net exports <sup>2</sup>	-535	-559	-591		-646	-687	-733	-751	-788	-805	-819	-822	-556	-704	-808	-832
<i>Previous Tealbook</i> <sup>2</sup>	-534	-556	-590		-651	-691	-737	-757	-798	-814	-827	-829	-555	-709	-817	-838
Exports	5.1	.8	1.8		-1.9	1.7	1.4	3.2	-1.0	2.4	2.5	5.0	.3	1.1	2.2	4.2
Imports	3.0	4.4	6.4		6.8	7.4	7.8	5.0	4.4	4.1	3.7	4.0	5.2	6.7	4.0	3.2
Gov't cons. & invest.	2.6	.7	.2		.0	1.3	.2	.6	.3	1.6	.7	.7	.8	.5	.8	.9
<i>Previous Tealbook</i>	2.7	.0	.0		.0	1.3	.4	.4	.3	1.6	.7	.7	.7	.5	.8	.9
Federal	.0	-1.8	-1.5		-1.0	-1.0	-1.7	-4	-1.0	-8	-9	-6	-5	-1.0	-8	-6
Defense	.3	-2.2	-1.9		-1.4	-1.4	-2.6	-4	-1.7	-1.3	-1.6	-1.0	-7	-1.5	-1.4	-8
Nondense	-5	-1.1	-8		-4	-4	-4	-4	-1	.0	.1	.1	-3	-4	.1	-4
State & local	4.3	2.2	1.2		.7	2.8	1.4	1.3	1.1	3.0	1.7	1.4	1.7	1.5	1.8	1.8
Change in priv. inventories <sup>2</sup>	114	57	73		80	76	74	55	56	52	45	38	89	71	48	15
<i>Previous Tealbook</i> <sup>2</sup>	119	105	106		133	107	97	88	79	58	48	43	111	106	57	14

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	-2	2.7	1.7	1.3	2.5	2.5	2.0	2.2	2.0	1.8
<i>Previous Tealbook</i>	-2	2.7	1.7	1.3	2.5	2.5	2.0	2.1	2.0	1.8
Final sales	-4	2.0	1.5	1.7	1.9	2.6	2.0	2.3	2.1	2.0
<i>Previous Tealbook</i>	-4	2.0	1.5	1.7	1.9	2.6	1.9	2.2	2.3	2.1
Priv. dom. final purch.	-2.4	3.5	2.6	2.3	2.6	3.6	3.2	3.7	2.7	2.1
<i>Previous Tealbook</i>	-2.4	3.5	2.6	2.3	2.6	3.6	3.0	3.6	2.9	2.2
Personal cons. expend.	-2	3.1	1.5	1.3	2.3	3.2	2.8	3.2	2.6	2.1
<i>Previous Tealbook</i>	-2	3.1	1.5	1.3	2.3	3.2	2.6	3.2	2.6	2.1
Durables	2.5	9.3	4.8	7.2	4.6	7.5	5.6	6.4	4.1	3.7
Nondurables	.2	3.3	.4	.8	2.6	2.3	3.0	2.6	2.4	2.2
Services	-8	2.0	1.4	.6	1.8	2.8	2.3	2.9	2.5	1.7
Residential investment	-10.8	-5.2	6.0	15.7	3.5	5.1	6.9	11.2	5.3	3.9
<i>Previous Tealbook</i>	-10.8	-5.2	6.0	15.7	3.5	5.1	7.1	10.1	7.3	4.2
Nonres. priv. fixed invest.	-12.2	8.1	9.0	5.2	4.2	5.5	4.0	4.2	2.6	2.0
<i>Previous Tealbook</i>	-12.2	8.1	9.0	5.2	4.2	5.5	3.7	4.0	3.1	2.1
Equipment & intangibles	-6.0	12.0	9.2	5.5	3.6	5.7	5.0	5.0	2.6	2.2
<i>Previous Tealbook</i>	-6.0	12.0	9.2	5.5	3.6	5.7	4.1	4.9	3.5	2.4
Nonres. structures	-27.1	-4.0	8.0	4.1	6.5	5.0	.5	1.5	2.7	1.2
<i>Previous Tealbook</i>	-27.1	-4.0	8.0	4.1	6.5	5.0	2.2	1.0	1.9	.8
Net exports <sup>1</sup>	-395	-459	-459	-447	-417	-443	-556	-704	-808	-832
<i>Previous Tealbook</i> <sup>1</sup>	-395	-459	-459	-447	-417	-443	-555	-709	-817	-838
Exports	.8	10.1	4.2	2.2	5.2	2.4	.3	1.1	2.2	4.2
Imports	-6.2	12.0	3.5	.3	2.4	5.4	5.2	6.7	4.0	3.2
Gov't. cons. & invest.	2.3	-1.1	-3.0	-2.2	-2.9	.4	.8	.5	.8	.9
<i>Previous Tealbook</i>	2.3	-1.1	-3.0	-2.2	-2.9	.4	.7	.5	.8	.9
Federal	3.9	3.2	-4.0	-2.1	-6.8	-8	-5	-1.0	-8	-6
Defense	3.6	2.0	-4.1	-3.9	-7.4	-2.9	-7	-1.5	-1.4	-8
Nondefense	4.6	5.5	-3.9	1.0	-5.9	2.7	-3	-4	.1	-4
State & local	1.3	-4.0	-2.3	-2.3	-2	1.1	1.7	1.5	1.8	1.8
Change in priv. inventories <sup>1</sup>	-148	58	38	55	61	68	89	71	48	15
<i>Previous Tealbook</i> <sup>1</sup>	-148	58	38	55	61	68	111	106	57	14

1. Billions of chained (2009) dollars.



**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 3.7	1.4 1.9	2.1 1.9	2.2 2.4	2.0 2.1	2.5 1.9	2.2 1.9	2.2 2.4	1.8 1.8	2.2 1.9	2.2 1.9	2.1 2.3	2.0 2.0	2.2 2.1	2.0 2.0	1.8 1.8
Final sales <i>Previous Tealbook</i>	3.9 3.5	2.7 2.3	1.7 1.8	2.7 2.6	1.8 2.0	2.6 2.4	2.2 2.2	2.7 2.4	1.8 2.0	2.3 2.4	2.1 2.2	2.3 2.4	2.0 1.8	2.3 2.2	2.1 2.2	2.0 2.0
Priv. dom. final purch. <i>Previous Tealbook</i>	3.3 2.9	3.2 2.8	2.4 2.6	3.0 3.0	3.0 2.9	3.3 3.2	3.2 3.1	2.2 3.0	2.6 2.9	2.4 2.5	2.2 2.3	2.2 2.3	2.7 2.5	3.1 3.0	2.4 2.5	1.8 1.9
Personal cons. expend. <i>Previous Tealbook</i>	2.4 2.1	2.1 1.9	1.9 2.0	2.2 2.1	2.2 2.1	2.2 2.2	2.2 2.1	2.2 2.1	1.9 2.1	1.8 1.8	1.7 1.7	1.8 1.7	1.9 1.8	2.2 2.2	1.8 1.8	1.4 1.4
Durables	.6	.6	.3	.4	.4	.5	.4	.4	.3	.3	.3	.3	.4	.5	.3	.3
Nondurables	.6	.5	.5	.4	.4	.4	.4	.4	.4	.3	.3	.4	.5	.4	.4	.3
Services	1.2	1.0	1.1	1.3	1.4	1.3	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.3	1.2	.8
Residential investment <i>Previous Tealbook</i>	.3 .3	.2 .2	.0 .1	.3 .4	.4 .3	.4 .4	.4 .4	.3 .4	.3 .4	.2 .3	.2 .2	.2 .2	.2 .2	.4 .3	.2 .3	.2 .2
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	.5 .5	.8 .6	.5 .6	.5 .5	.5 .5	.6 .6	.6 .5	.5 .4	.3 .4	.4 .3	.3 .4	.3 .4	.5 .5	.5 .5	.3 .4	.3 .3
Equipment & intangibles <i>Previous Tealbook</i>	.4 .3	.7 .4	.5 .5	.6 .4	.5 .6	.5 .4	.4 .4	.4 .4	.2 .4	.3 .3	.3 .4	.3 .4	.5 .4	.5 .5	.3 .4	.2 .3
Nonres. structures <i>Previous Tealbook</i>	.2 .2	.1 .2	.0 .1	.1 .1	-.1 -.1	.1 .1	.1 .1	.1 .1	.1 .1	.1 .1	.1 .0	.1 .0	.0 .1	.0 .0	.1 .1	.0 .0
Net exports <i>Previous Tealbook</i>	.2 .2	-.6 -.5	-.7 -.8	-.4 -.4	-.13 -.14	-.9 -.9	-.10 -.10	-.4 -.4	-.8 -.9	-.4 -.3	-.3 -.3	.0 .0	-.8 -.8	-.9 -.9	-.4 -.4	.0 .0
Exports	.6	.1	.2	.2	-.2	.2	.2	.4	-.1	.3	.3	.6	.0	.1	.3	.5
Imports	-.5	-.7	-.10	-.8	-.10	-.11	-.12	-.8	-.7	-.6	-.6	-.6	-.8	-.10	-.6	-.5
Gov't. cons. & invest. <i>Previous Tealbook</i>	.5 .5	.1 .0	.0 .0	.1 .1	.0 .0	.2 .2	.0 .1	.1 .1	.1 .1	.3 .3	.1 .1	.1 .1	.2 .1	.1 .1	.1 .1	.2 .2
Federal	.0	-.1	-.1	.0	-.1	-.1	-.1	.0	-.1	.0	-.1	.0	.0	-.1	-.1	.0
Defense	.0	-.1	-.1	.0	-.1	-.1	-.1	.0	-.1	-.1	-.1	.0	.0	-.1	-.1	.0
Nondefense	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
State & local	.5	.2	.1	.2	.1	.3	.2	.1	.1	.3	.2	.2	.2	.2	.2	.2
Change in priv. inventories <i>Previous Tealbook</i>	.0 .2	-.14 -.3	.4 .0	-.5 -.2	.2 .7	-.1 -.6	.0 -.2	-.5 -.2	.0 -.2	-.1 -.5	-.2 -.2	-.2 -.1	.0 .2	-.1 -.1	-.1 -.3	-.2 -.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				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				
GDP chain-wt. price index <i>Previous Tealbook</i>	2.1	1.6	.9		.8	1.7	1.7	1.6	1.6	2.0	1.8	1.8	1.8	1.4	1.9	2.0
PCE chain-wt. price index <i>Previous Tealbook</i>	2.1	1.9	.0		1.7	1.7	1.6	1.6	1.6	2.0	1.8	1.7	1.7	1.7	1.8	1.9
Energy <i>Previous Tealbook</i>	2.2	1.3	.4		.8	1.6	1.6	1.5	1.5	1.8	1.8	1.7	1.7	1.4	1.7	1.9
Food <i>Previous Tealbook</i>	2.2	1.2	-.4		1.5	1.6	1.5	1.5	1.5	1.8	1.8	1.7	1.7	1.5	1.7	1.9
Ex. food & energy <i>Previous Tealbook</i>	15.1	-1.9	-19.6		-14.3	4.2	4.2	3.8	3.8	3.4	2.8	2.3	2.1	-9	2.7	1.8
Ex. food & energy, market based <i>Previous Tealbook</i>	15.2	-1.0	-29.7		1.0	3.2	3.4	3.1	3.1	2.9	2.6	2.2	2.0	2.7	2.4	1.5
CPI <i>Previous Tealbook</i>	-1.1	2.2	2.0		1.7	1.7	1.8	1.9	1.9	1.9	1.9	2.0	2.0	.7	2.0	2.0
Ex. food & energy <i>Previous Tealbook</i>	-1.1	1.9	1.4		1.7	1.7	1.8	1.9	1.9	1.9	1.9	2.0	2.0	.5	2.0	1.9
ECI, hourly compensation <sup>2</sup> <i>Previous Tealbook</i>	1.9	1.4	1.4		1.5	1.5	1.4	1.4	1.4	1.7	1.7	1.6	1.6	1.4	1.7	1.9
Business sector Output per hour <i>Previous Tealbook</i>	1.8	1.2	1.2		1.5	1.5	1.4	1.4	1.4	1.7	1.7	1.6	1.6	1.3	1.7	1.9
Compensation per hour <i>Previous Tealbook</i>	1.8	1.1	1.3		1.5	1.5	1.4	1.3	1.3	1.7	1.7	1.6	1.6	1.2	1.7	1.9
Unit labor costs <i>Previous Tealbook</i>	1.8	1.0	1.0		1.4	1.4	1.4	1.4	1.4	1.7	1.7	1.6	1.6	1.4	1.7	1.9
Core goods imports chain-wt. price index <sup>3</sup> <i>Previous Tealbook</i>	3.0	1.6	.2		.9	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	1.8	2.1	2.1
Business sector Output per hour <i>Previous Tealbook</i>	3.0	1.7	-.7		1.9	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0
Compensation per hour <i>Previous Tealbook</i>	2.5	1.7	1.7		2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.1
Unit labor costs <i>Previous Tealbook</i>	2.5	1.8	1.6		2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.0
Core goods imports chain-wt. price index <sup>3</sup> <i>Previous Tealbook</i>	.0	2.5	2.5		2.6	2.6	2.6	2.6	2.6	2.8	2.8	2.8	2.8	2.6	2.8	2.8
Business sector Output per hour <i>Previous Tealbook</i>	.0	2.5	2.5		2.6	2.6	2.6	2.6	2.6	2.7	2.7	2.7	2.7	2.6	2.7	2.7
Compensation per hour <i>Previous Tealbook</i>	3.8	.5	2.6		1.7	1.7	1.4	1.3	1.3	1.1	1.7	1.4	1.4	1.5	1.4	1.5
Unit labor costs <i>Previous Tealbook</i>	3.6	.6	2.0		1.7	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.5	1.6
Core goods imports chain-wt. price index <sup>3</sup> <i>Previous Tealbook</i>	2.1	2.5	2.3		3.2	2.9	2.9	2.9	2.9	3.4	3.1	3.1	3.1	3.0	3.2	3.4
Business sector Output per hour <i>Previous Tealbook</i>	2.1	2.2	2.8		3.2	2.9	2.9	2.9	2.9	3.3	3.0	3.0	3.0	3.0	3.1	3.3
Compensation per hour <i>Previous Tealbook</i>	-1.6	2.0	-.3		1.5	1.2	1.6	1.6	1.6	2.2	1.3	1.6	1.6	1.5	1.7	1.8
Unit labor costs <i>Previous Tealbook</i>	-1.4	1.6	.8		1.5	1.3	1.3	1.3	1.3	1.7	1.4	1.4	1.5	1.4	1.5	1.6
Core goods imports chain-wt. price index <sup>3</sup> <i>Previous Tealbook</i>	-3.1	-2.5	-2.2		-.3	.0	.8	1.1	1.1	1.2	1.2	1.2	1.2	.4	1.2	1.2
Business sector Output per hour <i>Previous Tealbook</i>	-3.1	-1.7	-2.0		-1.1	.3	1.0	1.1	1.1	1.2	1.3	1.4	1.4	.3	1.3	1.2

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 .4	1.8 1.8	1.9 1.9	1.9 1.9	1.6 1.6	1.3 1.3	1.2 1.0	1.4 1.7	1.9 1.8	2.0 1.9
PCE chain-wt. price index <i>Previous Tealbook</i>	1.2 1.2	1.3 1.3	2.7 2.7	1.8 1.8	1.2 1.2	1.1 1.1	.5 .3	1.4 1.5	1.7 1.7	1.9 1.9
Energy <i>Previous Tealbook</i>	2.3 2.3	6.4 6.4	12.0 12.0	2.3 2.3	-2.5 -2.5	-6.4 -6.4	-15.7 -18.3	-9 2.7	2.7 2.4	1.8 1.5
Food <i>Previous Tealbook</i>	-1.8 -1.8	1.3 1.3	5.1 5.1	1.2 1.2	.8 .8	2.8 2.8	.7 .5	1.8 1.8	2.0 2.0	2.0 1.9
Ex. food & energy <i>Previous Tealbook</i>	1.4 1.4	1.0 1.0	1.9 1.9	1.8 1.8	1.5 1.5	1.4 1.4	1.4 1.3	1.4 1.4	1.7 1.7	1.9 1.9
Ex. food & energy, market based <i>Previous Tealbook</i>	1.8 1.8	.7 .7	1.9 1.9	1.5 1.5	1.2 1.2	1.2 1.2	1.2 1.1	1.4 1.4	1.7 1.7	1.9 1.9
CPI <i>Previous Tealbook</i>	1.5 1.5	1.2 1.2	3.3 3.3	1.9 1.9	1.2 1.2	1.2 1.2	.4 .2	1.8 2.0	2.1 2.1	2.1 2.0
Ex. food & energy <i>Previous Tealbook</i>	1.8 1.8	.6 .6	2.2 2.2	1.9 1.9	1.7 1.7	1.7 1.7	1.9 1.9	2.0 2.0	2.1 2.1	2.1 2.0
ECI, hourly compensation <sup>1</sup> <i>Previous Tealbook</i> <sup>1</sup>	1.2 1.2	2.1 2.1	2.2 2.2	1.8 1.8	2.0 2.0	2.3 2.3	2.0 2.0	2.6 2.6	2.8 2.7	2.8 2.7
Business sector Output per hour <i>Previous Tealbook</i>	5.6 5.6	1.7 1.7	.0 .0	-2 -2	1.6 1.6	-2 -2	1.4 1.2	1.5 1.6	1.4 1.5	1.5 1.6
Compensation per hour <i>Previous Tealbook</i>	1.3 1.3	1.2 1.2	.6 .6	5.8 5.8	-1 -1	2.6 2.6	2.0 2.1	3.0 3.0	3.2 3.1	3.4 3.3
Unit labor costs <i>Previous Tealbook</i>	-4.2 -4.2	-4 -4	.6 .6	6.0 6.0	-1.7 -1.7	2.8 2.8	.6 .9	1.5 1.4	1.7 1.5	1.8 1.6
Core goods imports chain-wt. price index <sup>2</sup> <i>Previous Tealbook</i> <sup>2</sup>	-1.9 -1.9	2.3 2.3	4.3 4.3	.1 .1	-1.1 -1.1	.5 .5	-3.1 -2.8	.4 .3	1.2 1.3	1.2 1.2

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>	.6	.6	.5	.5	.5	.5	.5	.4	.4	.4	.4				
Nonfarm payroll employment <sup>2</sup>	5.4	5.1	5.0	5.0	4.9	4.9	4.9	4.8	4.8	4.8	4.7	5.0	4.9	4.7	4.7	
Unemployment rate <sup>3</sup>	5.4	5.2	5.0	5.0	5.0	4.9	4.9	4.9	4.8	4.8	4.8	5.0	4.9	4.8	4.7	
<i>Previous Tealbook<sup>3</sup></i>	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	
Natural rate of unemployment <sup>3</sup>	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	
<i>Previous Tealbook<sup>3</sup></i>	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	
Employment-to-Population Ratio <sup>3</sup>	59.4	59.3	59.3	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.3	59.4	59.4	59.2	
Employment-to-Population Trend <sup>3</sup>	59.9	59.8	59.7	59.6	59.5	59.5	59.4	59.3	59.2	59.2	59.1	59.7	59.4	59.1	58.8	
GDP gap <sup>4</sup>	-5	-4	-2	-1	.1	.3	.5	.6	.7	.8	.9	-2	.5	.9	1.0	
<i>Previous Tealbook<sup>4</sup></i>	-5	-4	-2	-1	.0	.1	.4	.4	.5	.6	.8	-2	.4	.8	.9	
Industrial production <sup>5</sup>	-2.4	1.8	-2.2	1.6	2.4	2.3	2.6	2.8	2.5	2.1	1.9	-8	2.2	2.3	1.8	
<i>Previous Tealbook<sup>5</sup></i>	-2.4	2.7	-1.3	1.2	2.2	2.2	3.0	3.0	2.3	2.1	2.0	-3	2.1	2.4	1.9	
Manufacturing industr. prod. <sup>5</sup>	1.4	2.5	-1.4	1.7	3.2	3.0	2.6	2.4	2.6	2.2	1.9	.5	2.6	2.3	1.8	
<i>Previous Tealbook<sup>5</sup></i>	1.2	2.5	-3	1.6	3.0	2.8	2.9	2.6	2.4	2.1	2.0	.7	2.6	2.3	1.9	
Capacity utilization rate - mfg. <sup>3</sup>	75.9	76.1	75.6	75.7	76.1	76.4	76.7	76.9	77.2	77.4	77.5	75.6	76.7	77.5	78.0	
<i>Previous Tealbook<sup>3</sup></i>	75.9	76.1	75.8	75.9	76.2	76.5	76.8	77.1	77.4	77.5	77.7	75.8	76.8	77.7	78.3	
Housing starts <sup>6</sup>	1.2	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.5	1.5	1.5	1.1	1.3	1.5	1.5	
Light motor vehicle sales <sup>6</sup>	17.1	17.8	17.3	17.0	17.0	17.0	17.0	17.0	16.9	16.8	16.7	17.2	17.0	16.8	16.7	
<i>Income and saving</i>																
Nominal GDP <sup>5</sup>	6.1	2.9	3.0	2.8	4.3	3.8	3.9	3.9	4.1	3.7	3.9	3.2	3.7	3.9	3.8	
Real disposable pers. income <sup>5</sup>	1.2	3.5	2.3	3.4	2.5	2.3	1.9	3.4	1.8	2.4	2.3	2.7	2.5	2.5	2.2	
<i>Previous Tealbook<sup>5</sup></i>	1.3	4.4	1.9	3.8	2.4	2.2	2.1	2.9	1.7	2.3	2.2	2.9	2.6	2.3	2.2	
Personal saving rate <sup>3</sup>	4.6	4.7	4.6	4.6	4.5	4.3	4.0	4.1	3.9	3.9	3.9	4.6	4.0	3.9	4.0	
<i>Previous Tealbook<sup>3</sup></i>	4.8	5.1	4.9	5.1	4.9	4.6	4.4	4.4	4.2	4.1	4.1	4.9	4.4	4.1	4.2	
Corporate profits <sup>7</sup>	14.7	5.1	-14.4	-10.7	1.8	3.4	3.8	-3.4	-1.1	-1.2	1.2	-5.0	-6	-1.1	.8	
Profit share of GNP <sup>3</sup>	11.5	11.5	11.0	10.6	10.6	10.6	10.6	10.4	10.3	10.2	10.1	11.0	10.6	10.1	9.8	
Gross national saving rate <sup>3</sup>	18.3	18.4	18.2	17.9	17.9	17.8	17.6	17.4	17.4	17.3	17.2	18.2	17.6	17.2	17.1	
Net national saving rate <sup>3</sup>	3.4	3.5	3.1	2.7	2.8	2.6	2.3	2.0	2.0	1.8	1.6	3.1	2.3	1.6	1.3	

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.

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

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	2.2	2.5	2.9	2.5	2.0	1.7	1.3
Unemployment rate <sup>2</sup>	9.9	9.5	8.7	7.8	7.0	5.7	5.0	4.9	4.7	4.7
<i>Previous Tealbook<sup>2</sup></i>	9.9	9.5	8.7	7.8	7.0	5.7	5.0	4.9	4.8	4.7
Natural rate of unemployment <sup>2</sup>	6.2	6.2	6.0	5.8	5.4	5.1	5.1	5.1	5.1	5.1
<i>Previous Tealbook<sup>2</sup></i>	6.2	6.2	6.0	5.8	5.4	5.1	5.1	5.1	5.1	5.1
Employment-to-Population Ratio <sup>2</sup>	58.4	58.3	58.5	58.7	58.5	59.2	59.3	59.4	59.4	59.2
Employment-to-Population Trend <sup>2</sup>	61.6	61.3	60.9	60.2	60.2	60.0	59.7	59.4	59.1	58.8
GDP gap <sup>3</sup>	-5.5	-4.4	-4.2	-4.2	-2.8	-9	-2	.5	.9	1.0
<i>Previous Tealbook<sup>3</sup></i>	-5.5	-4.4	-4.2	-4.2	-2.8	-9	-2	.4	.8	.9
Industrial production <sup>4</sup>	-5.4	5.9	2.8	2.1	2.3	4.5	-8	2.2	2.3	1.8
<i>Previous Tealbook<sup>4</sup></i>	-5.4	5.9	2.8	2.1	2.3	4.5	-3	2.1	2.4	1.9
Manufacturing industr. prod. <sup>4</sup>	-6.1	6.0	2.7	1.5	1.3	3.4	.5	2.6	2.3	1.8
<i>Previous Tealbook<sup>4</sup></i>	-6.1	6.0	2.7	1.5	1.3	3.4	.7	2.6	2.3	1.9
Capacity utilization rate - mfg. <sup>2</sup>	67.1	72.5	74.4	74.1	74.2	76.2	75.6	76.7	77.5	78.0
<i>Previous Tealbook<sup>2</sup></i>	67.1	72.5	74.4	74.1	74.2	76.2	75.8	76.8	77.7	78.3
Housing starts <sup>5</sup>	.6	.6	.6	.8	.9	1.0	1.1	1.3	1.5	1.5
Light motor vehicle sales <sup>5</sup>	10.4	11.5	12.7	14.4	15.5	16.4	17.2	17.0	16.8	16.7
<i>Income and saving</i>										
Nominal GDP <sup>4</sup>	.1	4.6	3.6	3.2	4.1	3.9	3.2	3.7	3.9	3.8
Real disposable pers. income <sup>4</sup>	-7	2.6	1.7	5.1	-2.9	3.6	2.7	2.5	2.5	2.2
<i>Previous Tealbook<sup>4</sup></i>	-7	2.6	1.7	5.1	-2.9	3.6	2.9	2.6	2.3	2.2
Personal saving rate <sup>2</sup>	5.6	5.5	5.8	9.2	4.4	4.7	4.6	4.0	3.9	4.0
<i>Previous Tealbook<sup>2</sup></i>	5.6	5.5	5.8	9.2	4.4	4.7	4.9	4.4	4.1	4.2
Corporate profits <sup>6</sup>	53.7	18.0	6.8	.6	4.1	3.4	-5.0	-6	-1.1	.8
Profit share of GNP <sup>2</sup>	10.6	12.0	12.3	12.0	12.0	11.9	11.0	10.6	10.1	9.8
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	17.1
Net national saving rate <sup>2</sup>	-1.7	-3	.8	2.9	3.1	3.9	3.1	2.3	1.6	1.3

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	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Unified budget</b>					Not seasonally adjusted											
Receipts	3,249	3,406	3,525	3,641	680	1,027	802	746	720	1,078	862	795	746	1,110	875	820
Outlays	3,688	3,861	3,989	4,157	943	904	924	1,001	939	949	972	974	1,051	989	975	1,018
Surplus/deficit	-439	-455	-463	-515	-263	123	-123	-255	-219	-129	-110	-179	-305	121	-100	-198
<i>Previous Tealbook</i>	-424	-463	-469	-575	-263	123	-107	-263	-224	135	-111	-181	-309	125	-104	-213
<b>Means of financing:</b>																
Borrowing	337	730	584	636	67	-16	46	428	253	-78	127	207	338	-89	127	228
Cash decrease	-40	8	-0	-0	123	-154	56	20	-4	-21	13	2	-3	-2	2	-0
Other <sup>1</sup>	142	-283	-120	-120	73	47	21	-193	-30	-30	-30	-30	-30	-30	-30	-30
Cash operating balance, end of period	199	191	192	192	100	254	199	179	183	204	191	189	192	194	192	192
<b>NIPA federal sector</b>					Seasonally adjusted annual rates											
Receipts	3,379	3,507	3,644	3,783	3,356	3,408	3,455	3,467	3,482	3,518	3,560	3,603	3,623	3,657	3,693	3,730
Expenditures	3,983	4,104	4,301	4,513	3,936	4,015	4,060	4,037	4,099	4,112	4,167	4,221	4,309	4,309	4,368	4,423
Consumption expenditures	955	960	971	982	957	957	955	954	962	962	962	963	972	974	975	977
Defense	594	594	597	601	595	595	594	592	596	595	594	594	598	598	597	597
Nondefense	361	366	374	381	362	362	362	362	366	367	368	369	374	376	378	380
Other spending	3,029	3,144	3,330	3,531	2,979	3,057	3,105	3,084	3,136	3,149	3,206	3,258	3,336	3,335	3,393	3,446
Current account surplus	-604	-597	-658	-730	-262	-607	-605	-571	-616	-593	-607	-618	-685	-652	-675	-693
Gross investment	263	260	260	261	262	264	262	261	260	260	259	260	260	260	260	260
Gross saving less gross investment <sup>2</sup>	-596	-583	-641	-712	-569	-599	-594	-558	-603	-580	-592	-603	-669	-635	-657	-674
<b>Fiscal indicators</b>																
High-employment (HEB) surplus/deficit <sup>3</sup>	-550.4	-594.9	-691.6	-784.3	-505.9	-569.7	-578.1	-554.3	-608.8	-595.6	-621.0	-644.8	-713.4	-689.2	-719.0	-745.0
Change in HEB, percent of potential GDP	.5	.2	.4	.3	-2	.3	.0	-1	.3	-1	.1	.1	.3	-2	.1	.1
Fiscal impetus (FI), percent of GDP <sup>4</sup>	.3	.2	.2	.2	.0	.6	.3	.3	.1	.3	.1	.2	.1	.3	.2	.2
<i>Previous Tealbook</i>	.3	.2	.2	.2	.0	.7	.2	.3	.1	.3	.2	.2	.1	.3	.2	.2
Federal purchases	.0	-1	-1	.0	-1	.0	-1	-1	-1	-1	-1	.0	-1	-1	-1	.0
State and local purchases	.2	.2	.2	.2	-1	.5	.2	-1	.1	.3	-1	.1	.1	.3	.2	.1
Taxes and transfers	.2	.1	.1	.0	.0	.2	.2	.2	.1	.1	.1	.1	.1	.1	.1	.1

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.

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

Measure and country	2015				2016				2017			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Real GDP<sup>1</sup></b>												
Total foreign	1.7	1.0	2.2	2.3	2.7	2.9	2.9	2.9	3.0	2.6	2.8	2.9
<i>Previous Tealbook</i>	1.6	1.1	2.1	2.4	2.8	2.9	3.0	3.0	3.0	2.6	2.9	2.9
Advanced foreign economies	1.0	.3	1.9	1.7	1.9	2.1	2.1	2.1	2.2	1.3	1.8	1.9
Canada	-8	-5	2.4	2.0	2.2	2.3	2.3	2.1	2.0	1.9	1.9	1.8
Japan	4.5	-1.2	.4	.7	1.0	1.1	1.2	1.3	3.0	-4.7	-2	1.0
United Kingdom	1.5	2.6	2.5	2.5	2.7	2.7	2.7	2.7	2.5	2.4	2.4	2.4
Euro area	2.1	1.4	1.6	1.6	1.7	1.9	1.9	2.0	2.0	2.0	2.0	2.1
Germany	1.4	1.8	1.7	1.7	1.7	1.8	1.9	2.0	2.0	1.9	1.9	1.9
Emerging market economies	2.4	1.7	2.5	2.9	3.4	3.6	3.6	3.7	3.8	3.8	3.8	3.8
Asia	4.3	3.7	4.3	4.7	4.9	4.9	4.9	4.9	4.9	4.9	4.8	4.8
Korea	3.3	1.3	3.2	3.9	3.9	3.9	3.9	3.9	3.7	3.7	3.7	3.7
China	5.7	7.2	7.4	6.5	6.3	6.2	6.2	6.2	6.1	6.1	6.1	6.1
Latin America	.9	.1	1.0	1.4	2.2	2.5	2.6	2.6	2.9	2.9	2.9	3.0
Mexico	1.7	2.0	2.3	2.2	2.7	3.1	3.1	3.1	3.1	3.1	3.1	3.2
Brazil	-3.0	-7.2	-4.1	-9	.6	.8	1.1	1.4	1.8	2.1	2.1	2.1
<b>Consumer prices<sup>2</sup></b>												
Total foreign	.1	2.5	2.0	1.7	2.2	2.3	2.4	2.4	2.4	2.9	2.5	2.5
<i>Previous Tealbook</i>	-.1	2.6	2.3	2.0	2.3	2.3	2.4	2.4	2.4	2.9	2.4	2.5
Advanced foreign economies	-8	2.0	.7	.5	1.2	1.4	1.5	1.6	1.6	2.6	1.6	1.7
Canada	-2	2.5	2.4	1.5	1.6	1.7	1.8	1.9	2.0	2.0	2.0	2.0
Japan	-3	1.7	.0	-.5	.4	.9	1.0	1.1	1.2	6.5	1.2	1.2
United Kingdom	-1.3	.9	1.0	.6	1.6	1.8	1.9	1.9	1.9	2.0	2.0	2.0
Euro area	-1.3	2.3	-3	.3	1.2	1.4	1.5	1.5	1.5	1.5	1.5	1.6
Germany	-1.6	2.2	-4	.3	1.3	1.5	1.6	1.7	1.7	1.7	1.7	1.7
Emerging market economies	.8	3.0	3.0	2.7	3.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Asia	.1	2.7	2.7	2.1	2.7	2.7	2.8	2.8	2.8	2.8	2.8	2.8
Korea	.1	1.5	-.9	2.2	2.9	3.0	3.2	3.2	3.2	3.2	3.2	3.3
China	.2	2.5	3.3	1.9	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Latin America	2.2	3.7	4.0	3.8	3.9	3.9	3.9	3.9	3.7	3.7	3.7	3.7
Mexico	1.0	2.7	2.9	3.1	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Brazil	10.9	10.2	10.1	7.6	6.6	6.2	6.2	6.2	5.7	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	-----Projected-----									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	
<b>Real GDP<sup>1</sup></b>										
Total foreign	4.8	3.2	2.4	2.7	2.5	1.8	2.8	2.8	2.9	
<i>Previous Tealbook</i>	4.8	3.2	2.3	2.7	2.5	1.8	2.9	2.8	2.9	
Advanced foreign economies	3.1	1.8	.4	2.0	1.7	1.2	2.0	1.8	1.9	
Canada	3.6	3.0	1.0	2.7	2.5	.8	2.2	1.9	1.8	
Japan	3.6	.3	.0	2.3	-8	1.1	1.1	-3	1.0	
United Kingdom	1.8	2.1	1.0	2.8	3.0	2.3	2.7	2.4	2.4	
Euro area	2.4	.6	-1.0	.6	.9	1.7	1.9	2.0	2.0	
Germany	4.5	2.4	.1	1.3	1.5	1.6	1.8	1.9	1.8	
Emerging market economies	6.7	4.6	4.3	3.4	3.2	2.4	3.6	3.8	3.9	
Asia	8.4	4.9	5.7	5.3	4.9	4.3	4.9	4.8	4.8	
Korea	6.1	2.9	2.1	3.4	2.7	2.9	3.9	3.7	3.7	
China	10.0	8.6	7.9	7.6	7.2	6.7	6.2	6.1	6.0	
Latin America	4.7	4.2	3.4	1.5	1.8	.8	2.5	2.9	3.1	
Mexico	4.4	4.2	3.4	1.0	2.6	2.1	3.0	3.1	3.2	
Brazil	5.8	2.5	2.3	2.0	-3	-3.8	1.0	2.0	2.1	
<b>Consumer prices<sup>2</sup></b>										
Total foreign	3.2	3.4	2.3	2.3	2.0	1.6	2.4	2.6	2.5	
<i>Previous Tealbook</i>	3.2	3.4	2.3	2.3	2.0	1.7	2.4	2.6	2.5	
Advanced foreign economies	1.7	2.2	1.3	1.0	1.2	.6	1.4	1.9	1.7	
Canada	2.2	2.7	1.0	1.0	1.9	1.5	1.7	2.0	2.0	
Japan	-3	-3	-2	1.4	2.5	.2	.8	2.5	1.3	
United Kingdom	3.4	4.6	2.6	2.1	.9	.3	1.8	2.0	2.0	
Euro area	2.0	2.9	2.3	.8	.2	.2	1.4	1.5	1.6	
Germany	1.6	2.6	2.0	1.3	.4	.1	1.5	1.7	1.8	
Emerging market economies	4.3	4.3	3.1	3.3	2.6	2.4	3.1	3.1	3.1	
Asia	4.3	4.5	2.6	3.1	1.7	1.9	2.7	2.8	2.8	
Korea	3.2	3.9	1.7	1.1	1.0	1.2	3.1	3.2	3.2	
China	4.6	4.6	2.0	2.9	1.5	2.0	2.5	2.5	2.5	
Latin America	4.4	4.0	4.3	4.0	4.8	3.4	3.9	3.7	3.7	
Mexico	4.3	3.5	4.1	3.6	4.2	2.4	3.3	3.3	3.3	
Brazil	5.6	6.7	5.6	5.9	6.6	9.7	6.3	5.5	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				Projected-----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>-473.2</b>	<b>-438.7</b>	<b>-454.9</b>	<b>-491.3</b>	<b>-578.7</b>	<b>-595.7</b>	<b>-647.4</b>	<b>-688.5</b>	<b>-748.7</b>	<b>-752.6</b>	<b>-783.5</b>	<b>-809.5</b>
<i>Previous Tealbook</i>	-469.5	-456.7	-454.7	-512.2	-588.5	-604.2	-653.8	-696.7	-758.7	-756.7	-784.2	-808.3
Current account as percent of GDP	-2.7	-2.4	-2.5	-2.7	-3.2	-3.2	-3.5	-3.7	-3.9	-3.9	-4.0	-4.1
<i>Previous Tealbook</i>	-2.7	-2.6	-2.5	-2.8	-3.2	-3.3	-3.5	-3.7	-4.0	-3.9	-4.0	-4.1
Net goods & services	-537.2	-520.0	-535.8	-561.2	-633.2	-662.4	-710.1	-736.6	-778.1	-786.1	-802.9	-814.3
Investment income, net	208.8	212.7	214.8	207.2	204.8	198.8	194.7	185.3	179.6	165.7	151.4	142.0
Direct, net	278.8	280.6	273.2	271.5	282.6	291.7	303.6	312.4	325.6	332.6	340.5	353.4
Portfolio, net	-70.0	-67.9	-58.4	-64.3	-77.8	-92.9	-108.8	-127.1	-146.0	-166.9	-189.1	-211.4
Other income and transfers, net	-144.8	-131.4	-133.9	-137.3	-150.3	-132.1	-132.0	-137.3	-150.3	-132.1	-132.0	-137.3

## Annual Data

	Projected-----									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	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>-376.8</b>	<b>-389.5</b>	<b>-464.5</b>	<b>-627.6</b>	<b>-773.6</b>	<b>-839.8</b>	
<i>Previous Tealbook</i>	-442.0	-460.4	-449.7	-376.8	-389.5	-473.3	-635.8	-777.0	-827.4	
Current account as percent of GDP	-3.0	-3.0	-2.8	-2.3	-2.2	-2.6	-3.4	-4.0	-4.2	
<i>Previous Tealbook</i>	-3.0	-3.0	-2.8	-2.3	-2.2	-2.6	-3.4	-4.0	-4.1	
Net goods & services	-494.7	-548.6	-536.8	-478.4	-508.3	-538.5	-685.6	-795.3	-824.4	
Investment income, net	185.7	229.0	220.8	233.6	247.4	210.9	195.9	159.7	122.5	
Direct, net	288.0	298.6	290.2	301.7	300.5	276.0	297.6	338.0	386.8	
Portfolio, net	-102.3	-69.5	-69.4	-68.1	-53.1	-65.2	-101.6	-178.3	-264.3	
Other income and transfers, net	-133.0	-140.8	-133.7	-132.0	-128.6	-136.8	-137.9	-137.9	-137.9	

## Abbreviations

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ABS	asset-backed securities
AFE	advanced foreign economy
BEA	Bureau of Economic Analysis
BOC	Bank of Canada
BOE	Bank of England
BOJ	Bank of Japan
CDS	credit default swaps
C&I	commercial and industrial
CMBS	commercial mortgage-backed securities
CP	commercial paper
CPI	consumer price index
CRE	commercial real estate
Desk	Open Market Desk
DSGE	dynamic stochastic general equilibrium
EME	emerging market economy
FOMC	Federal Open Market Committee; also, the Committee
GCF	General Collateral Finance
GDP	gross domestic product
GSE	government-sponsored enterprise
IP	industrial production
MBS	mortgage-backed securities
MERS	Middle East Respiratory Syndrome
OIS	overnight index swap
ON RRP	overnight reverse repurchase agreement
PCE	personal consumption expenditures
PMI	purchasing managers index
RRP	reverse repurchase agreement
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