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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: Outlook, Risks, and Policy Strategies

June 1, 2018

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

## Comparing the Staff Projection with Other Forecasts

The staff's projection for real GDP growth in 2018 is the same as the projections from both the Survey of Professional Forecasters (SPF) and the Blue Chip consensus and a touch higher than the Blue Chip in 2019. The staff's unemployment rate forecast is 0.1 to 0.2 percentage point below the outside forecasts in both 2018 and 2019. The staff's projections for total CPI inflation in 2018 is a touch higher than the outside forecasts and the same as the outside forecasts for 2019. The staff forecasts for total and core PCE inflation are the same or lower than the forecasts from the SPF.

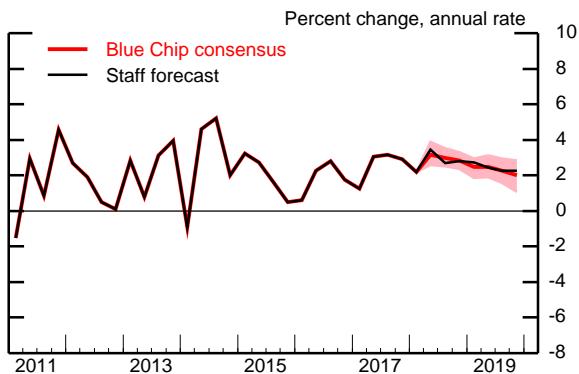
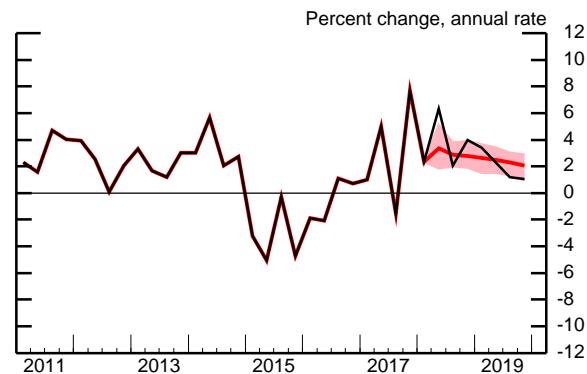
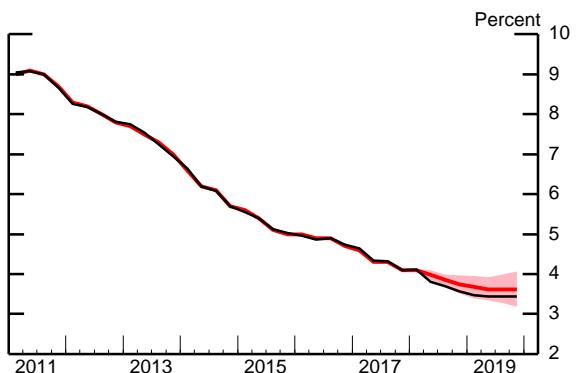
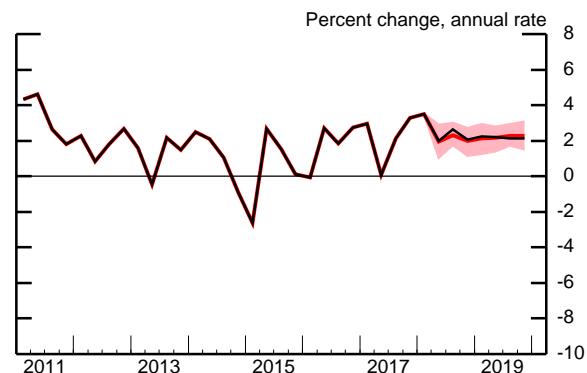
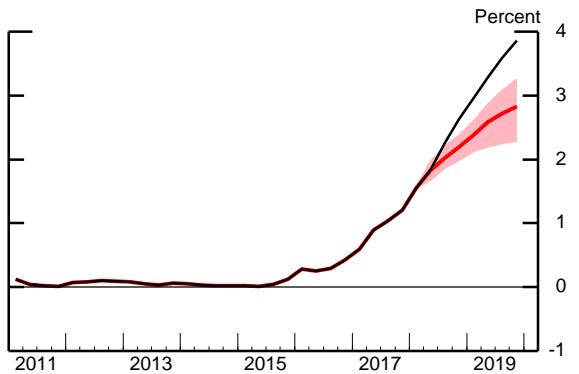
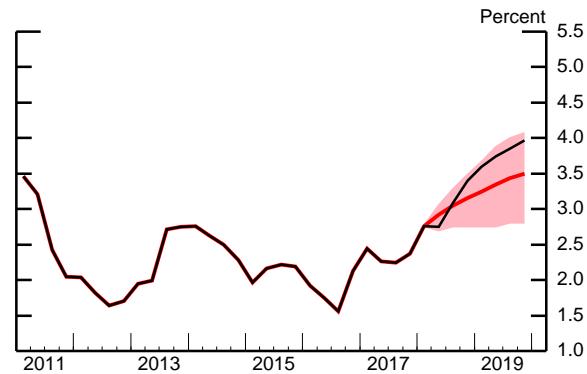
### Comparison of Tealbook and Outside Forecasts

	2018	2019
<b>GDP (Q4/Q4 percent change)</b>		
June Tealbook	2.8	2.4
Blue Chip (05/10/18)	2.8	2.3
SPF median (05/11/18)	2.8	n.a.
<b>Unemployment rate (Q4 level)</b>		
June Tealbook	3.6	3.4
Blue Chip (05/10/18)	3.7	3.6
SPF median (05/11/18)	3.8	n.a.
<b>CPI inflation (Q4/Q4 percent change)</b>		
June Tealbook	2.6	2.2
Blue Chip (05/10/18)	2.5	2.2
SPF median (05/11/18)	2.5	2.2
<b>PCE price inflation (Q4/Q4 percent change)</b>		
June Tealbook	2.1	1.9
SPF median (05/11/18)	2.1	2.1
<b>Core PCE price inflation (Q4/Q4 percent change)</b>		
June Tealbook	1.9	2.0
SPF median (05/11/18)	2.2	2.1

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

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

## Tealbook Forecast Compared with Blue Chip

**Real GDP****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.

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

## Revisions to the Staff Projection since the Previous SEP

The FOMC most recently published its Summary of Economic Projections, or SEP, following the March FOMC meeting. The table below compares the staff's current economic projection with the one we presented in the March Tealbook.

Incoming data for GDP growth have been a little stronger than our expectations in the March Tealbook, while data on the labor market have been mixed, with a lower unemployment rate but also slower payroll growth on average. Our projection for real activity over the medium term has been revised down, reflecting somewhat weaker financial conditions (a stronger dollar and lower equity prices) as well as the small rethinks that we built into the current Tealbook regarding both supply constraints and consumer spending from the recent tax cuts. Thus, resource utilization, as measured by the unemployment gap or the output gap, is somewhat less tight in this projection than in the March Tealbook.

Our projection for headline inflation in 2018 is revised up a bit relative to the March Tealbook, reflecting the rise in oil prices in recent months. We continue to expect core inflation to edge up in coming years but by slightly less than we projected in March, given the revisions to resource utilization and the dollar. We now project core inflation to be just slightly above 2 percent, and headline inflation to be at 2 percent, by 2020.

With the projections for both resource utilization and inflation weaker than in the March Tealbook, the federal funds rate path from the inertial Taylor (1999) rule that we use in our baseline forecast now rises less steeply than in March.

**Staff Economic Projections Compared with the March Tealbook**

Variable	2017	2018		2018	2019	2020	Longer run
		H1	H2				
Real GDP <sup>1</sup> March Tealbook	2.6 2.6	2.8 2.6	2.7 3.3	2.8 2.9	2.4 2.6	1.8 2.1	1.7 1.7
Unemployment rate <sup>2</sup> March Tealbook	4.1 4.1	3.8 3.9	3.6 3.5	3.6 3.5	3.4 3.1	3.4 3.1	4.7 4.7
PCE inflation <sup>1</sup> March Tealbook	1.7 1.7	2.3 2.0	1.8 1.6	2.1 1.8	1.9 2.0	2.0 2.1	2.0 2.0
Core PCE inflation <sup>1</sup> March Tealbook	1.5 1.5	2.1 2.1	1.7 1.8	1.9 1.9	2.0 2.1	2.1 2.2	n.a. n.a.
Federal funds rate <sup>2</sup> March Tealbook	1.20 1.20	1.74 1.84	2.52 2.66	2.52 2.66	3.78 4.01	4.54 4.96	2.50 2.50
Memo: Federal funds rate, end of period March Tealbook	1.38 1.38	1.77 1.87	2.54 2.69	2.54 2.69	3.80 4.04	4.55 4.98	2.50 2.50
Output gap <sup>2,3</sup> March Tealbook	1.4 1.4	1.9 1.9	2.5 2.7	2.5 2.7	3.0 3.5	2.9 3.6	n.a. n.a.

1. Percent change from final quarter of preceding period to final quarter of period indicated.

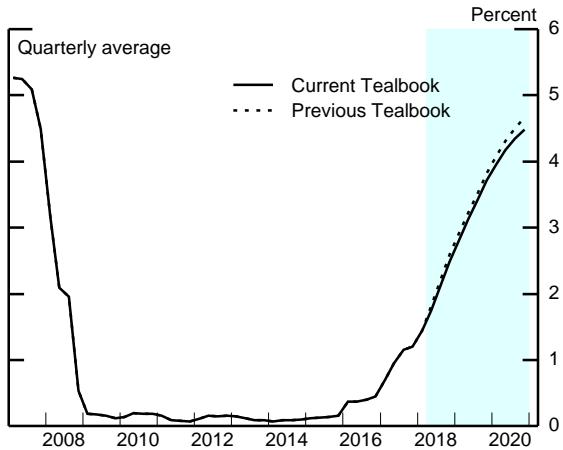
2. Percent, final quarter of period indicated.

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

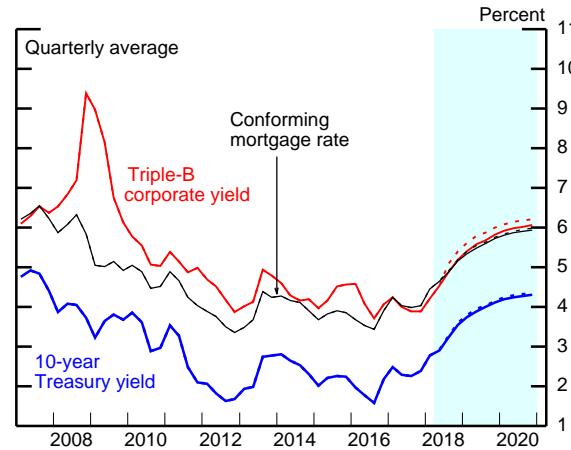
n.a. Not available.

## Key Background Factors underlying the Baseline Staff Projection

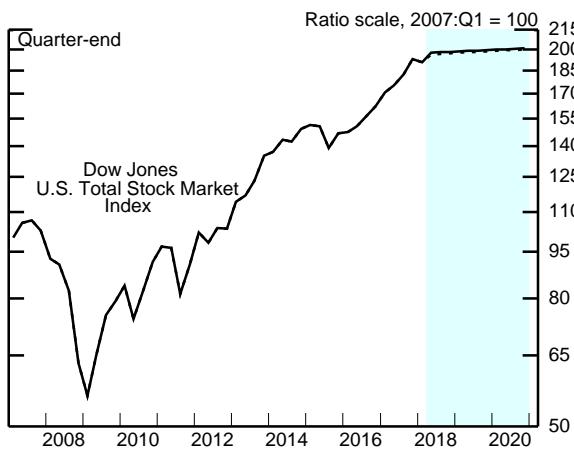
Federal Funds Rate



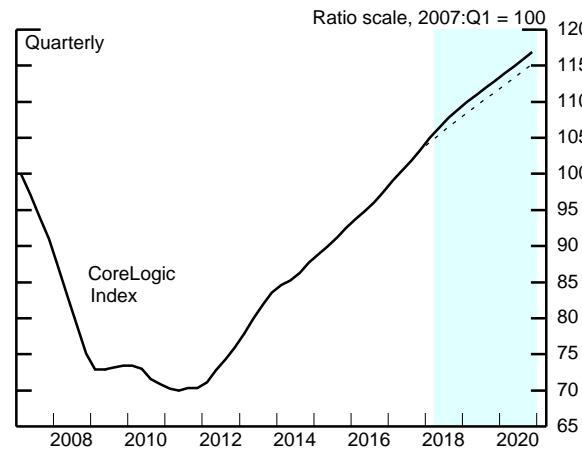
Long-Term Interest Rates



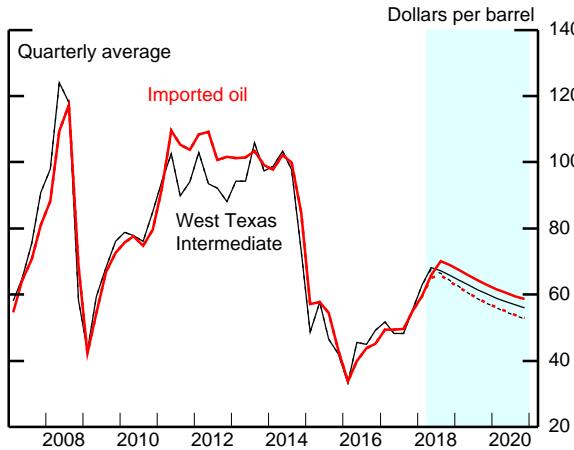
Equity Prices



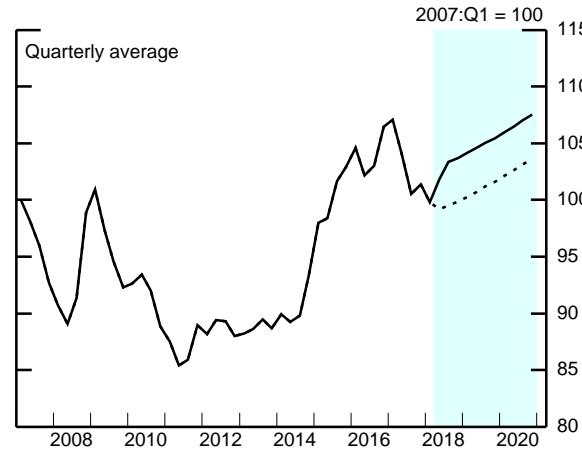
House Prices



Crude Oil Prices



Broad Real Dollar



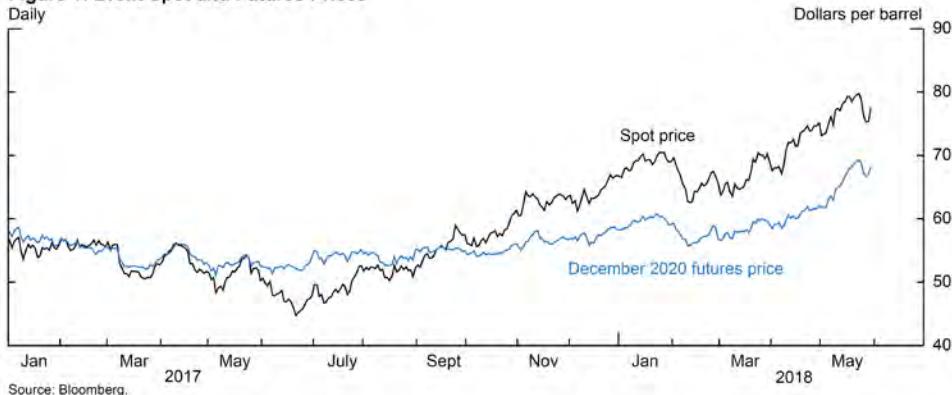
## The Recent Rise in Oil Prices

Oil prices have increased about 50 percent over the past year, with the spot price of Brent crude oil rising from about \$50 per barrel to about \$75 per barrel (figure 1). For most of the period, further-dated futures prices remained relatively stable, in the range of \$55 per barrel; however, since the time of the April Tealbook, futures prices have moved up appreciably, reaching nearly \$70 per barrel.

Both supply and demand factors have contributed to the oil price increase. In particular, the broad-based improvement in the outlook for the global economy was a key driver of the price increase in the second half of 2017. In recent months, supply concerns have become more prevalent, affecting both spot and further-dated futures prices. Despite sharply rising U.S. production, markets have been attuned to escalating conflict between Saudi Arabia and Iran as well as the precipitous decline in Venezuelan oil production amid the country's economic and political crisis. Prices also increased after President Trump announced on May 8 that the United States was withdrawing from the Iran nuclear deal and that sanctions against Iranian oil exports would be reinstated.

We expect oil prices to decline slowly through 2020 as geopolitical risks stabilize and as supply, including U.S. shale oil production, grows to meet demand. In addition, higher prices have put pressure on OPEC's November 2016 agreement with certain non-OPEC countries to restrain production. A stated aim of the agreement was to reduce the glut in global inventories, and, in recent months, inventory levels have fallen rapidly toward long-run averages. In response to both lower inventories and higher prices, OPEC leaders have recently expressed a willingness to discuss relaxing the production agreement at their upcoming meeting in June, reducing some of the upward pressure on prices. That said, we do think that some of the recent increase in prices is likely to be long lasting, and, in line with futures prices, we have increased our forecast for the price of oil at the end of 2020 by about \$7 per barrel relative to the April Tealbook.

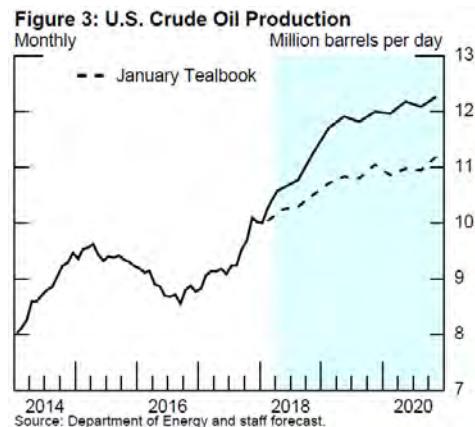
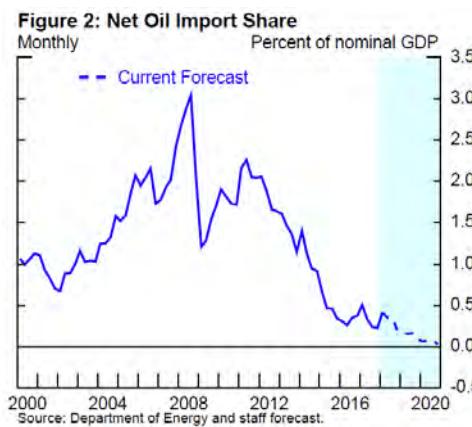
**Figure 1: Brent Spot and Futures Prices**



What is the expected effect of the recent rise in oil prices on the U.S. economy? To begin with, higher oil prices are likely to depress consumption. In particular, the increase in oil prices since last year is estimated to have translated into a roughly \$250 annual increase in expenditures on gasoline for each household, on average, from about \$1850 to \$2100. However, as indicated in figure 2, the share of net oil imports in U.S. GDP has declined substantially as U.S. oil production has grown rapidly over the past decade, so higher oil prices now imply much less of a redistribution of purchasing power overseas than in the past. Accordingly, much of the negative effect on GDP from lower consumer spending is likely to be offset by increased production and investment in the growing oil sector. In our projection, a \$10 per barrel increase in the long-run price of oil from current levels would lower the level of GDP by only about 5 basis points after three years, as the drag on consumption is largely offset by higher oil investment and production. This restraint is about one-fourth as large as it was a decade ago and should get smaller still as U.S. oil production grows, as seen in figure 3, and the net oil import share shrinks to zero.

Indeed, as U.S. oil trade moves into balance, the offsetting effects of a change in the relative price of oil might be expected to net out within the domestic economy. However, it is also possible that the marginal propensities to consume and invest differ sufficiently across U.S. oil consumers and producers such that increases in oil prices would still have a negative effect on overall GDP.

Even with zero net oil imports, changes in oil prices will still influence consumer price inflation. We currently estimate that a permanent \$10 per barrel rise in the price of oil from its current level increases core inflation by less than 0.1 percentage point after two years and increases headline inflation by a cumulative  $\frac{1}{4}$  percentage point, with most of the effects occurring in the first year.



## Cyclical Position of the U.S. Economy: Near-Term Perspective

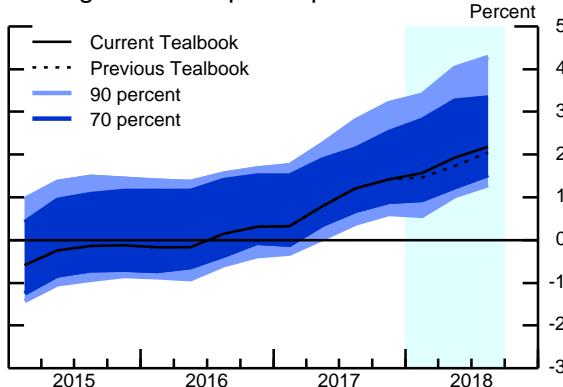
(Percent change at annual rate from final quarter of preceding period except as noted)

Measure	2015	2016	2017	2018 Q1	2018 Q2	2018 Q3
<b>Output gap<sup>1</sup></b>	<b>-.1</b>	<b>.3</b>	<b>1.4</b>	<b>1.6</b>	<b>1.9</b>	<b>2.2</b>
Previous Tealbook	-.1	.3	1.4	1.5	1.7	2.1
Real GDP	2.0	1.8	2.6	2.2	3.4	2.7
Previous Tealbook	2.0	1.8	2.6	1.7	2.9	3.0
Measurement error in GDP	-.3	-.2	-.1	-.1	.3	.0
Previous Tealbook	-.3	-.2	-.1	-.1	.0	.0
Potential output	1.5	1.6	1.5	1.7	1.7	1.7
Previous Tealbook	1.5	1.6	1.5	1.7	1.7	1.7

Note: The output gap is the percent difference between actual and potential output; a negative number indicates that the economy is operating below potential. The change in the output gap is equal to real GDP growth less the contribution of measurement error less the growth rate of potential output. For quarterly figures, the growth rates are at an annual rate, and this calculation needs to be multiplied by 1/4 to obtain the quarterly change in the output gap.

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

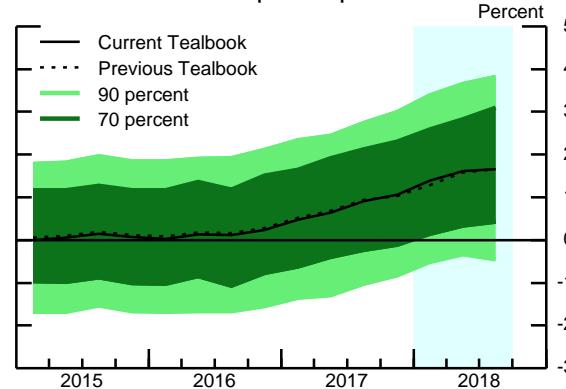
### Judgmental Output Gap



Note: Shaded regions show the distribution of historical revisions to the staff's estimates of the output gap.

Source: Various macroeconomic data; staff assumptions.

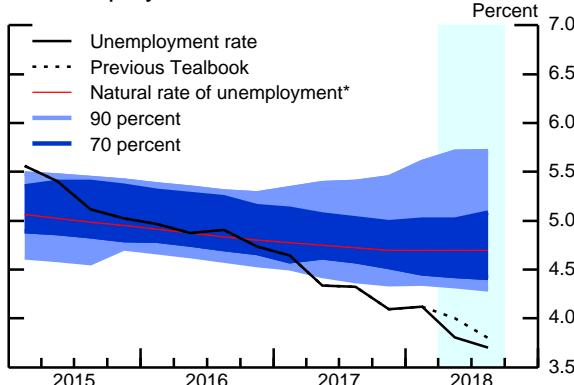
### Model-Based Output Gap



Note: Shaded regions denote model-computed uncertainty bands.

Source: Various macroeconomic data; staff assumptions.

### Unemployment Rate

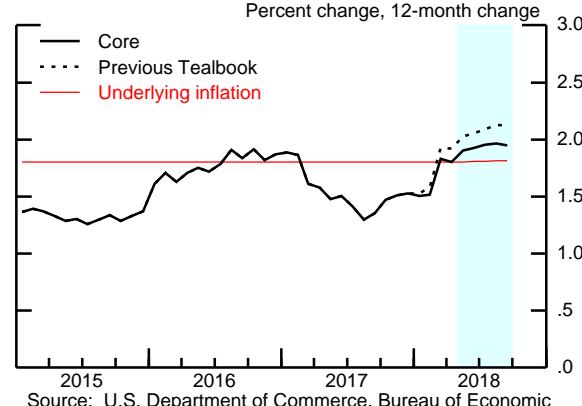


Note: Shaded regions show the distribution of historical revisions to the staff's estimates of the natural rate.

\*Staff estimate including the effect of EEB.

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

### Core PCE Price Inflation



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

## Summary of the Near-Term Outlook for GDP

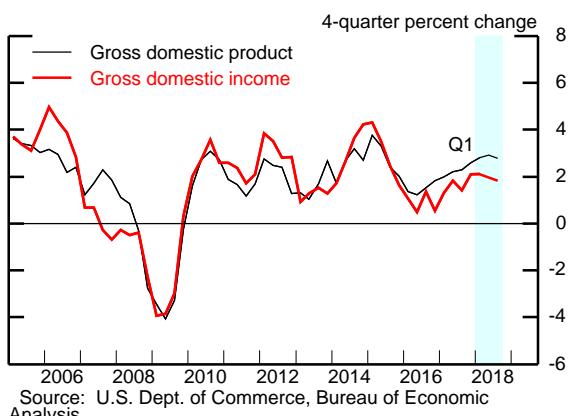
(Percent change at annual rate except as noted)

Measure	2018:Q2		2018:Q3		2018:H2	
	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook
<b>Real GDP</b>	<b>2.9</b>	<b>3.4</b>	<b>3.0</b>	<b>2.7</b>	<b>2.9</b>	<b>2.7</b>
Private domestic final purchases	2.8	3.2	3.2	3.0	3.1	2.9
Personal consumption expenditures	2.2	2.9	2.6	2.4	2.5	2.3
Residential investment	-2.1	-.9	5.0	-.7	5.0	.3
Nonres. private fixed investment	8.0	6.1	6.2	7.8	5.6	6.7
Government purchases	1.2	1.0	2.2	1.9	2.4	1.8
<i>Contributions to change in real GDP</i>						
Inventory investment <sup>1</sup>	.1	.3	-.3	-.2	-.4	-.1
Net exports <sup>1</sup>	.1	.2	.2	-.1	.2	.0

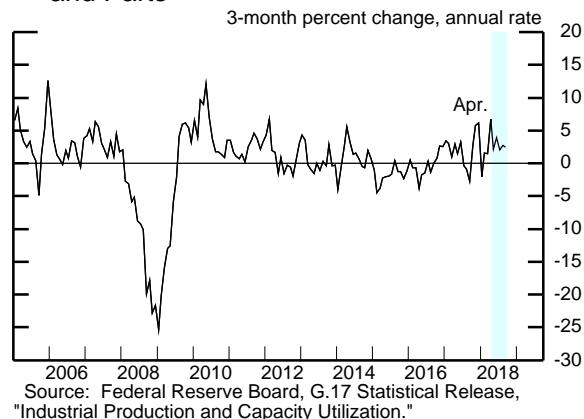
1. Percentage points.

### Recent Nonfinancial Developments (1)

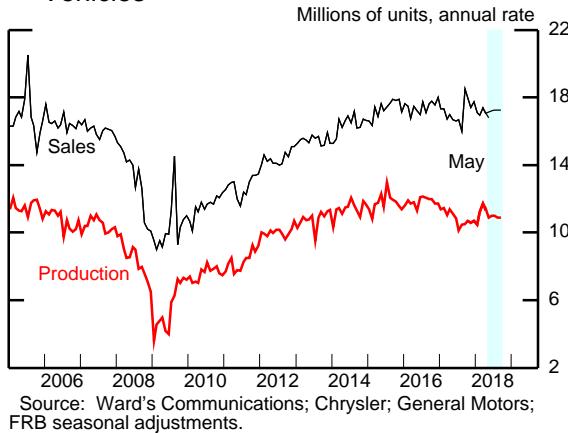
Real GDP and GDI



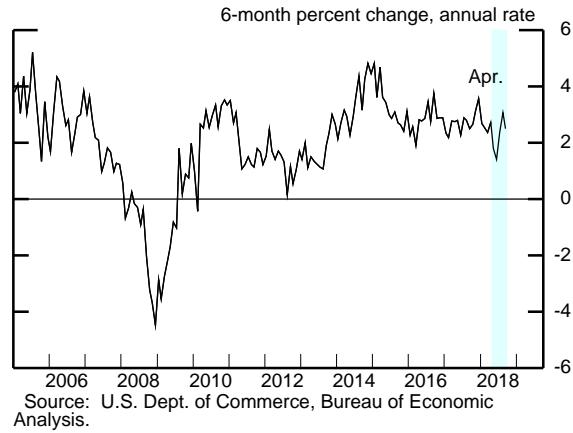
Manufacturing IP ex. Motor Vehicles and Parts



Sales and Production of Light Motor Vehicles

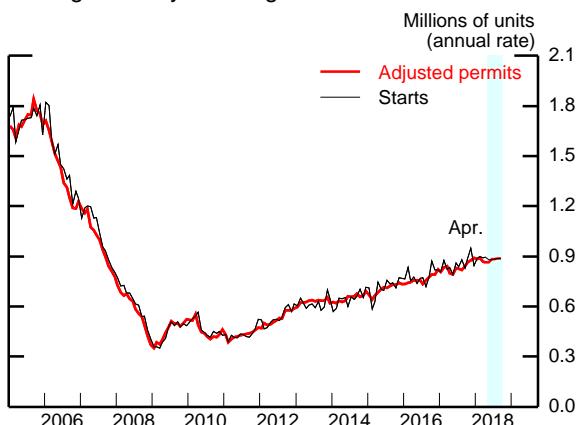


Real PCE Growth



## Recent Nonfinancial Developments (2)

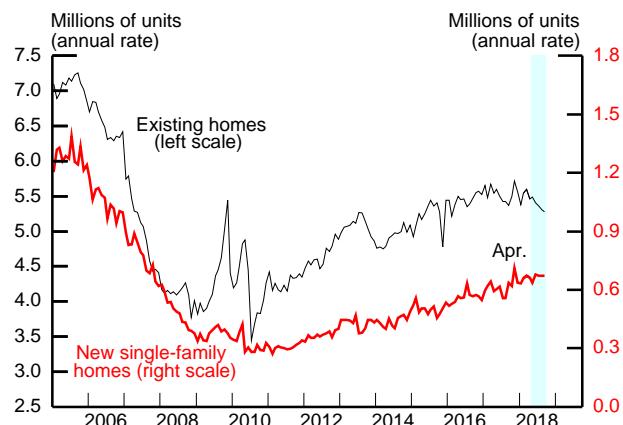
### Single-Family Housing Starts and Permits



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

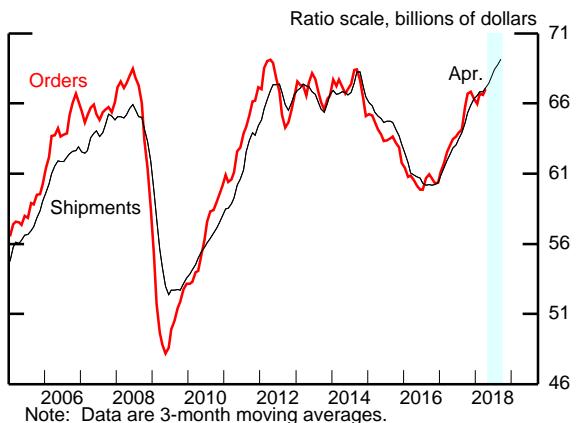
Source: U.S. Census Bureau.

### Home Sales



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

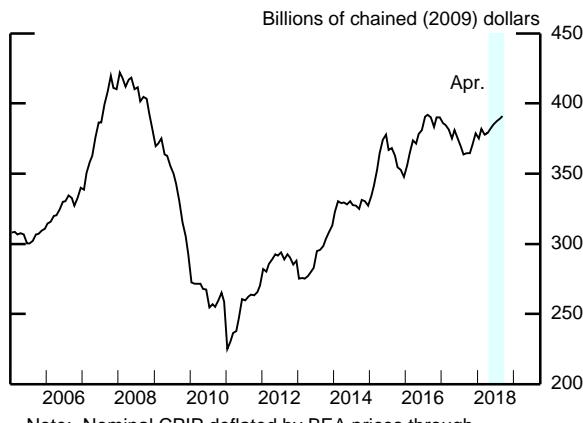
### Nondefense Capital Goods ex. Aircraft



Note: Data are 3-month moving averages.

Source: U.S. Census Bureau.

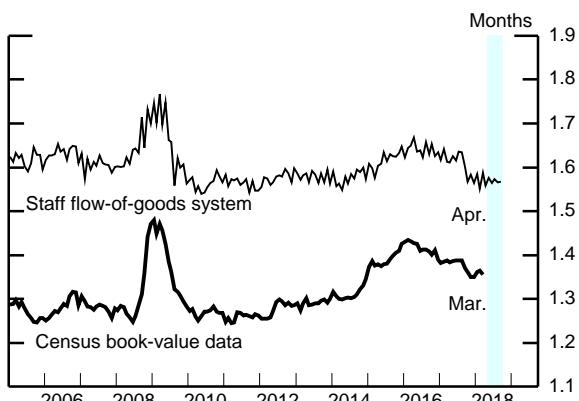
### Nonresidential Construction Put in Place



Note: Nominal CPIP deflated by BEA prices through 2017:Q4 and by the staff's estimated deflator thereafter.

Source: U.S. Census Bureau.

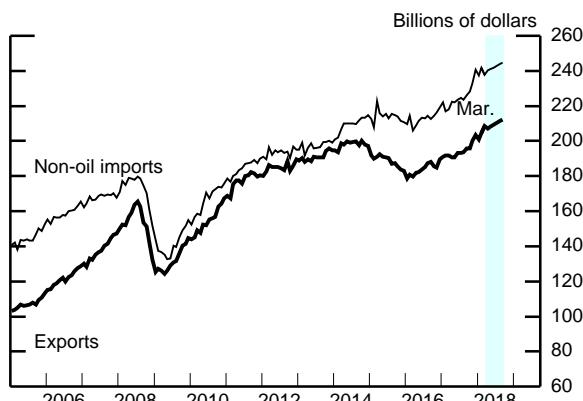
### Inventory Ratios



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

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

### Exports and Non-oil Imports



Note: Forecasts are linear interpolations of quarterly values.

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

**Federal Reserve System Nowcasts of 2018:Q2 Real GDP Growth**  
 (Percent change at annual rate from previous quarter)

Federal Reserve Entity	Type of model	Nowcast as of May 30, 2018
Federal Reserve Bank		
Boston	• Mixed-frequency BVAR	3.4
New York	• Factor-augmented autoregressive model combination • Factor-augmented autoregressive model combination, financial factors only • Dynamic factor model	2.4 2.3 3.0
Cleveland	• Bayesian regressions with stochastic volatility • Tracking model	2.7 3.6
Atlanta	• Tracking model combined with Bayesian vector autoregressions (VARs), dynamic factor models, and factor-augmented autoregressions (known as GDPNow)	4.1
Chicago	• Dynamic factor models • Bayesian VARs	2.2 3.3
St. Louis	• Dynamic factor models • News index model • Let-the-data-decide regressions	2.8 3.7 2.8
Kansas City	• Accounting-based tracking estimate	2.8
Board of Governors	• Board staff's forecast (judgmental tracking model) <sup>1</sup> • Monthly dynamic factor models (DFM-45) • Mixed-frequency dynamic factor model (DFM-BM)	2.9 3.1 3.8
Memo: Median of Federal Reserve System nowcasts		3.0

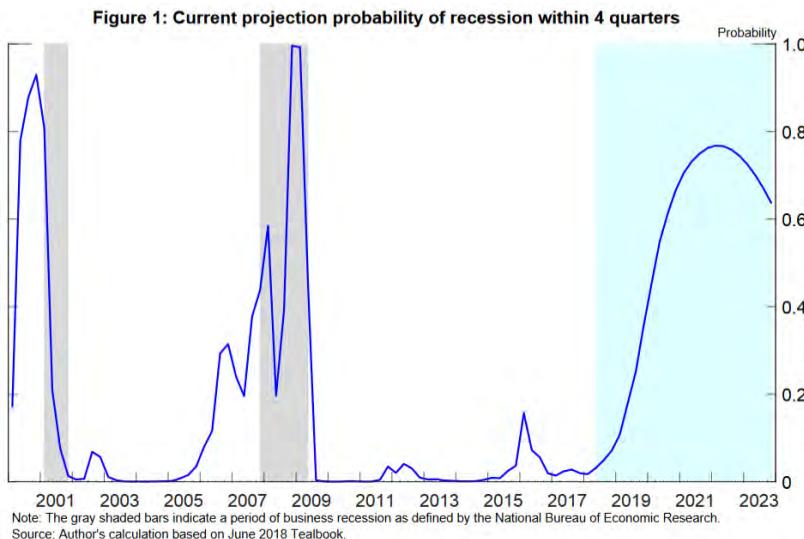
<sup>1</sup> The June Tealbook forecast, finalized on May 31, 2018, is 3.4 percent.

## Alternative View: A Strong but Precarious Projection

Engineering a soft landing to the current expansion, as we have penciled into the projection, will prove increasingly precarious. I use a simple logit regression framework to show that while the probability of a recession in the near future is small, the odds increase substantially further along the staff's baseline projection. This analysis is consistent with the Federal Reserve's historical difficulty with engineering a soft landing. Looking at real-time data in staff forecasts preceding the Great Recession, I illustrate how this framework correctly warned of an elevated risk of a recession in the near term that the staff did not fully take into account. In accordance with best practices, the staff is not currently forecasting a recession directly. However, this analysis shows that we are forecasting conditions that have presaged previous recessionary episodes and should consider either weakening the forecast or forecasting a recession in the early 2020s.

Specifically, I estimate a logit on data from 1965:Q1 to 2018:Q1 where the left-hand side is an indicator of "recession within four quarters" that is generated using NBER recession dating. The right-hand side consists of the term spread between the 10-year Treasury yield and the federal funds rate, the term premium on 10-year Treasury yields, the spread of triple-B-rated bonds over Treasury yields, and the staff's judgmental output gap.<sup>1</sup> Financial conditions and expectations are represented in the logit by the spreads and premiums, and the real side of the economy is represented by the output gap. All of the explanatory variables are statistically significant predictors of recessions.<sup>2</sup>

Figure 1 shows the recession probability generated by the logit using the June Tealbook projection. From 2020 to 2023, the probability of a recession beginning during the following four quarters is high. Analysis of the logit attributes the high probability to our projections of a high output gap, a term spread that turns negative in mid-2020, and an increasing triple-B spread. The recession



Note: This alternative view was prepared by David S. Miller.

<sup>1</sup> The term premium and triple-B spread are calculated based on the FRB/US model's structure and the specification of their corresponding interest rates.

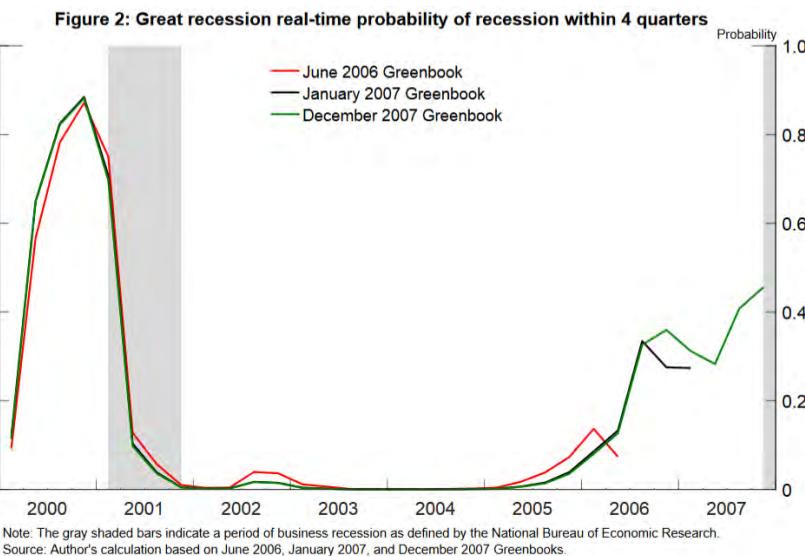
<sup>2</sup> The specification is robust to using the 10-year Treasury premium to modify the term spread variable rather than stand as a separate explanatory variable and to replacing the output gap with the unemployment gap.

probability exceeds 0.6 by the end of 2020, a threshold that foreshadows almost every recession in the post-1965 period.

To show that this framework could have forecast the Great Recession while the staff did not, I use similar logits to calculate the near future recession probability using real-time staff projections from three Greenbooks that precede, and coincide with, the start of the Great Recession. Each logit is estimated on data from 1965:Q1 until the most recent data available at the time of the corresponding Greenbook. The left-hand side is the indicator of “recession within four quarters” but is generated from NBER recession data that do not include the Great Recession. The right-hand side includes the same variables as the original logit.<sup>3</sup>

Figure 2 shows an elevated risk of a recession within the next four quarters starting in 2006, which is rising with each Greenbook. By the end of 2007—corresponding to when the NBER would later determine the Great Recession began—the real-time recession probability is high enough that, based on the logit, a recession was a likely outcome. While the staff had slightly weakened its near-term projection by the December 2007 Greenbook, we did not take into account the high, and increasing, probability of a recession within four quarters.<sup>4</sup>

The current projection suffers from dissonance: It is inconsistent with the probability of recession it implies. The staff projection is very strong and does not explicitly forecast a recession. However, according to my analysis, the projection implies a very high and rising probability of a recession. One way to address this dissonance would be to modify the unobserved components of the projection by changing the estimate of potential output, the natural rate of unemployment, or  $r^*$  to produce a lower output gap and steeper term spread. However, if we believe that the current medium-term projection is our best forecast through 2020, then the analysis presented here suggests that we should pencil in an outright recession in 2021 or 2022 (we currently project that GDP will grow more slowly than its potential rate, but not a recession).

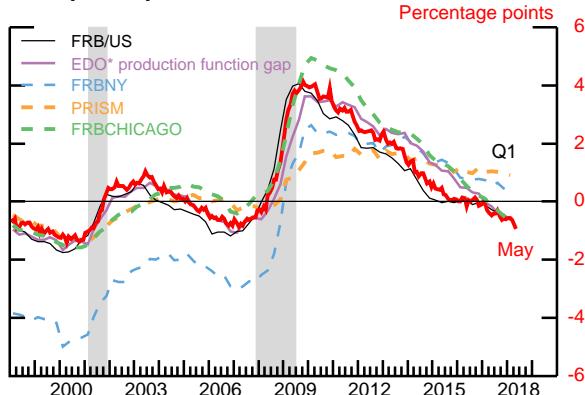


<sup>3</sup> These vintage Greenbooks did not contain the triple-B yield and spread. I include the triple-B spread in these logits to maintain consistency with the first logit and make the reported probabilities comparable. The spread would have been observable in real time.

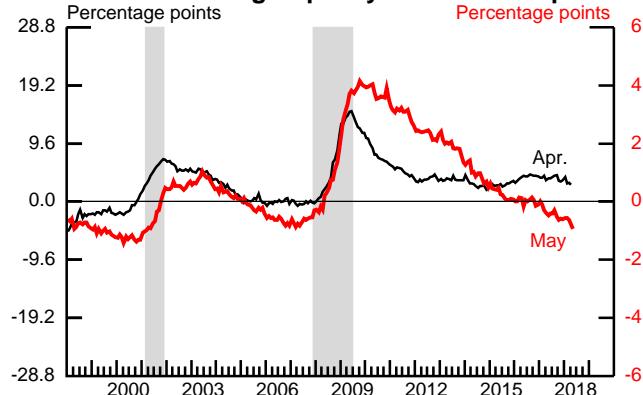
<sup>4</sup> The December 2007 Greenbook forecast real GDP growth in 2008 at 1½ percent compared with a forecast of 2¼ percent in the January 2007 Greenbook. Forecasts of real GDP growth in 2009 and later are similar in both Greenbooks.

**Alternative Measures of Slack**

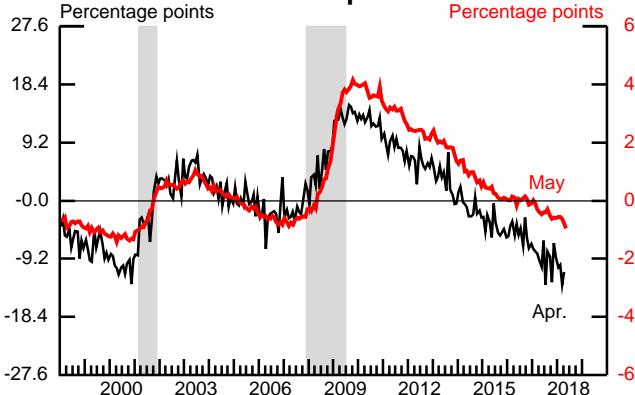
The red line in each panel is the staff's measure of the unemployment rate gap (right axis).

**Output Gaps**

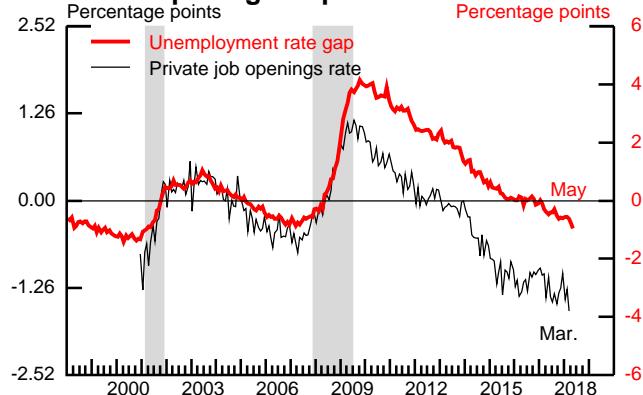
\* EDO is Estimated, Dynamic, Optimization-based model.  
Source: Federal Reserve Board; PRISM: Federal Reserve Board Bank of Chicago; Federal Reserve Board Bank of Philadelphia, PRISM Model Documentation (June 2011); FRBNY: Federal Reserve Bank of New York Staff Report 618 (May 2013, revised April 2014).

**Manufacturing Capacity Utilization Gap\***

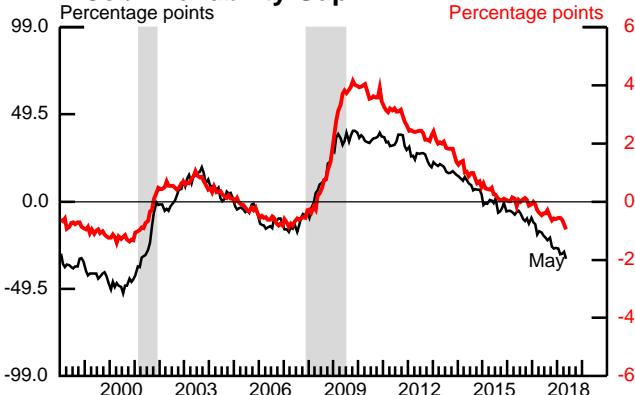
Source: Federal Reserve Board.

**Jobs Hard to Fill Gap\***

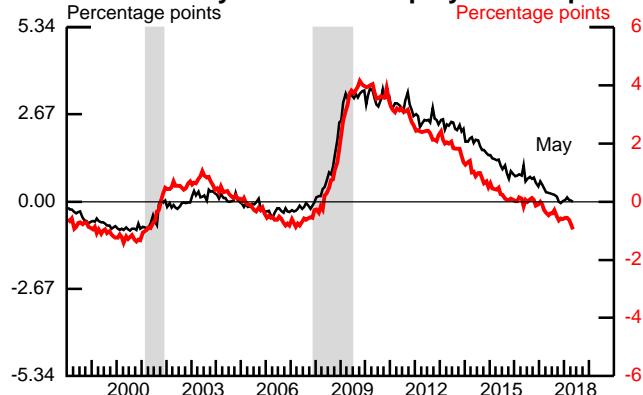
Note: Percent of small businesses surveyed with at least one "hard to fill" job opening. Seasonally adjusted by Federal Reserve Board Staff.  
Source: National Federation of Independent Business, Small Business Economic Trends Survey.

**Job Openings Gap\***

Note: Job openings rate is the number of job openings divided by employment plus job openings.  
Source: Job Openings and Labor Turnover Survey; U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics; Conference Board, Help Wanted OnLine.

**Job Availability Gap\***

Note: Percent of households believing jobs are plentiful minus the percent believing jobs are hard to get.  
Source: Conference Board.

**Involuntary Part-Time Employment Gap**

Note: Percent of employment.  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey.

\* Plots the negative of the gap to have the same sign as the unemployment rate gap.

Note: The shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research. Output gaps are multiplied by negative 0.54 to facilitate comparison with the unemployment rate gap. Manufacturing capacity utilization gap is constructed by subtracting its average rate from 1972 to 2013. Other gaps were constructed by subtracting each series' average in 2004:Q4 and 2005:Q1.

## Inflation Perceptions and Inflation Expectations

Given the presumed role of inflation expectations in influencing actual inflation, it is important to understand the survey evidence on expectations. Currently, however, there are many unanswered questions about measures of expected inflation from household surveys like the University of Michigan Surveys of Consumers. For example, it is not clear how to interpret the fact that consumers tend to expect future inflation that is higher than official estimates of past inflation. Do survey respondents actually expect inflation to be higher in the future than it is now, or do they think current inflation has been higher than indicated by the official statistics? And, does the downward drift in households' long-term inflation expectations that began in mid-2014 reflect a decrease over time in their perceptions of past inflation? That is, are households' expectations somewhat adaptive?

Insight may come from better understanding individuals' perceptions of recent inflation—namely, what consumers think inflation has been in the past. In 2016, the University of Michigan Surveys of Consumers began asking the following questions on inflation perceptions four times a year.<sup>1</sup>

**Short-term perceptions:** During the past 12 months, do you think that prices in general went up or went down, or stayed where they were a year ago? By about what percent do you think prices went (up/down), on the average, during the past 12 months?

**Long-term perceptions:** What about prices over the past 5 to 10 years? Do you think prices now are higher, about the same, or lower than they were 5 to 10 years ago? By about what percent per year do you think prices went (up/down), on the average, during the past 5 to 10 years?

Figures 1 and 2 summarize the distributions of responses on long-term inflation perceptions and expectations from the February 2018 survey. The two distributions are

Figure 1: Perceived Average Inflation over the Past 5 to 10 Years

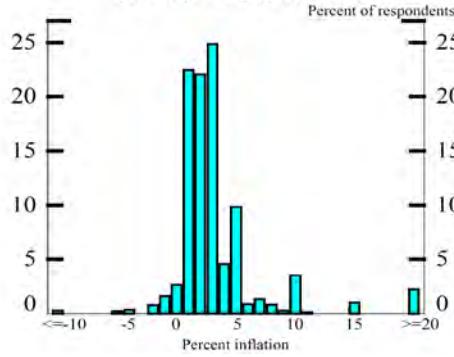
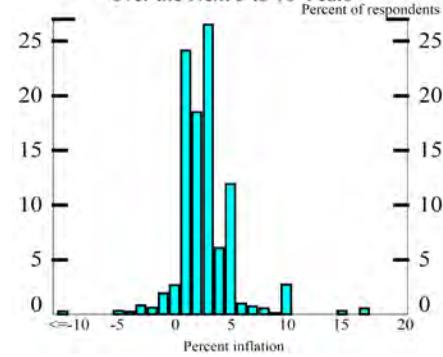


Figure 2: Expected Average Inflation over the Next 5 to 10 Years



Note: Weighted using households' weights in the survey.

Source: University of Michigan Surveys of Consumers; Federal Reserve Board staff calculations.

<sup>1</sup> The Federal Reserve Board contracted the University of Michigan Survey Research Center to include these questions. The perceptions questions are worded consistently with the questions on inflation expectations and are posed in February, May, August, and November.

similar, with the bulk of the responses falling between 1 and 5 percent, but the distribution of perceptions has slightly more responses in the right tail. (Note that inflation experiences differ across households, and the distribution of perceptions could reflect, at least in part, these differences.)

Figure 3 plots the median responses for both short- and long-term inflation perceptions and expectations. As illustrated by the black lines, median long-term inflation expectations (the solid line) have been quite similar to median long-term perceptions (the dashed line). These median readings suggest that households do not expect inflation to increase relative to what they perceive to have experienced over the past 5 to 10 years, even though the median expectations are higher than official estimates of inflation. Median short-term inflation perceptions (red dashed line), on the other hand, have run lower than long-term inflation perceptions as well as both short- and long-term expectations. One natural interpretation is that households have perceived inflation as being relatively low over the past few years, compared with the past 5 to 10 years, and that they expect it to move up to the level of the past 5 to 10 years both over the near term and the longer term. Measured official inflation was indeed low in 2015 and 2016. However, headline inflation has moved up more recently, and median short-term perceptions show just a hint of that upward drift.

The University of Michigan Survey Research Center began collecting the data on inflation perceptions after the downward drift in long-term expectations was largely complete, making it impossible to assess whether perceptions have declined in conjunction with expectations. Nevertheless, the cross-sectional aspect of the data provides some suggestive evidence on this issue. Figure 4 shows a scatterplot of individual responses to the two long-term inflation questions and indicates that those who perceive inflation to have been higher in the past also expect inflation to be higher in the future.<sup>2</sup> In addition, people who revised up their answer about long-term perceptions between surveys also tended to revise up their long-term expectations (not shown). These correlations suggest that the downward drift in expectations that began in 2014 could have reflected lower perceptions, possibly in response to the recent low inflation. We hope to learn much more from these data in the future.

Figure 3: Median Inflation Perceptions and Expectations

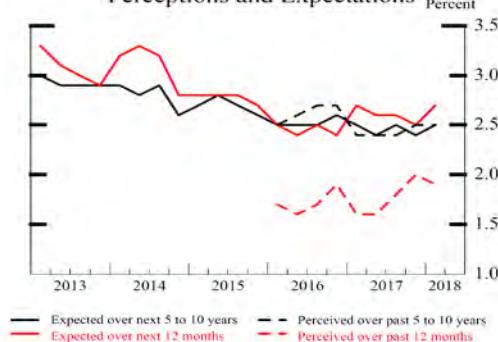
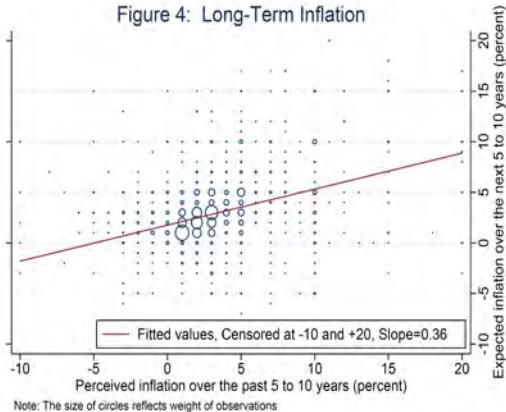


Figure 4: Long-Term Inflation

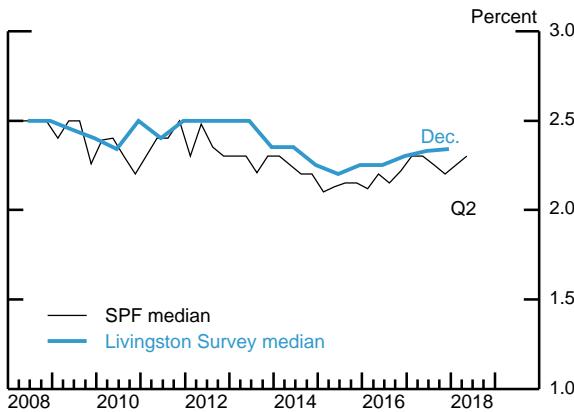


Source: University of Michigan Surveys of Consumers; Federal Reserve Board staff calculations.

<sup>2</sup> This result holds even when controlling for demographics.

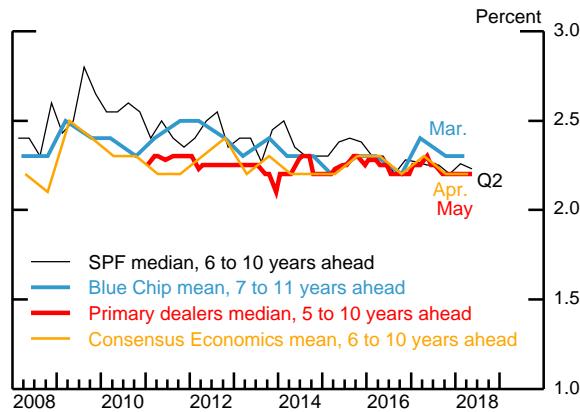
## Survey Measures of Longer-Term Inflation Expectations

CPI Next 10 Years



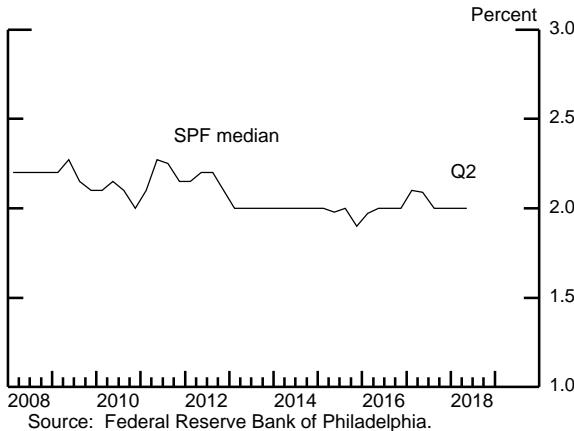
Note: SPF is Survey of Professional Forecasters.  
Source: Federal Reserve Bank of Philadelphia.

CPI Forward Expectations



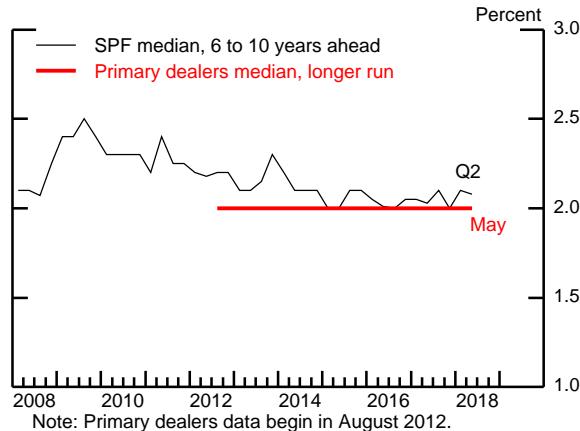
Source: Federal Reserve Bank of Philadelphia; Blue Chip Economic Indicators; Federal Reserve Bank of New York; Consensus Economics.

PCE Next 10 Years



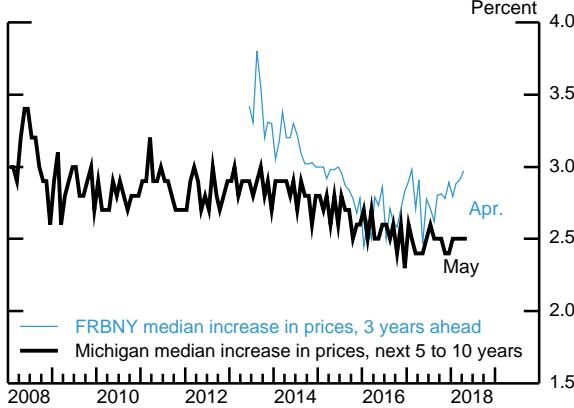
Source: Federal Reserve Bank of Philadelphia.

PCE Forward Expectations



Note: Primary dealers data begin in August 2012.  
Source: Federal Reserve Bank of Philadelphia; Federal Reserve Bank of New York.

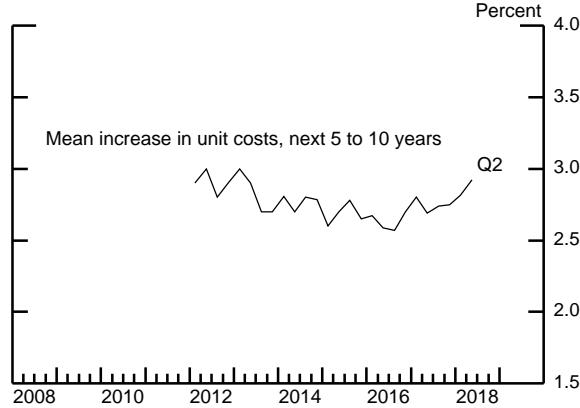
Surveys of Consumers



Note: Federal Reserve Bank of New York (FRBNY) Survey of Consumer Expectations reports expected 12-month inflation rate 3 years from the current survey date. FRBNY data begin in June 2013.

Source: University of Michigan Surveys of Consumers; Federal Reserve Bank of New York Survey of Consumer Expectations.

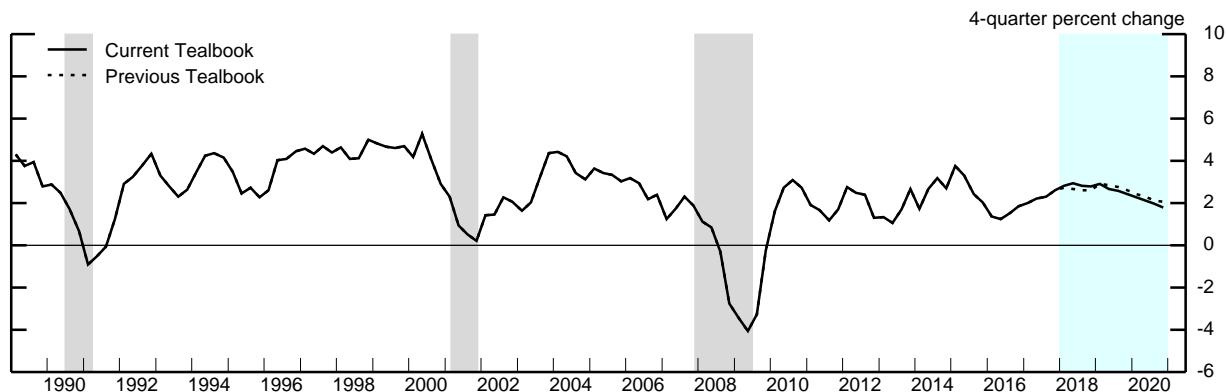
Survey of Business Inflation Expectations



Note: Survey of businesses in the Sixth Federal Reserve District. Data begin in February 2012.  
Source: Federal Reserve Bank of Atlanta.

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

Measure	2017	2018		2018	2019	2020
		H1	H2			
<b>Real GDP</b>		<b>2.6</b>	<b>2.8</b>	<b>2.7</b>	<b>2.8</b>	<b>2.4</b>
Previous Tealbook		2.6	2.3	2.9	2.6	2.1
Final sales		2.9	2.6	2.8	2.7	2.5
Previous Tealbook		2.9	1.7	3.3	2.5	2.7
Personal consumption expenditures		2.8	2.0	2.3	2.2	2.6
Previous Tealbook		2.8	1.7	2.5	2.1	2.7
Residential investment		2.6	-1.3	.3	-.5	.6
Previous Tealbook		2.6	-3.1	5.0	.9	1.7
Nonresidential structures		5.0	11.9	7.1	9.5	2.4
Previous Tealbook		5.0	9.5	5.9	7.7	2.0
Equipment and intangibles		6.7	6.4	6.5	6.5	4.2
Previous Tealbook		6.7	6.1	5.5	5.8	4.2
Federal purchases		1.0	1.4	3.4	2.4	4.0
Previous Tealbook		1.0	-1.2	4.8	1.8	4.1
State and local purchases		.5	.8	.9	.9	1.0
Previous Tealbook		.5	.7	1.0	.9	1.0
Exports		5.0	4.6	5.0	4.8	4.0
Previous Tealbook		5.0	4.2	6.3	5.2	5.2
Imports		4.7	2.8	3.8	3.3	4.5
Previous Tealbook		4.7	4.4	3.5	3.9	4.4
Contributions to change in real GDP (percentage points)						
Inventory change		-.3	.2	-.1	.1	.0
Previous Tealbook		-.3	.6	-.4	.1	-.1
Net exports		-.1	.1	.0	.1	-.2
Previous Tealbook		-.1	-.2	.2	.0	-.3

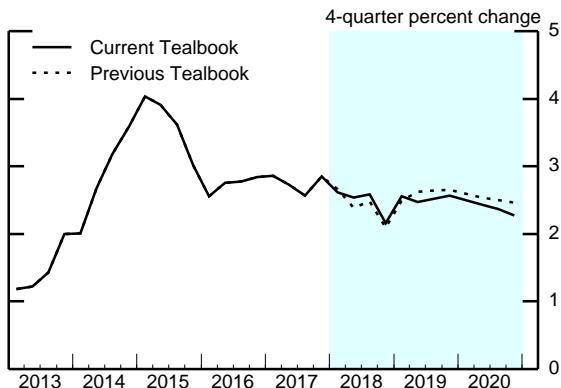
**Real GDP**

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

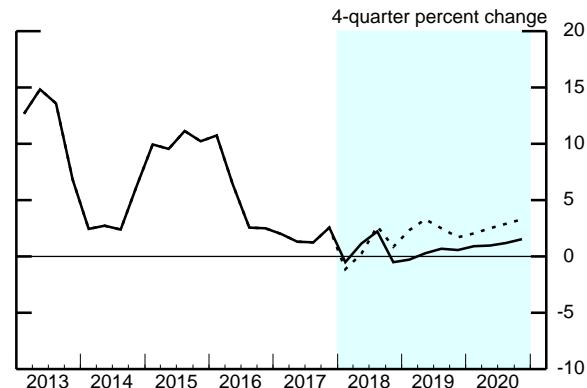
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

## Components of Final Demand

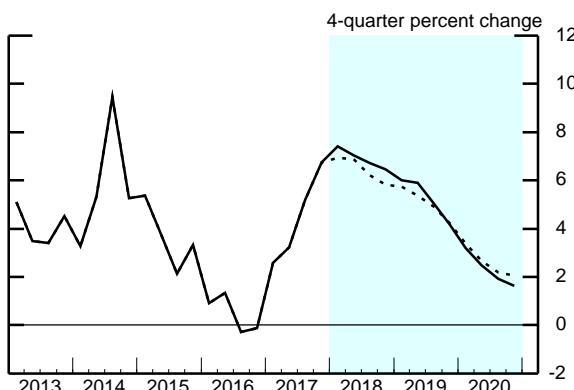
Personal Consumption Expenditures



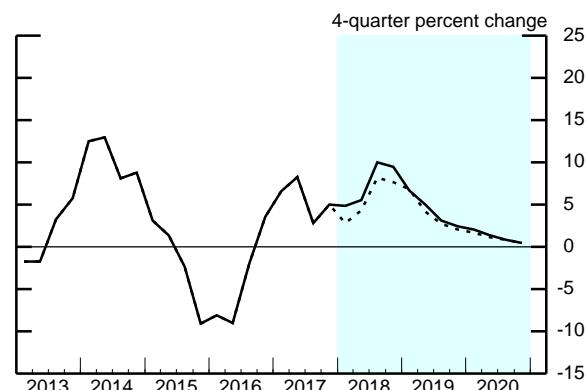
Residential Investment



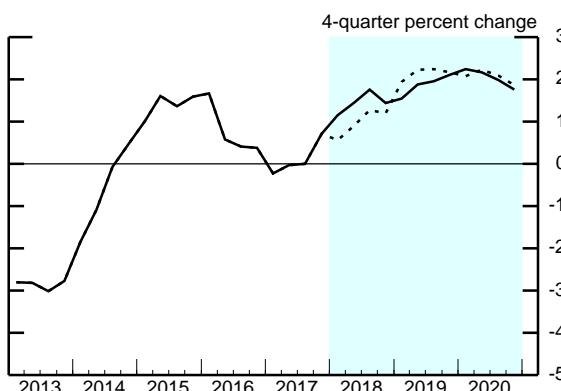
Equipment and Intangibles



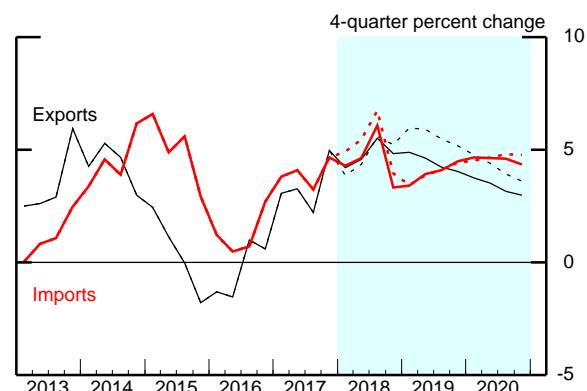
Nonresidential Structures



Government Consumption and Investment

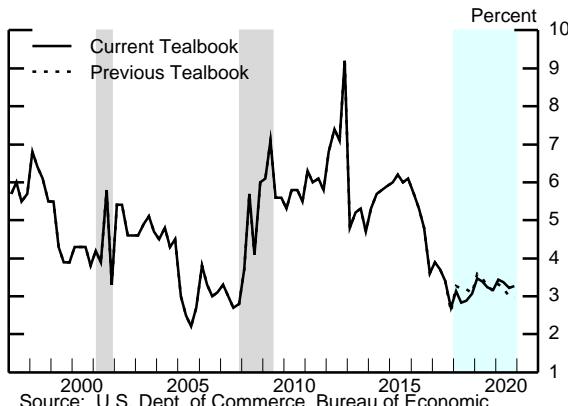


Exports and Imports

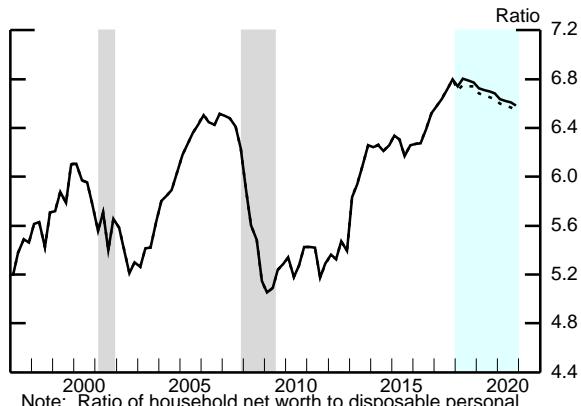


Source: U.S. Department of Commerce, Bureau of Economic Analysis.

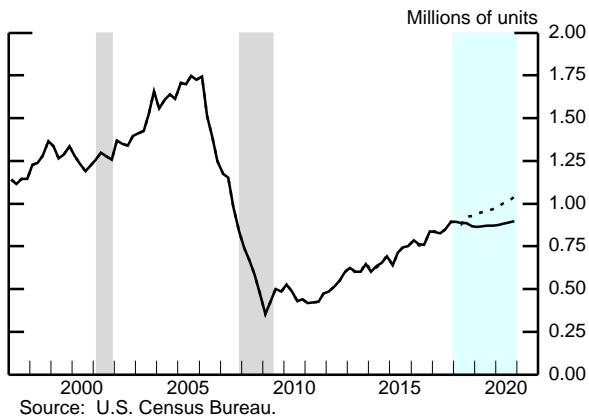
## Aspects of the Medium-Term Projection

**Personal Saving Rate**

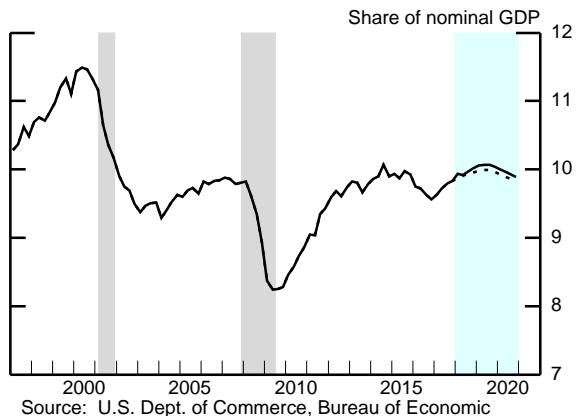
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

**Wealth-to-Income Ratio**

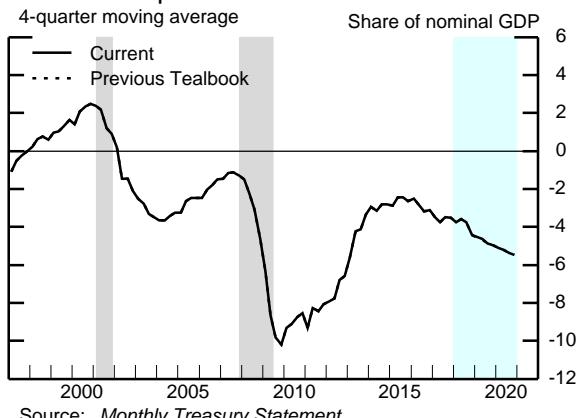
Source: For net worth, Federal Reserve Board, Financial Accounts of the United States; for income, U.S. Dept. of Commerce, Bureau of Economic Analysis.

**Single-Family Housing Starts**

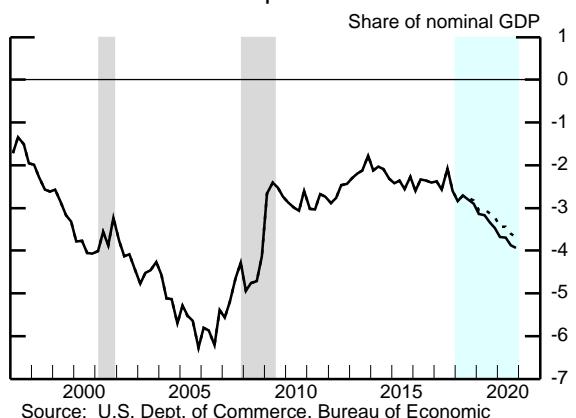
Source: U.S. Census Bureau.

**Equipment and Intangibles Spending**

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

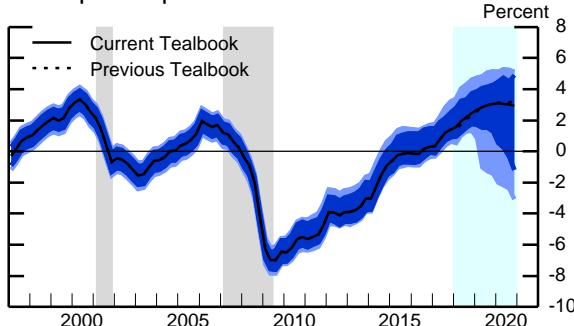
**Federal Surplus/Deficit**

Source: Monthly Treasury Statement.

**Current Account Surplus/Deficit**

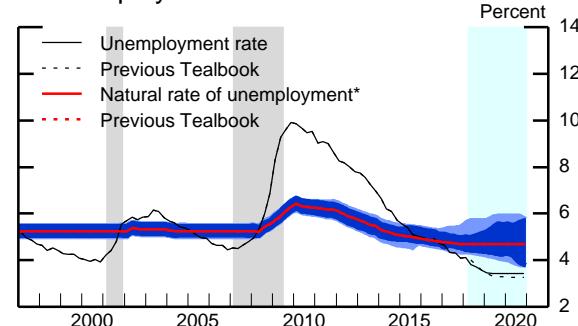
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

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

**Cyclical Position of the U.S. Economy: Longer-Term Perspective****Output Gap**

Note: Shaded regions show the 70 percent and 90 percent confidence intervals of the distribution of historical revisions to the staff's estimates of the output gap.

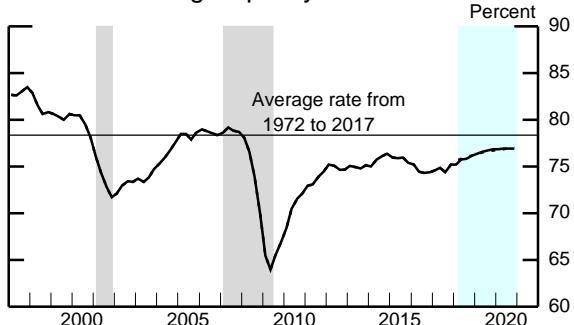
Source: Various macroeconomic data; staff assumptions.

**Unemployment Rate**

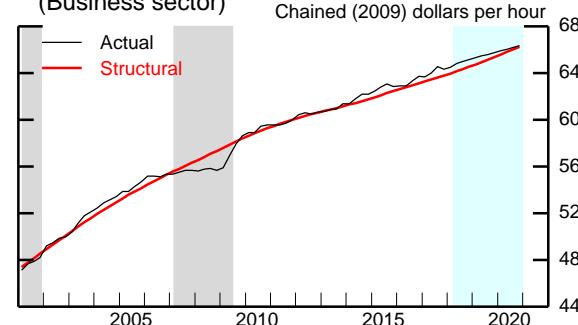
Note: Shaded regions show the 70 percent and 90 percent confidence intervals of the distribution of historical revisions to the staff's estimates of the natural rate.

\*Staff estimate including the effect of EEB.

Source: Various macroeconomic data; staff assumptions.

**Manufacturing Capacity Utilization Rate**

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

**Actual and Structural 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.

**Decomposition of Potential Output**  
(Percent change, Q4 to Q4, except as noted)

Measure	1974-95	1996-2000	2001-07	2008-10	2011-15	2016	2017	2018	2019	2020
Potential output	3.1	3.5	2.7	1.8	1.4	1.6	1.5	1.7	1.8	1.9
Previous Tealbook	3.1	3.4	2.6	1.6	1.2	1.4	1.5	1.7	1.9	1.9
<i>Selected contributions</i> <sup>1</sup>										
Structural labor productivity <sup>2</sup>	1.7	3.0	2.7	1.7	1.1	1.0	1.1	1.2	1.3	1.4
Previous Tealbook	1.6	2.9	2.8	1.4	.8	.8	1.0	1.1	1.2	1.3
Capital deepening	.7	1.5	1.0	.3	.5	.5	.5	.6	.6	.6
Multifactor productivity	.7	1.1	1.5	1.2	.3	.3	.4	.5	.5	.6
Structural hours	1.6	1.0	.8	.4	.5	.8	.2	.7	.6	.6
Previous Tealbook	1.6	1.2	.8	.0	.6	.8	.2	.7	.6	.6
Labor force participation	.4	-.1	-.2	-.5	-.6	-.3	-.3	-.3	-.2	-.2
Previous Tealbook	.4	-.1	-.2	-.5	-.6	-.3	-.3	-.3	-.2	-.2
Memo:										
Output gap <sup>3</sup>	-1.5	2.5	.2	-5.5	-.1	.3	1.4	2.5	3.0	2.9
Previous Tealbook	-1.9	2.4	.8	-4.2	-.1	.3	1.4	2.4	3.1	3.2

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 output in the final quarter of the period indicated. A negative number indicates that the economy is operating below potential.

## The Outlook for the Labor Market

Measure	2017	2018		2018	2019	2020
		H1	H2			
Output per hour, business <sup>1</sup> Previous Tealbook	.9 .9	1.6 .7	1.0 1.6	1.3 1.2	.9 .9	.9 .9
Nonfarm payroll employment <sup>2</sup> Previous Tealbook	183 183	205 199	187 191	196 195	158 181	129 160
Private employment <sup>2</sup> Previous Tealbook	180 180	206 197	180 180	193 188	148 170	119 150
Labor force participation rate <sup>3</sup> Previous Tealbook	62.7 62.7	62.8 62.8	62.7 62.7	62.7 62.7	62.7 62.7	62.7 62.7
Civilian unemployment rate <sup>3</sup> Previous Tealbook	4.1 4.1	3.8 4.0	3.6 3.6	3.6 3.6	3.4 3.3	3.4 3.3

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

2. Thousands, average monthly changes.

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

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

## Inflation Projections

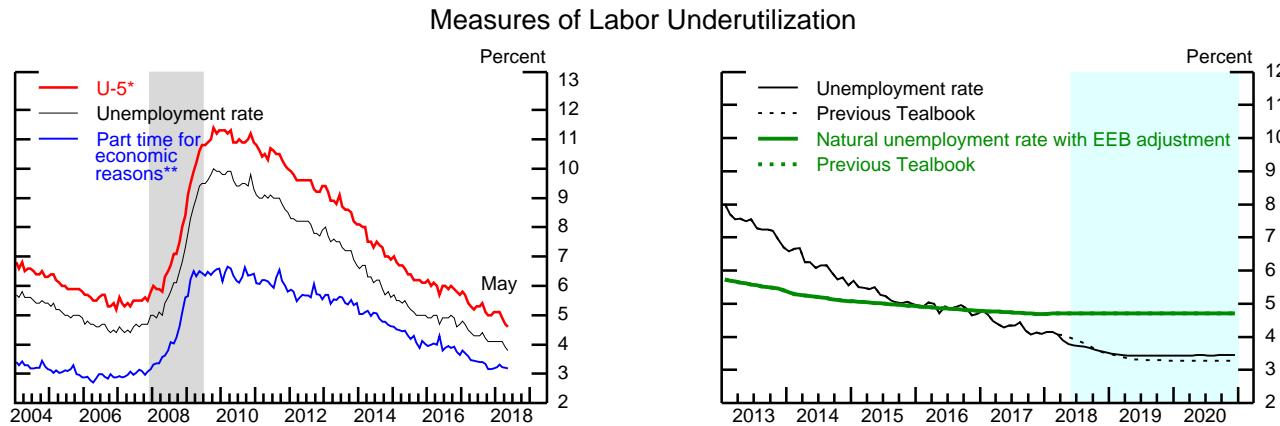
Measure	2017	2018		2018	2019	2020
		H1	H2			
<i>Percent change at annual rate from final quarter of preceding period</i>						
PCE chain-weighted price index Previous Tealbook	1.7 1.7	2.3 2.5	1.8 1.7	2.1 2.1	1.9 1.9	2.0 2.0
Food and beverages Previous Tealbook	.7 .7	1.0 .9	2.0 2.1	1.5 1.5	2.3 2.3	2.3 2.3
Energy Previous Tealbook	7.6 7.6	7.9 7.6	4.5 -.4	6.2 3.5	-1.3 -1.9	-1.0 -1.1
Excluding food and energy Previous Tealbook	1.5 1.5	2.1 2.4	1.7 1.7	1.9 2.0	2.0 2.1	2.1 2.1
Prices of core goods imports <sup>1</sup> Previous Tealbook	1.3 1.3	2.7 3.2	.2 1.3	1.4 2.3	.6 .6	.6 .6
<i>12-month percent change</i>						
PCE chain-weighted price index Previous Tealbook	2.0 2.1	2.0 2.1	2.2 2.4	2.4 2.5	2.5 2.5	2.4 2.4
Excluding food and energy Previous Tealbook	1.8 1.9	1.8 1.9	1.9 2.0	1.9 2.1	2.0 2.1	2.0 2.1

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

2. Staff forecast.

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

## Labor Market Developments and Outlook (1)

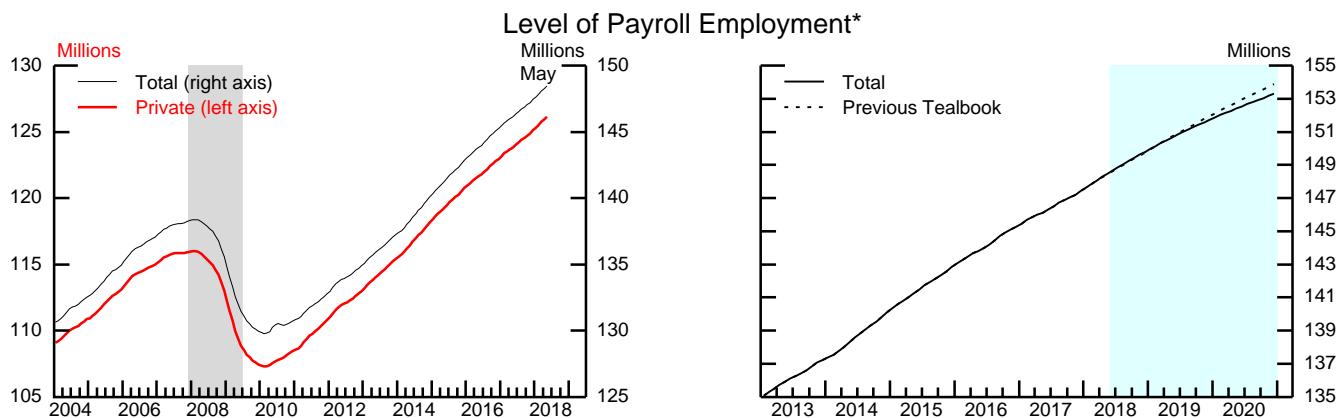


\* U-5 measures total unemployed persons plus all marginally attached to the labor force as a percent of the labor force plus persons marginally attached to the labor force.

\*\* Percent of Current Population Survey employment.

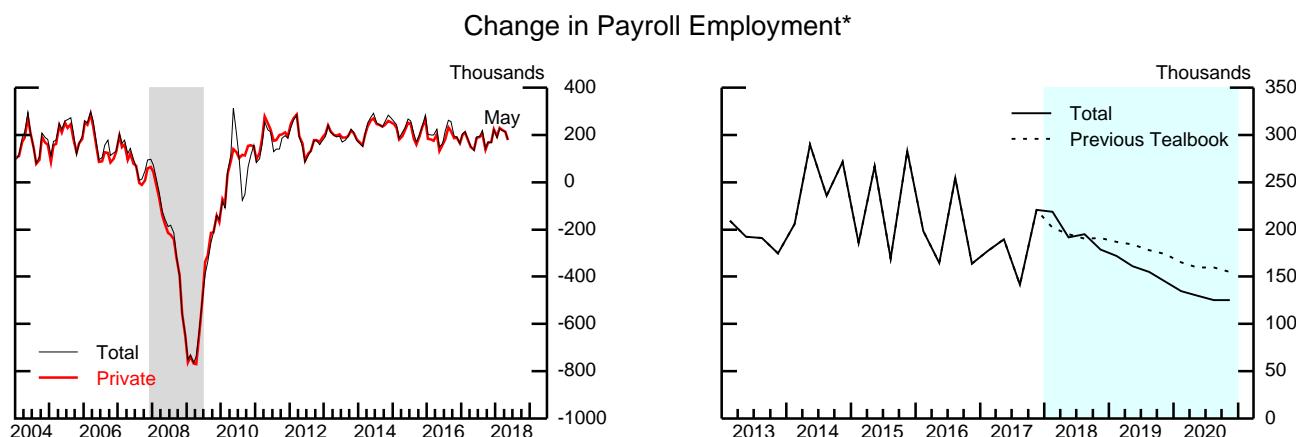
EEB Extended and emergency unemployment benefits.

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



\* 3-month moving averages.

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



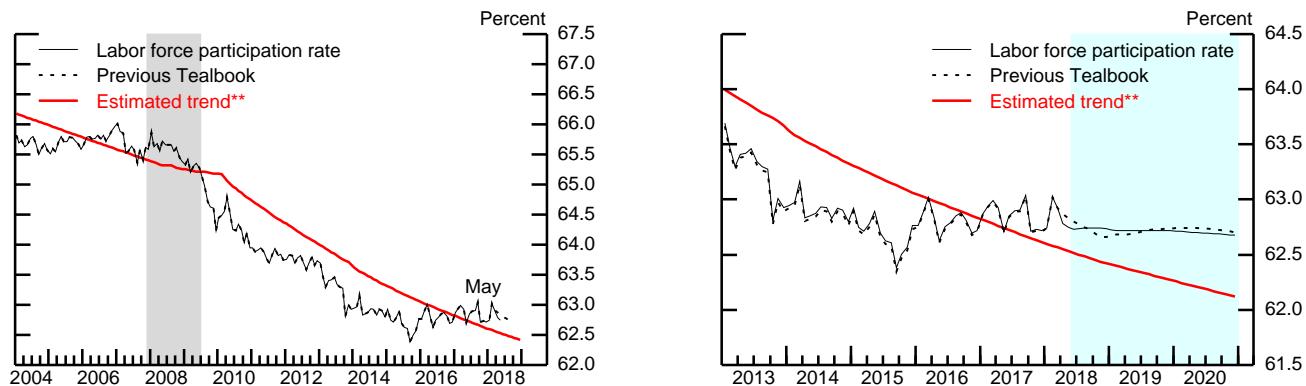
\* 3-month moving averages.

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\*

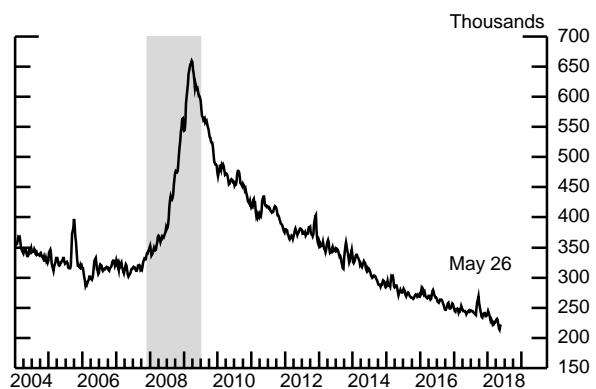


\* Published data adjusted by staff to account for changes in population weights.

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

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

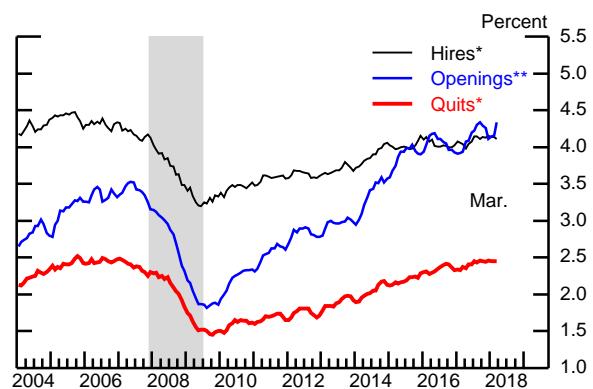
### Initial Unemployment Insurance Claims\*



\* 4-week moving average.

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

### Hires, Quits, and Job Openings

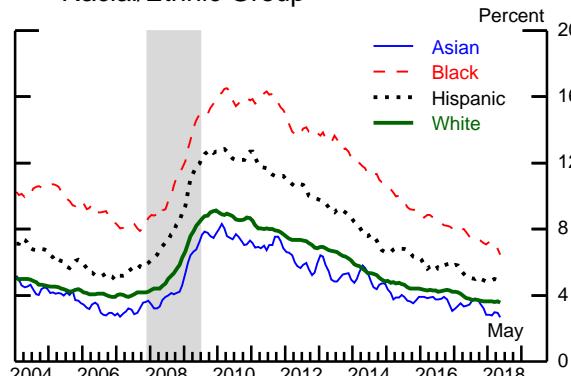


\* Percent of private nonfarm payroll employment, 3-month moving average.

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

Source: Job Openings and Labor Turnover Survey.

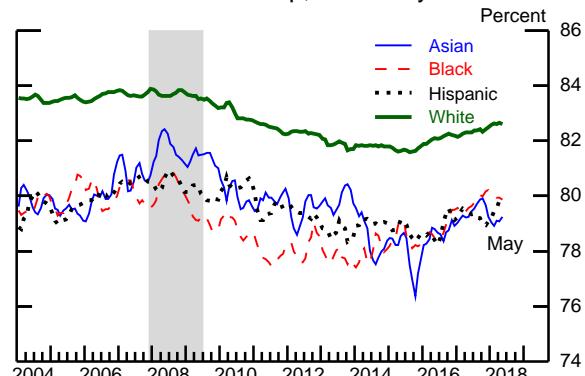
### Unemployment Rate by Racial/Ethnic Group



Note: These categories are not mutually exclusive, as the ethnicity Hispanic may include people of any race. The Current Population Survey defines Hispanic ethnicity as those who report their origin is Mexican, Puerto Rican, Cuban, Central American, or South American (and some others). 3-month moving averages.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey.

### Labor Force Participation Rate by Racial/Ethnic Group, 25 to 54 years old



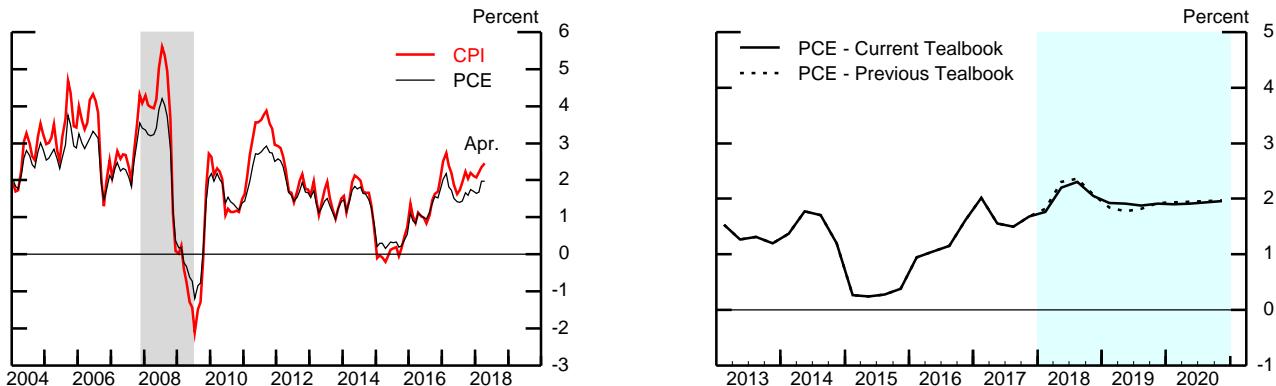
Note: These categories are not mutually exclusive, as the ethnicity Hispanic may include people of any race. The Current Population Survey defines Hispanic ethnicity as those who report their origin is Mexican, Puerto Rican, Cuban, Central American, or South American (and some others). 3-month moving averages.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey.

## Inflation Developments and Outlook (1)

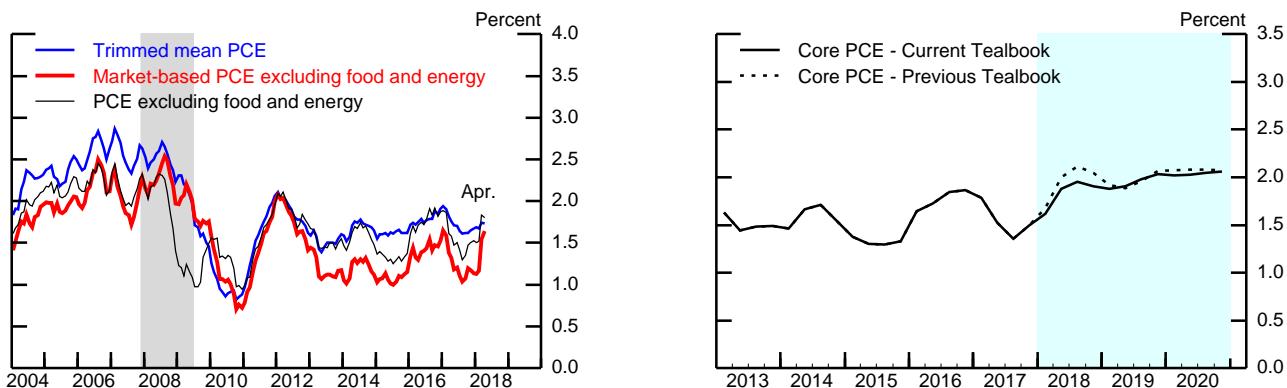
(Percent change from year-earlier period)

### Headline Consumer Price Inflation



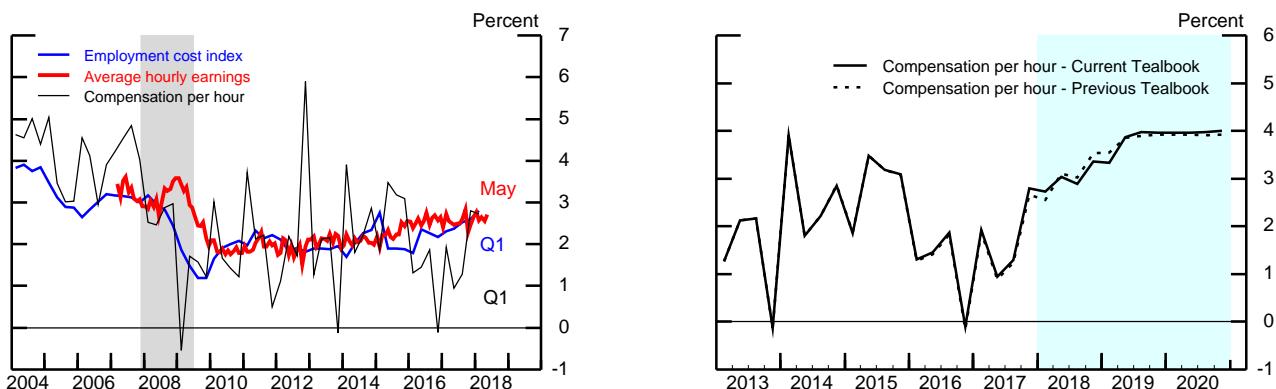
Source: For CPI, U.S. Department of Labor, Bureau of Labor Statistics; for PCE, U.S. Department of Commerce, Bureau of Economic Analysis.

### Measures of Underlying PCE Price Inflation



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.

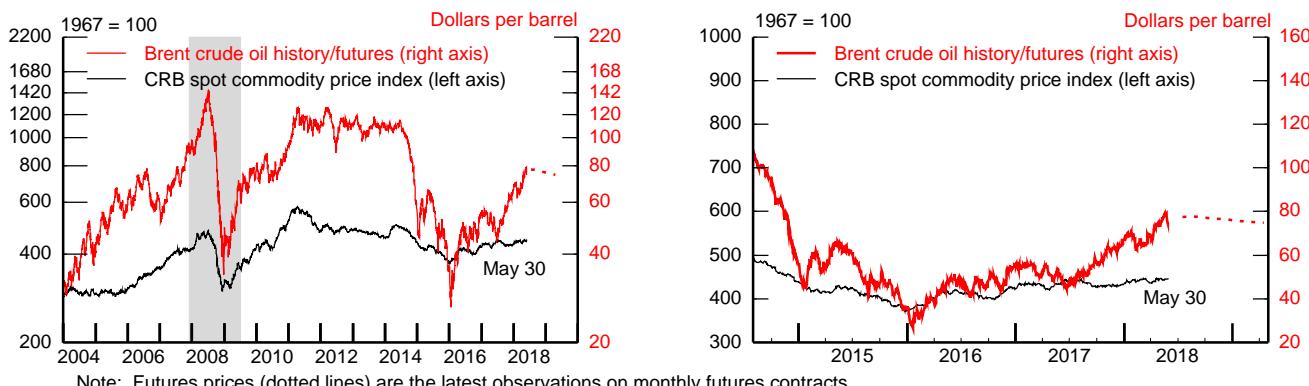
Source: U.S. Department of Labor, Bureau of Labor Statistics.

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

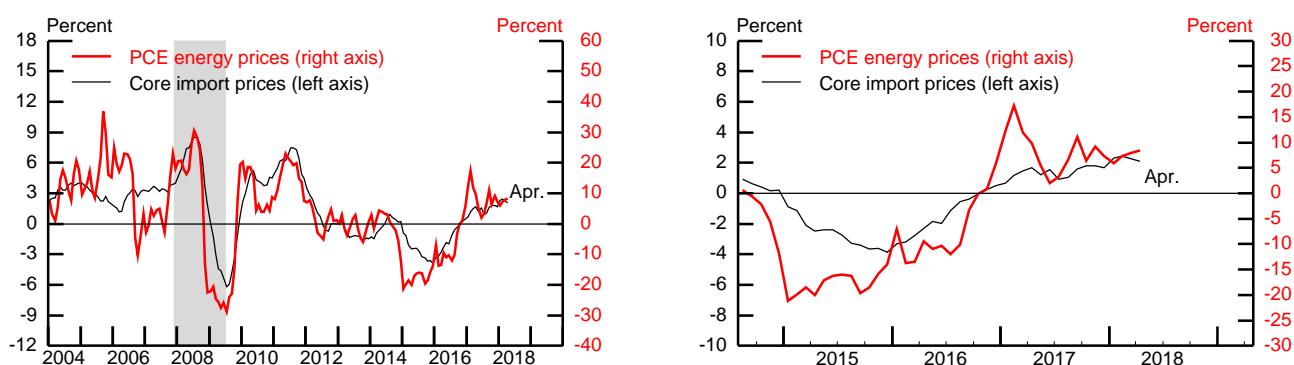
## Inflation Developments and Outlook (2)

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

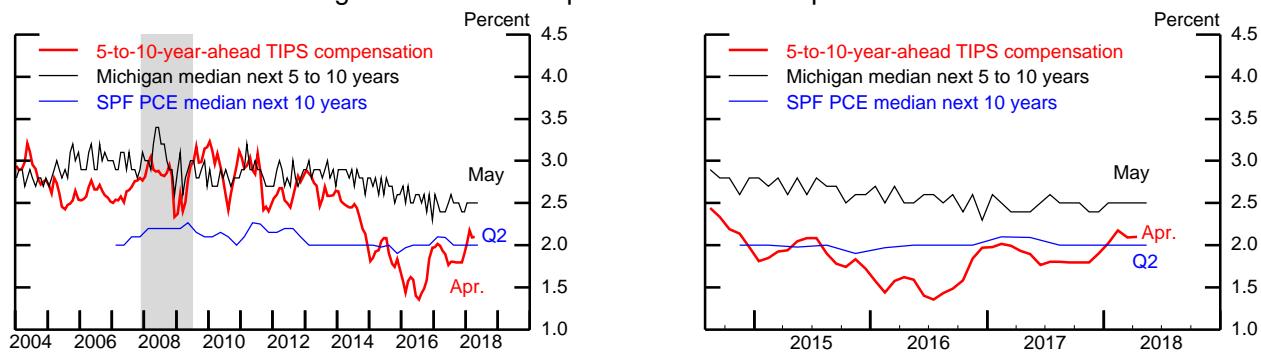
### Commodity and Oil Price Levels



### Energy and Import Price Inflation



### Long-Term Inflation Expectations and Compensation



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

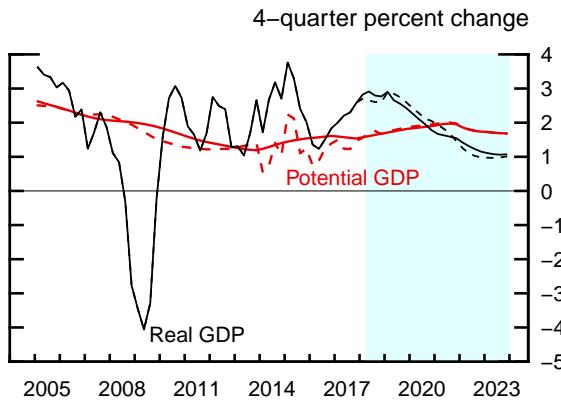
**The Long-Term Outlook**

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

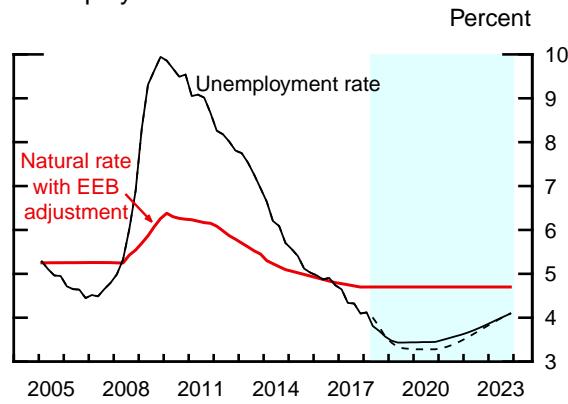
Measure	2018	2019	2020	2021	2022	2023	Longer run
Real GDP Previous Tealbook	2.8 2.6	2.4 2.6	1.8 2.1	1.5 1.5	1.1 1.0	1.1 1.0	1.7 1.7
Civilian unemployment rate <sup>1</sup> Previous Tealbook	3.6 3.6	3.4 3.3	3.4 3.3	3.6 3.5	3.8 3.8	4.1 4.1	4.7 4.7
PCE prices, total Previous Tealbook	2.1 2.1	1.9 1.9	2.0 2.0	2.0 2.0	2.1 2.1	2.1 2.1	2.0 2.0
Core PCE prices Previous Tealbook	1.9 2.0	2.0 2.1	2.1 2.1	2.1 2.1	2.1 2.2	2.2 2.2	2.0 2.0
Federal funds rate <sup>1</sup> Previous Tealbook	2.52 2.59	3.78 3.82	4.54 4.66	4.79 4.97	4.73 4.85	4.44 4.48	2.50 2.50
10-year Treasury yield <sup>1</sup> Previous Tealbook	3.6 3.6	4.1 4.2	4.3 4.4	4.2 4.3	4.1 4.1	3.9 3.9	3.4 3.4

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

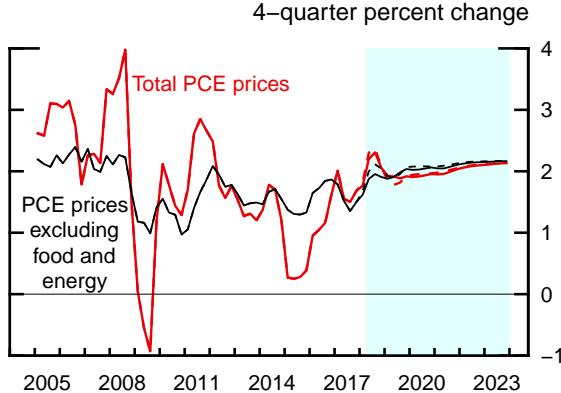
Real GDP



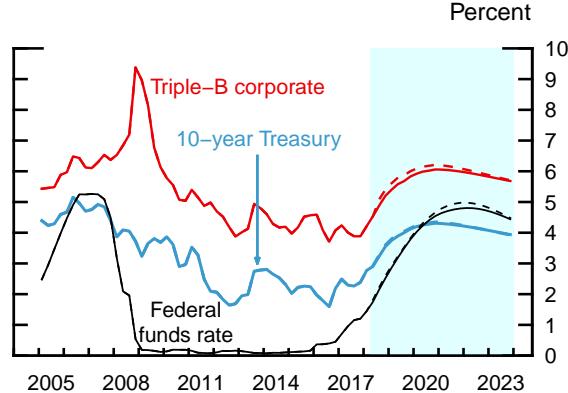
Unemployment Rate



PCE Prices



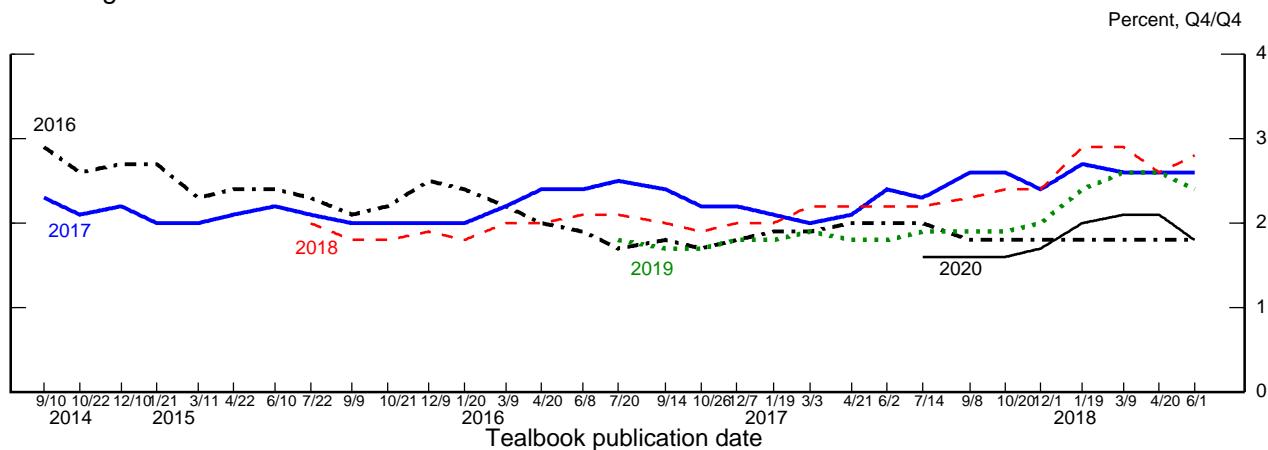
Interest Rates



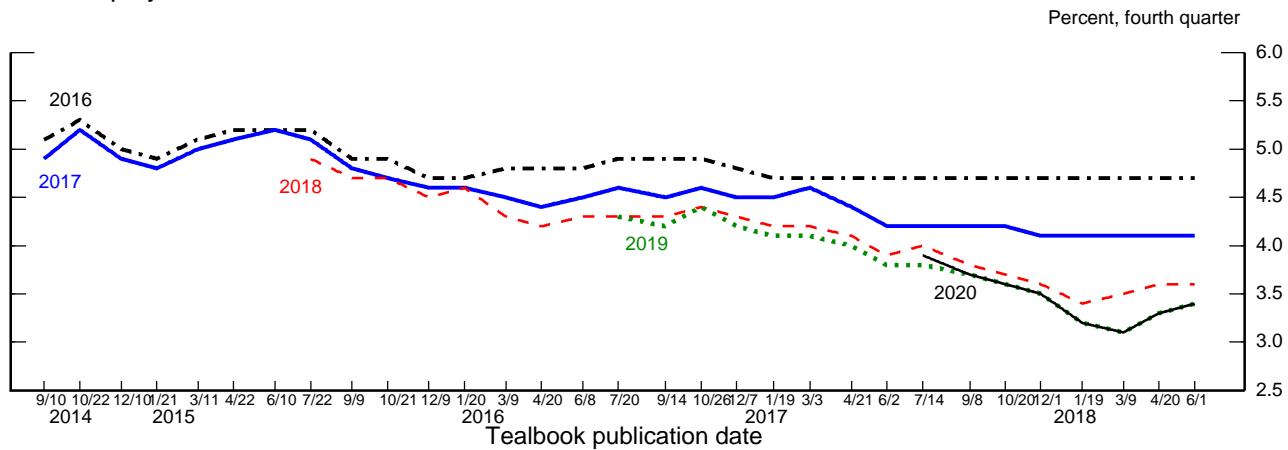
Note: In each panel, shading represents the projection period, and dashed lines are the previous Tealbook.

## Evolution of the Staff Forecast

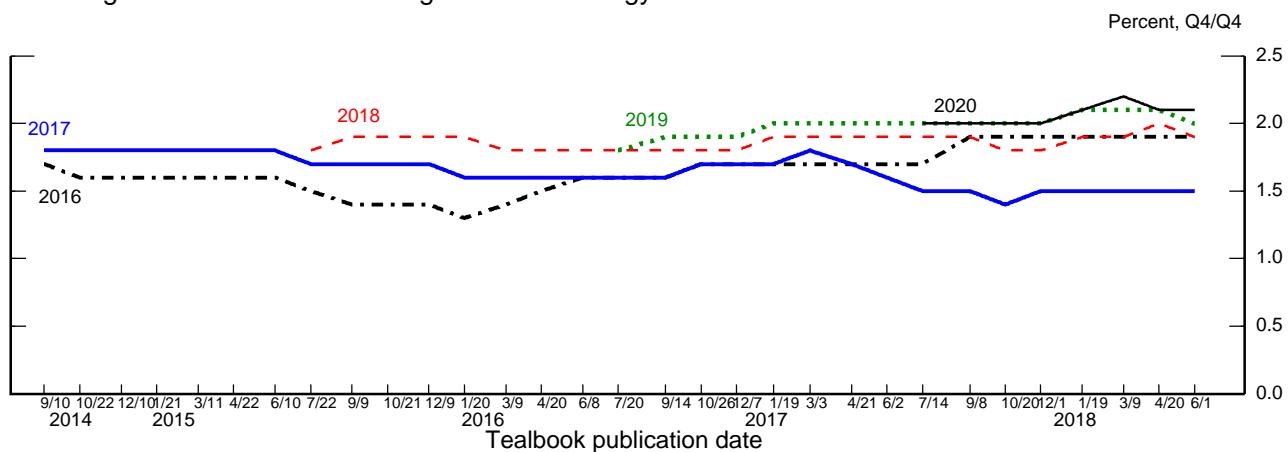
Change in Real GDP



Unemployment Rate



Change in PCE Prices excluding Food and Energy



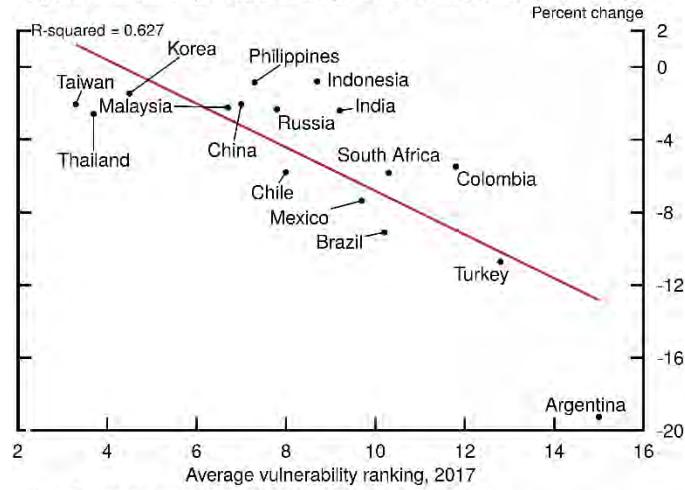
## Recent Financial Pressures in Emerging Market Economies

Since the April Tealbook, financial stresses have risen in emerging market economies (EMEs), with credit spreads widening, bond and equity funds experiencing outflows, and currencies depreciating against the dollar. In this discussion, we look more closely at the potential factors contributing to this turn in sentiment, including rising U.S. Treasury yields, spillovers from idiosyncratic developments in select countries, and heightened focus on EME vulnerabilities more broadly. Among EME asset prices, we concentrate on exchange rates, where the movements have been the most sizable.

The rise in financial stress has been especially pronounced for Turkey and Argentina, whose currencies have depreciated about 11 percent and 19 percent, respectively, since the April Tealbook and whose credit spreads have moved up sharply. Turkey and Argentina are also the two EMEs with the most significant macroeconomic vulnerabilities. In both countries, concerns have risen about the laxity of fiscal and monetary policies, the independence of the central bank, and the reliance on external financing. These vulnerabilities likely rendered the countries susceptible to shifts in market conditions.

However, the recent stresses have not been limited to Turkey and Argentina, suggesting that a common factor may have triggered the selloff in EME assets. Indeed, the notion that EMEs were hit by a common shock finds some support in that EMEs have been affected roughly in proportion to their vulnerabilities. As seen in figure 1, when recent EME currency depreciations are plotted against our relative vulnerability rankings, they line up well.<sup>1</sup>

**Figure 1. Exchange Rate Changes vs. Vulnerability Rankings**



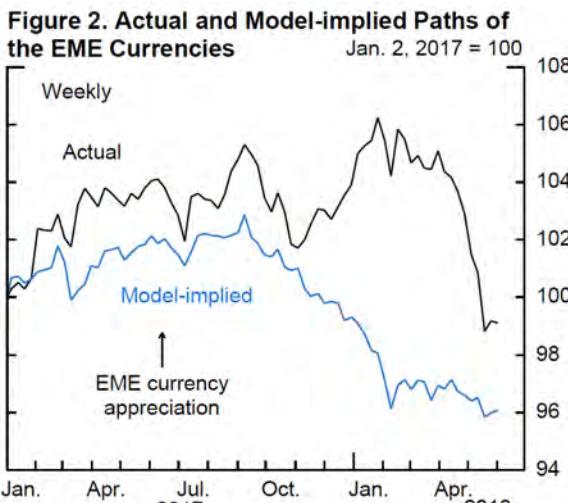
Note: Exchange rate appreciation from April 19, 2018, to May 31, 2018.

Source: Bloomberg; Haver Analytics; International Monetary Fund (IMF); International Financial Statistics and World Economic Outlook; World Bank-IMF Quarterly External Debt Statistics; staff calculations.

<sup>1</sup> Our vulnerability ranking is constructed by first ordering 16 EMEs according to six indicators of vulnerability: (1) current account deficit as a percent of GDP, (2) gross government debt as a percent of GDP, (3) average annual inflation over the past three years, (4) the five-year change in bank credit to the private sector as a share of GDP, (5) the ratio of external debt to exports, and (6) the ratio of foreign exchange reserves to GDP. By construction, the higher the rankings on each measure, the higher the vulnerability. We average the rankings across indicators for each EME. Thus, the values can theoretically range from 1 (least vulnerable) to 16 (most vulnerable).

Exactly what shock might have led to a shift in investor sentiment toward EMEs, however, is unclear. One possibility is that developments in Argentina and Turkey have served as a wake-up call to investors, leading to a broad repricing of risk in EME assets. Alternatively, some other common shocks, such as the rise in U.S. interest rates, may have increased pressures on EMEs. To provide an assessment, we use an empirical model relating EME currency movements to key underlying drivers. These drivers are the 2-year U.S. Treasury yield to capture the general level of U.S. interest rates and near-term monetary policy path, the slope of the U.S. Treasury yield curve (10-year minus 2-year) as a proxy for the opportunity cost of investing in dollar-denominated EME bonds, U.S. high-yield corporate bond spreads as an indicator of broad credit market conditions for risky debt, and the VIX index to capture general risk sentiment. The model is estimated on weekly data separately for each EME currency to allow potentially different responses to U.S. variables depending on country-specific fundamentals and risk characteristics.<sup>2</sup> On average, U.S. interest rates and risk sentiment explain around 20 percent of the variation in EME currencies over the post-crisis period, with the three interest rate variables accounting for most of the explanatory power.<sup>3</sup> Additionally, countries that are assessed as more vulnerable tend to have larger sensitivities to changes in U.S. interest rates and the VIX.

Regarding the recent movements (figure 2), the average EME currency depreciated about 5 percent against the dollar from mid-April through the third week of May, while the 2- and 10-year Treasury yields rose 19 basis points and 24 basis points, respectively.<sup>4</sup> During this



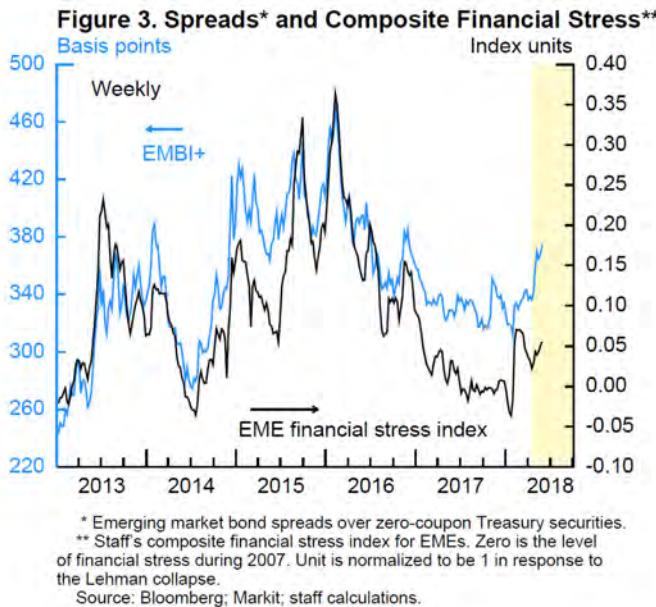
Note: The paths represent an equally weighted average of the EME currencies.

Source: Bloomberg; Merrill Lynch bond data; staff calculations.

<sup>2</sup> In our analysis, we include the 16 countries shown in figure 1. All right-hand-side variables are in first-difference form.

<sup>3</sup> A 10 basis point increase in the 2-year U.S. Treasury yield, the term spread, and the high-yield spread are associated with 0.5 percent, 0.25 percent, and 0.3 percent depreciation of the average EME currency, respectively.

<sup>4</sup> Since the third week of May, the average EME currency is little changed, on net, although increased political uncertainty in Italy weighed on risk sentiment and put downward pressure on Treasury yields and risky asset prices. See the Financial Market Developments section for a detailed discussion.



period, the model-based path moved down only 1½ percent, suggesting a material but relatively modest role for the rise in the Treasury yields. However, it is notable that during the period from last October to early February, EME currencies *appreciated* relative to the dollar even as 2- and 10-year U.S. Treasury yields increased significantly, suggesting that the link between Treasury yields and EME currencies is relatively loose. Nonetheless, it is also possible that the recent sharp depreciation in EME currencies reflects some catch-up following their earlier failure to respond to rising interest rates in the United States.

At this point, concerns about EME financial stresses should not be overstated. EME sovereign bond spreads and broad measures of EME financial stress, shown in figure 3, remain well below levels seen in other recent stress episodes such as that in early 2016 associated with concerns about China. The fact that EMEs with lower vulnerabilities have not been as affected suggests that investors have continued to differentiate between countries based on economic fundamentals. Moreover, incoming data for the EMEs continue to point to robust growth. As such, the recent tightening of financial conditions has left little imprint on our overall EME forecast. However, this tightening points to the possibility of more severe financial stresses, as described in the “EME Turbulence and Stronger Dollar” alternative scenario in the Risks and Uncertainty section.

## The Foreign GDP Outlook

Real GDP\*

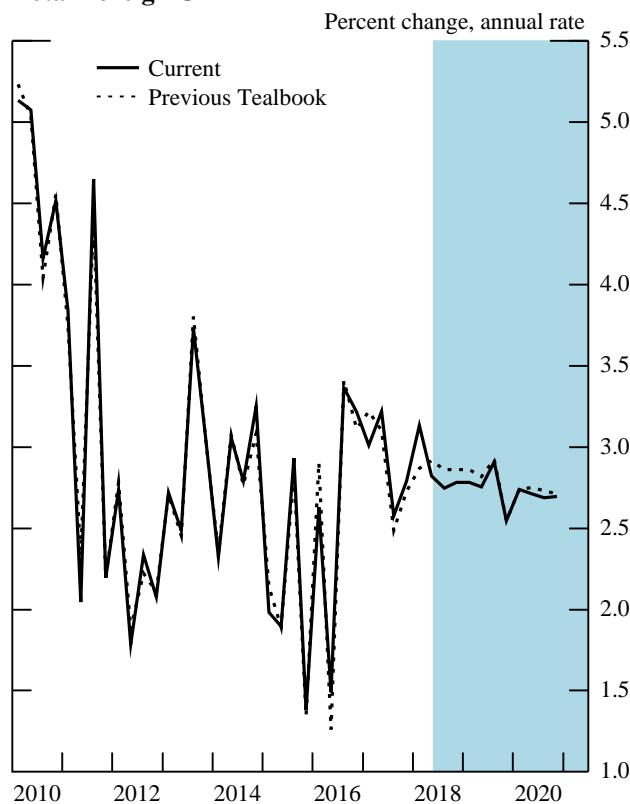
Percent change, annual rate

	2017			2018			2019	2020
	H1	Q3	Q4	Q1	Q2	H2		
1. Total Foreign	3.1	2.6	2.8	3.1	2.8	2.8	2.7	2.7
Previous Tealbook	3.2	2.5	2.7	2.9	2.9	2.9	2.8	2.7
2. Advanced Foreign Economies	3.2	2.1	1.9	1.2	2.1	1.9	1.7	1.7
Previous Tealbook	3.1	2.1	2.0	1.9	2.1	2.0	1.8	1.7
3. Canada	4.3	1.7	1.7	1.3	2.4	2.3	2.1	1.8
4. Euro Area	2.8	2.8	2.7	1.6	2.1	1.6	1.5	1.6
5. Japan	2.3	2.0	.6	-.6	1.3	.9	.2	.9
6. United Kingdom	1.1	1.9	1.6	.4	1.4	1.6	1.7	1.7
7. Emerging Market Economies	3.0	3.0	3.6	5.0	3.5	3.6	3.8	3.7
Previous Tealbook	3.2	2.8	3.4	3.9	3.7	3.7	3.8	3.7
8. China	7.0	6.6	6.5	7.2	6.7	6.3	6.2	5.9
9. Emerging Asia ex. China	4.1	5.1	3.3	5.7	3.3	3.9	3.8	3.7
10. Mexico	1.4	-.2	3.6	4.6	3.0	2.7	2.9	3.0
11. Brazil	3.4	1.1	.9	1.8	1.6	2.4	3.0	2.6

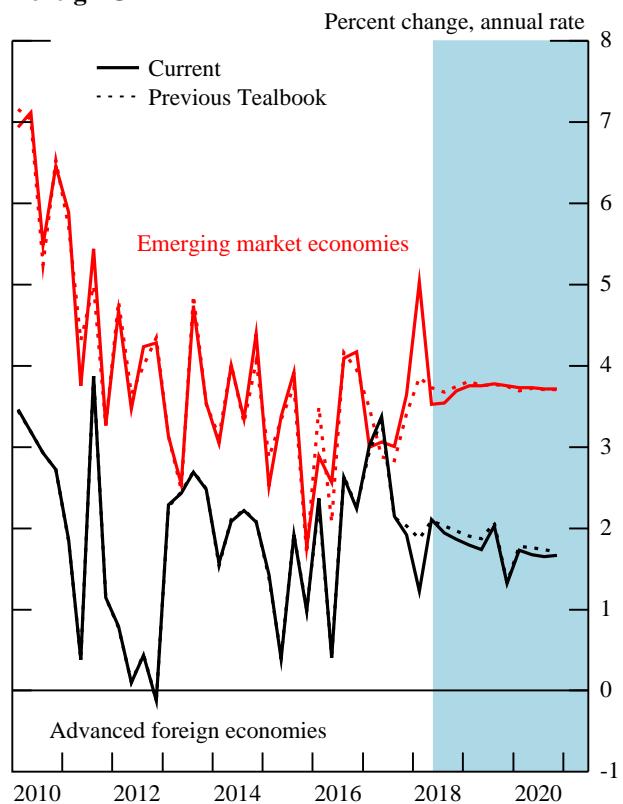
\* GDP aggregates weighted by shares of U.S. merchandise exports.

Int'l Econ Devel &amp; Outlook

### Total Foreign GDP



### Foreign GDP



## The Foreign Inflation Outlook

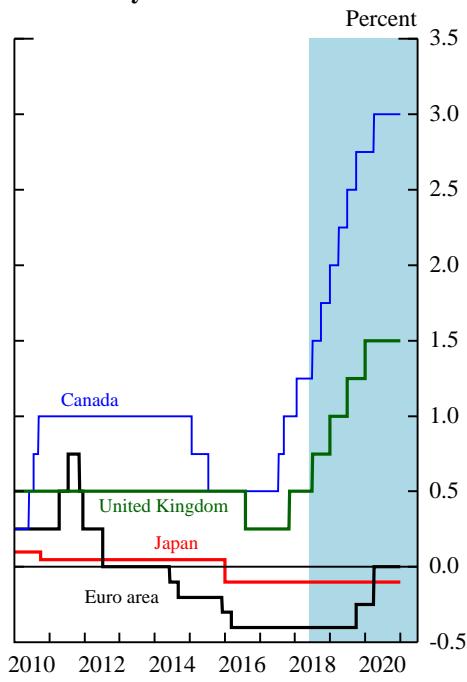
Consumer Prices*			Percent change, annual rate						
	2017			2018			2019		2020
	H1	Q3	Q4	Q1	Q2	H2			
1. Total Foreign Previous Tealbook	2.5 2.5	2.3 2.3	3.0 3.0	2.6 2.6	2.1 2.6	2.8 2.5	2.6 2.5	2.4 2.4	
2. Advanced Foreign Economies Previous Tealbook	1.3 1.3	1.2 1.2	2.1 2.1	2.6 2.6	1.7 1.9	1.9 1.6	1.9 1.8	1.6 1.7	
3. Canada	1.4	1.4	3.0	3.6	3.0	2.4	2.1	2.0	
4. Euro Area	1.5	1.0	1.7	2.0	2.2	1.9	1.5	1.6	
5. Japan	-.1	.7	1.9	2.5	-1.7	1.2	2.3	1.0	
6. United Kingdom	3.3	2.4	3.0	2.4	2.4	2.6	2.4	2.1	
7. Emerging Market Economies Previous Tealbook	3.3 3.3	3.1 3.1	3.7 3.7	2.6 2.7	2.4 3.1	3.3 3.2	3.1 3.0	3.0 2.9	
8. China	1.0	2.2	2.9	1.5	1.3	2.7	2.5	2.5	
9. Emerging Asia ex. China	2.0	2.0	3.2	2.2	2.5	3.3	3.1	3.0	
10. Mexico	8.0	5.4	5.0	4.1	3.1	3.7	3.4	3.2	
11. Brazil	2.7	2.3	3.6	3.1	2.7	4.3	4.3	4.3	

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

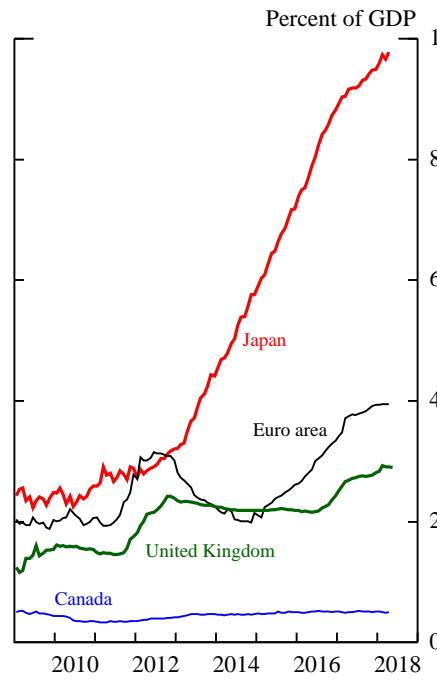
Int'l Econ Devel & Outlook

## Foreign Monetary Policy

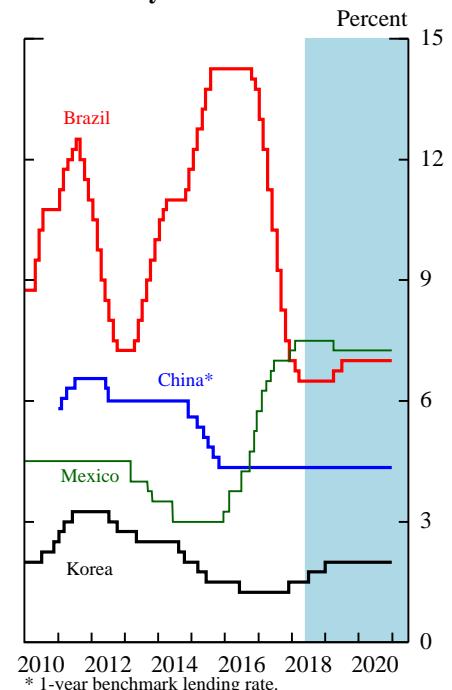
## AFE Policy Rates



## **AFE Central Bank Balance Sheets**

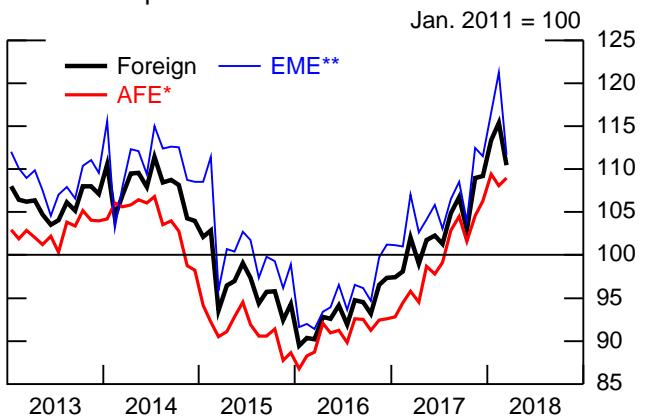


EME Policy Rates

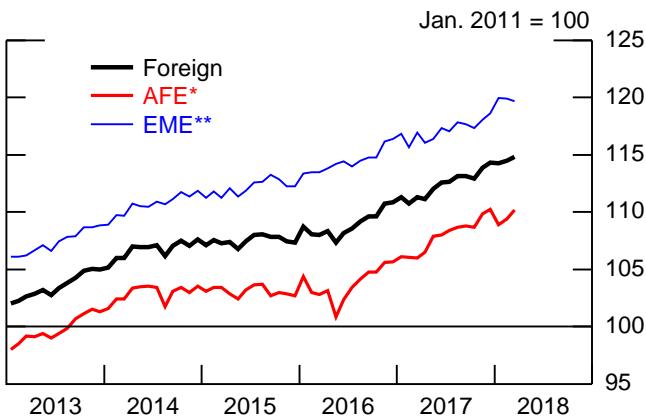


## Recent Foreign Indicators

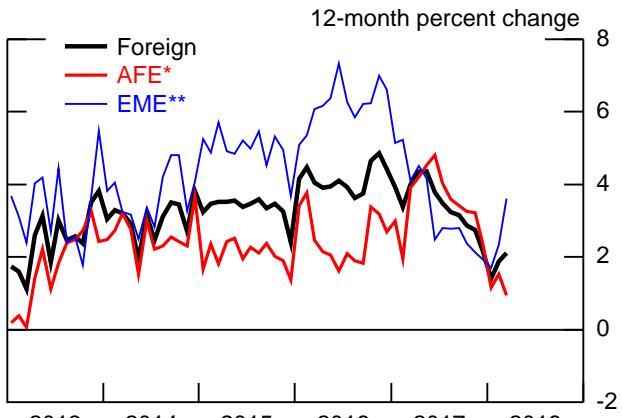
### Nominal Exports



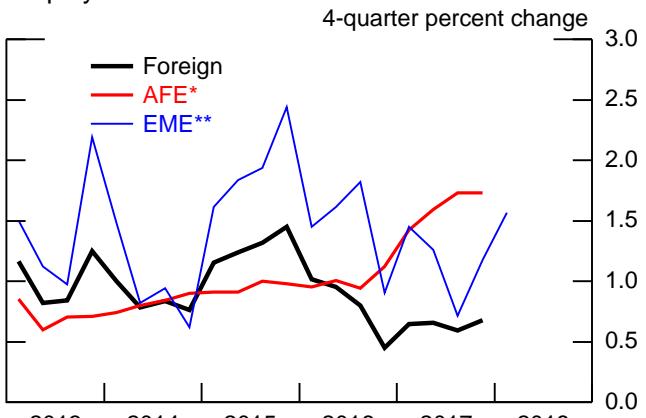
### Industrial Production



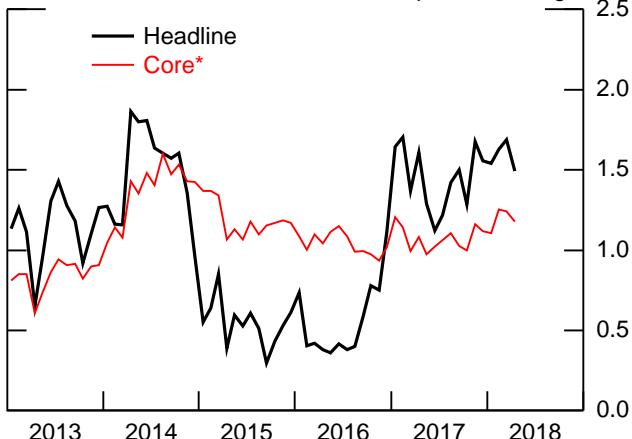
### Retail Sales



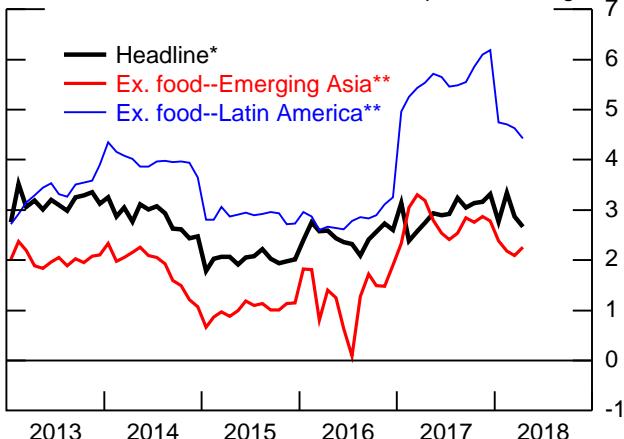
### Employment



### Consumer Prices: Advanced Foreign Economies

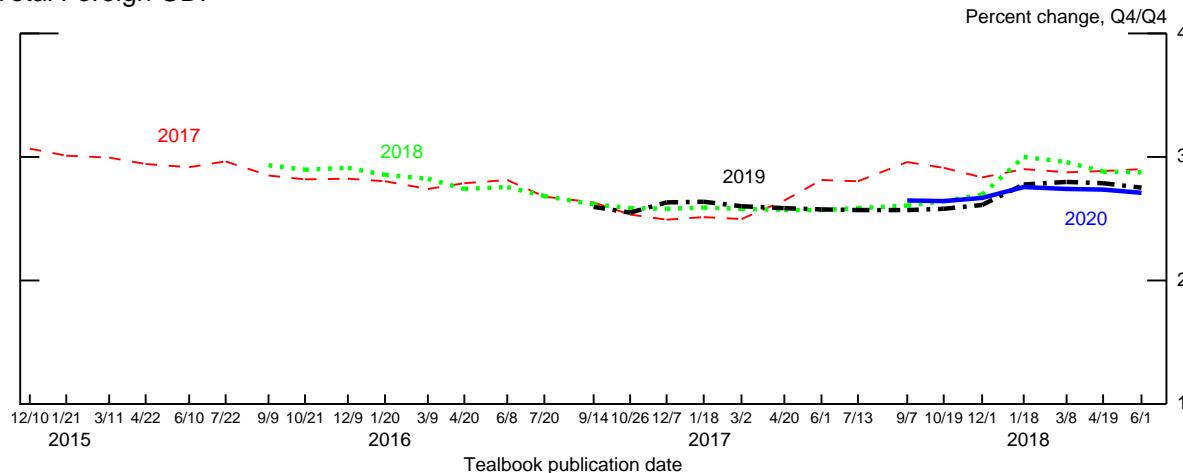


### Consumer Prices: Emerging Market Economies

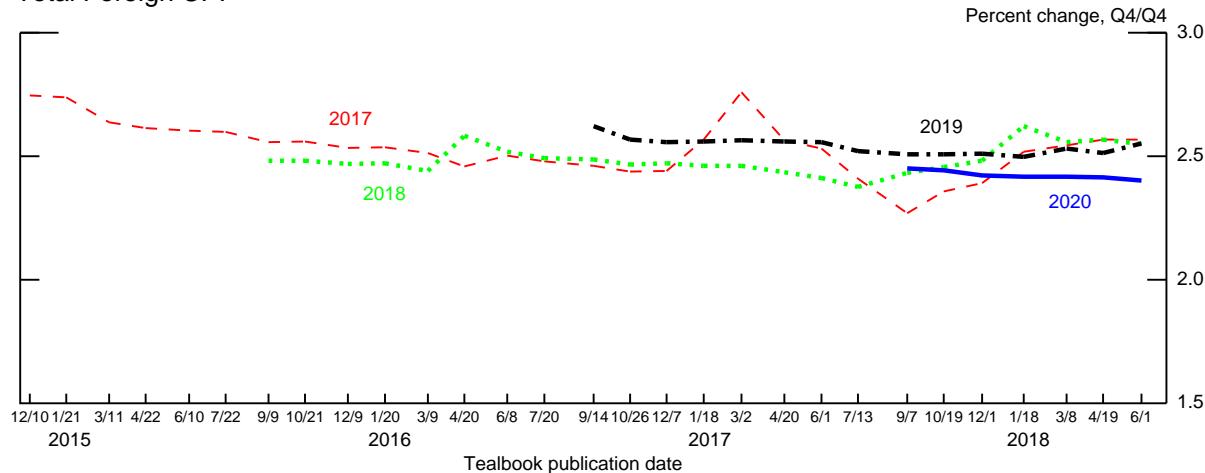


## Evolution of Staff's International Forecast

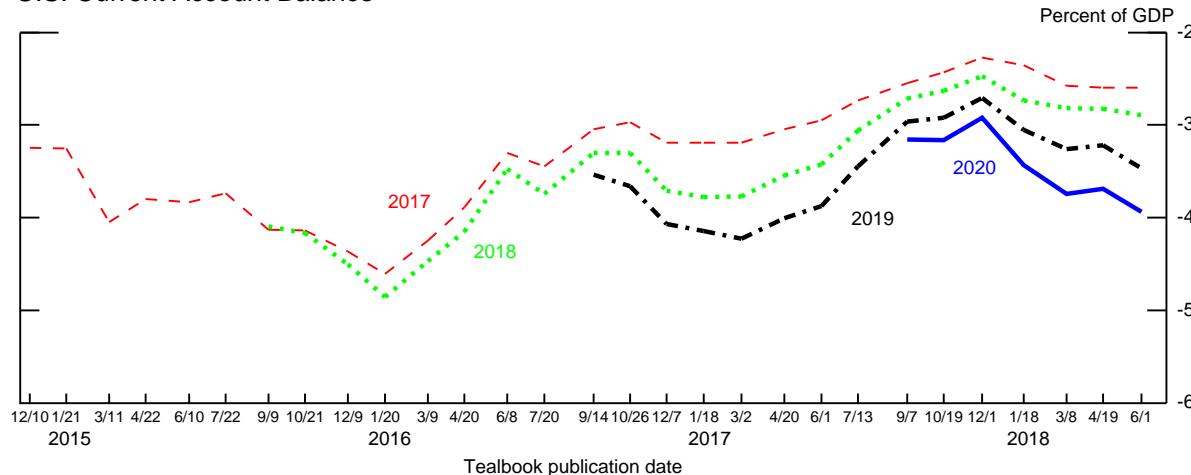
Total Foreign GDP



Total Foreign CPI

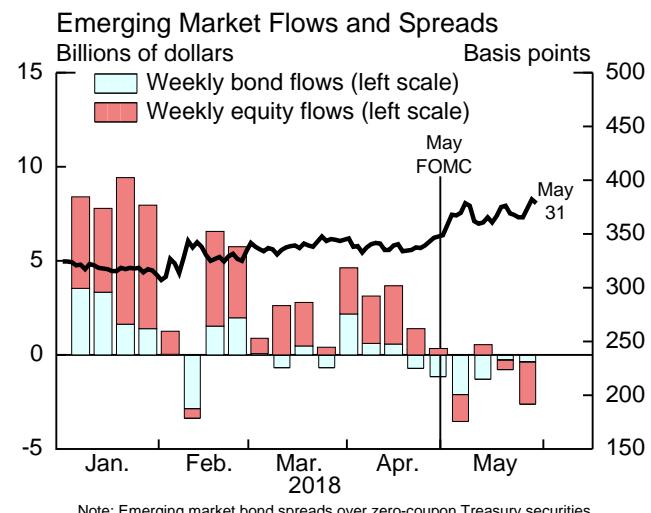
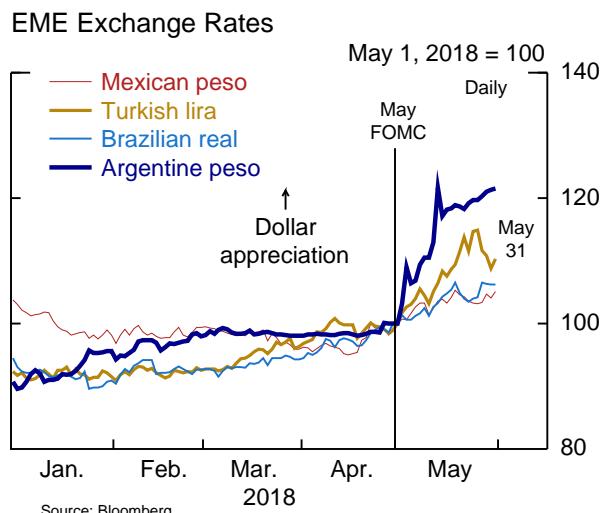
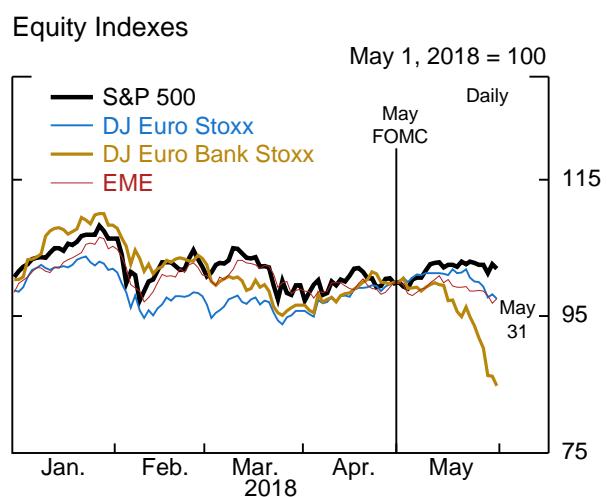
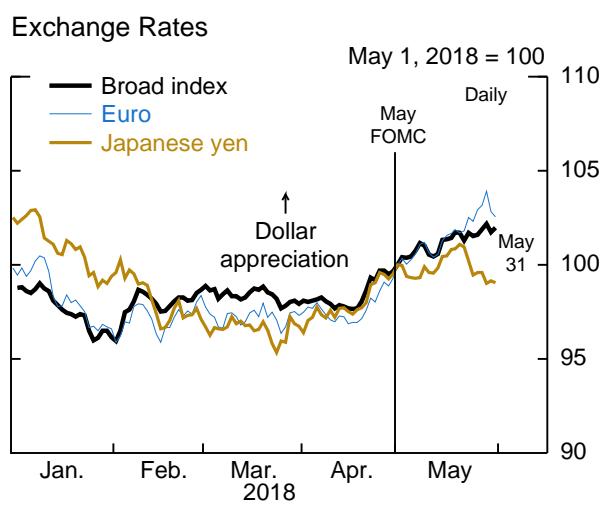
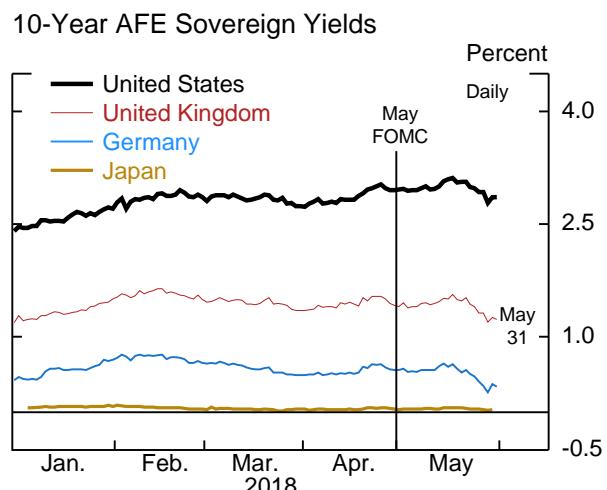
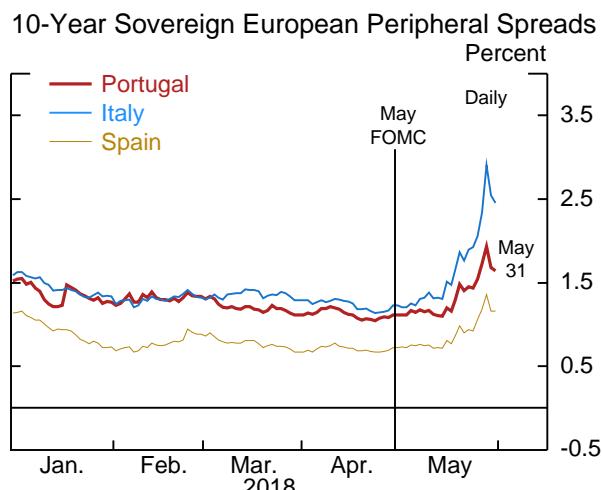


U.S. Current Account Balance



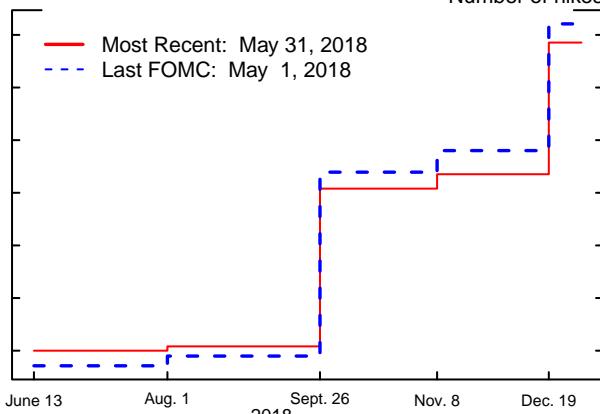
Int'l Econ Devel &amp; Outlook

## Foreign Developments



## Policy Expectations and Treasury Yields

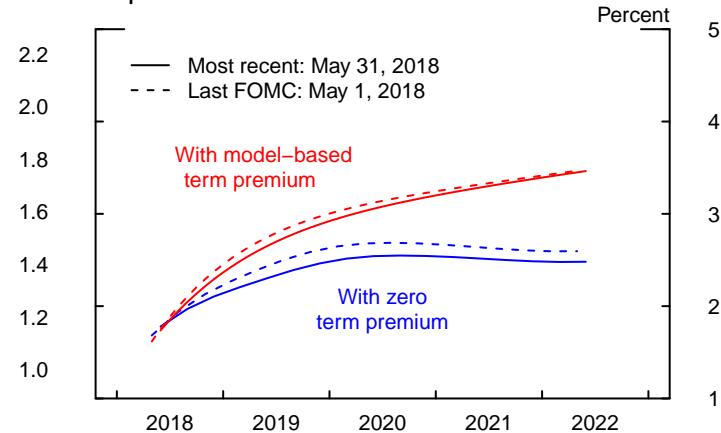
Cumulative Number of 25 bps Rate Hikes Priced into Futures Markets for Each FOMC Meeting over the Remainder of 2018  
Number of hikes



Note: Expected number of rate increases implied by a binomial tree fitted to settlement prices on federal funds futures contracts. The "Most Recent" path takes into account the anticipated effect of the adjustment in IOER discussed in the May FOMC meeting minutes.

Source: CME Group; Federal Reserve Board staff estimates.

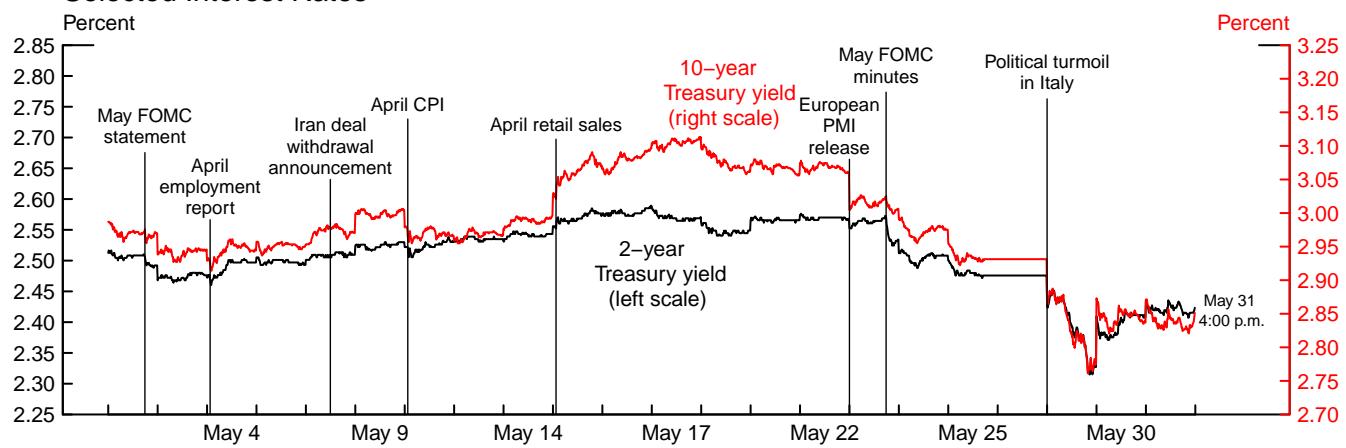
### Implied Federal Funds Rate



Note: Zero term premium path is estimated using overnight index swap quotes with a spline approach and a term premium of zero basis points. Model-based term premium path is estimated using a term structure model maintained by Board staff and corrects for term premium.

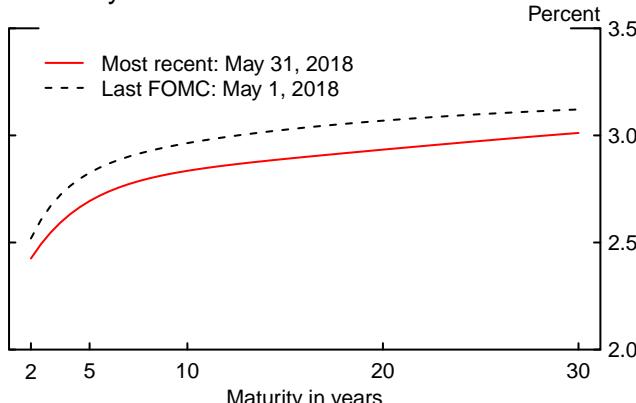
Source: Bloomberg; Federal Reserve Board staff estimates.

### Selected Interest Rates



Note: 5-minute intervals, 8:00 a.m. to 4:00 p.m. Data shown are for 2018.  
Source: Bloomberg.

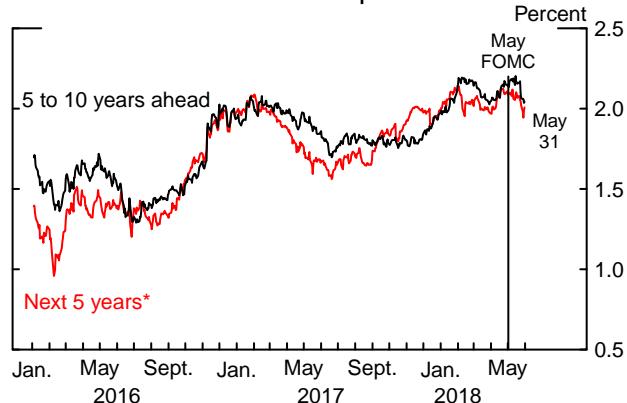
### Treasury Yield Curve



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

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

### TIPS-Based Inflation Compensation

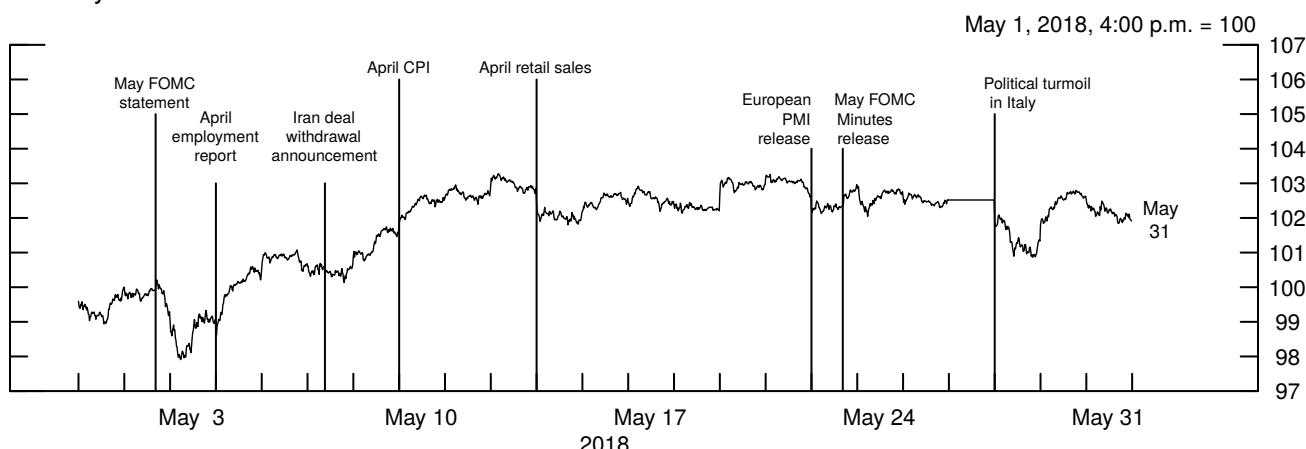


Note: Estimates based on smoothed nominal and inflation-indexed Treasury yield curves.

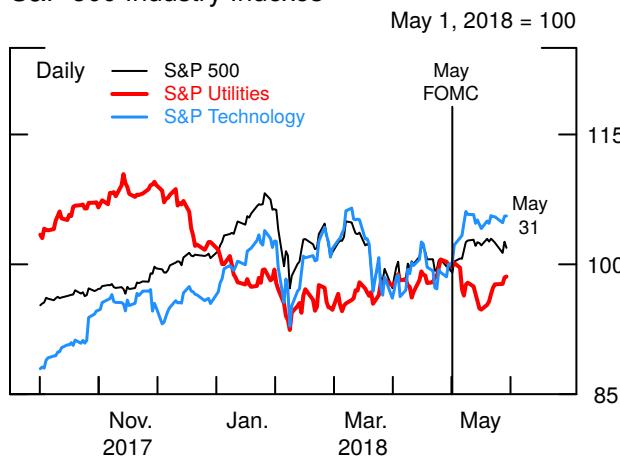
\* Adjusted for lagged indexation of Treasury Inflation-Protected Securities (carry effect).  
Source: Federal Reserve Bank of New York; Federal Reserve Board staff estimates.

## Corporate Asset Market Developments

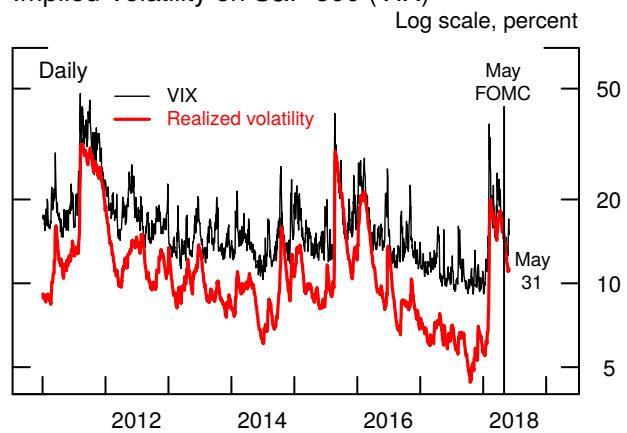
### Intraday S&P 500 Index



### S&P 500 Industry Indexes

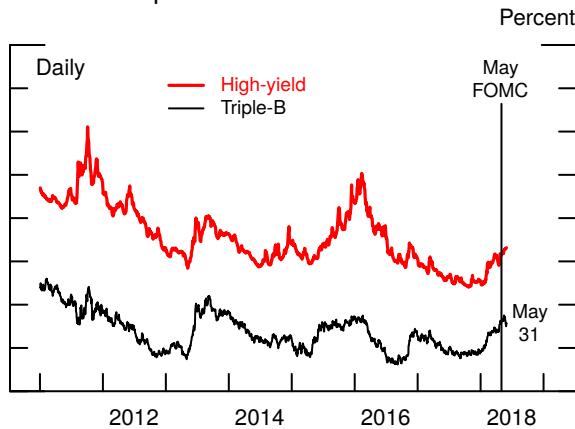


### Implied Volatility on S&P 500 (VIX)



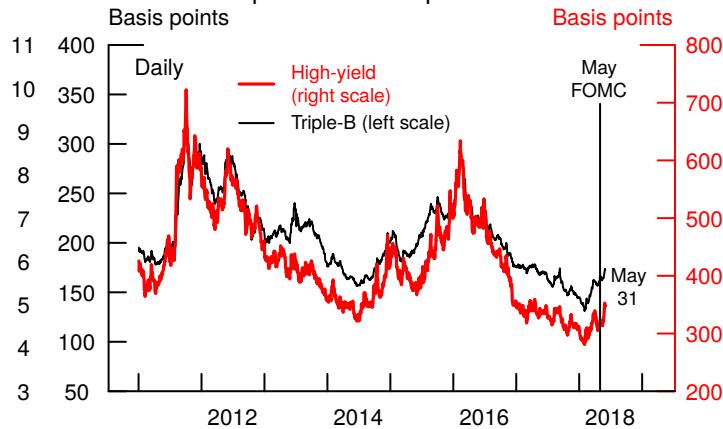
Financial Markets

### 10-Year Corporate Bond Yields



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

### 10-Year Corporate Bond Spreads



Note: Spreads over 10-year Treasury yield.  
Source: Staff estimates of smoothed yield curves based on Merrill Lynch bond data and smoothed Treasury yield curve.

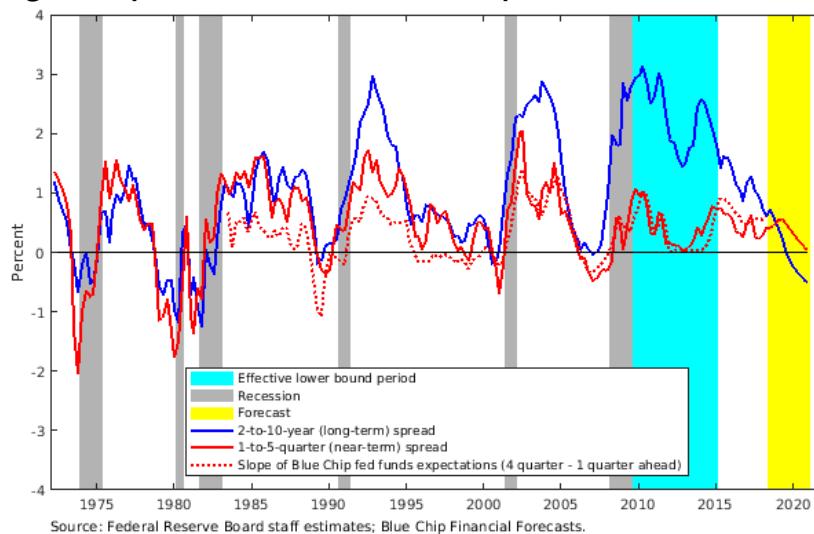
## Don't Fear the Long-Term Spread

Commonly cited measures of the term spread, such as the difference between the 10-year and 2-year nominal Treasury yields, have dropped over the past several years (figure 1, blue line). This trend has raised some concerns because low term spreads appear to have statistical power for predicting recessions over the coming year.<sup>1</sup> In this discussion, we document that for predicting recessions, a “long-term spread”—the spread in yields between a far-off maturity such as 10 years and a shorter maturity such as 1 or 2 years—is inferior to a more economically intuitive alternative, a “near-term spread.”

We focus on the difference between 5-quarter-ahead and 1-quarter-ahead forward interest rates (figure 1, red line). This near-term spread is driven largely by the market’s expectations for the path of the federal funds rate over the year ahead. Indeed, the near-term spread co-varies closely with a survey-based measure of such expectations, the dotted red line. Currently, the near-term spread is not much below its long-run average level. Looking ahead, the staff projection suggests that the near-term spread will decline, on net, as the policy rate trends toward its neutral level.<sup>2</sup> If instead the near-term spread becomes decidedly negative, that would signal that market participants expect the Fed to significantly lower rates in the year ahead, presumably owing to an economic slowdown.

Consistent with this reasoning, our empirical analysis finds that a relatively low near-term spread implies a higher probability of a recession over the next four quarters, similar to findings using long-term spreads. Moreover, we find that, after conditioning on a near-term spread, long-term spreads offer no additional predictive power for past recessions.

**Figure 1: Spreads of Yields and Market-Expected Paths of Short Rates**



<sup>1</sup> The predictive value of long-term spreads has not diminished of late, as confirmed in Michael D. Bauer and Thomas M. Mertens (2018), “Economic Forecasts with the Yield Curve,” FRBSF Economic Letter 2018-07 (San Francisco: Federal Reserve Bank of San Francisco, March 5); and Peter Johansson and Andrew Meldrum (2018), “Predicting Recession Probabilities Using the Slope of the Yield Curve,” FEDS Notes (Washington: Board of Governors of the Federal Reserve System, March 1). The latter paper also finds that when the first three principal components of the yield curve are included as regressors, the current probability of recession is lower than is implied by conditioning on the term slope alone.

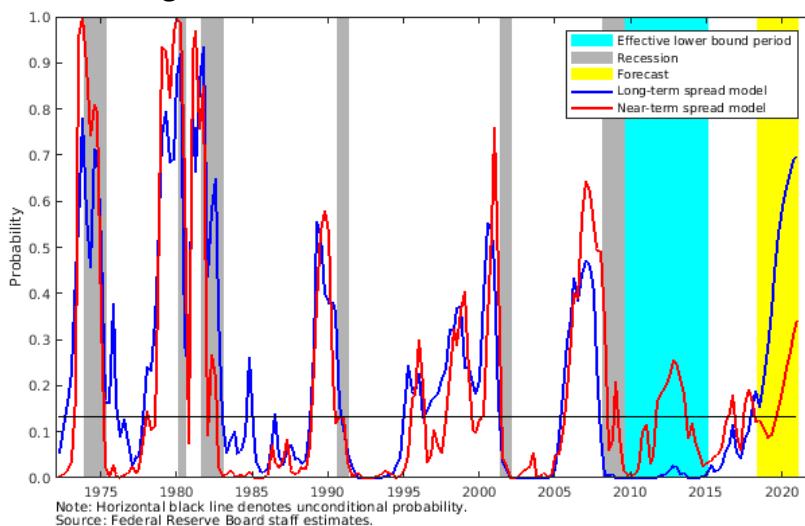
<sup>2</sup> Over the forecast period, constructing the long-term spread required interpolation from the yields included in the staff projection; the near-term spread is driven largely by the inertial Taylor rule that the staff uses to set the path of short -term interest rates.

Our analysis is based on a probit model, estimated on data from 1972:Q1 to 2018:Q1, where the probability of transition to recession in the four quarters ahead is a function of the near-term and long-term spreads and, in some specifications, added controls. In this model, the near-term spread is highly significant; all else being equal, when it falls from its mean level by one standard deviation (80 basis points), the probability of recession increases by almost 40 percentage points. In contrast, the coefficient on the long-term spread is economically small and not statistically different from zero.<sup>3</sup> As shown in figure 2, the fitted conditional probabilities of recession from our model (red line) show somewhat sharper spikes before recessions than a model using only the long-term spread (blue line).

While the predicted recession probabilities from the two models generally track each other fairly closely, a noticeable divergence appears in the forecast period. The model based on long-term spreads suggests that the probability of recession will move up considerably as the long-term spread falls well below its long-run mean level. However, the model based on the near-term spread suggests that the probability of recession will increase much less, as short-term rates in the staff's projection flatten but do not invert in the medium term.

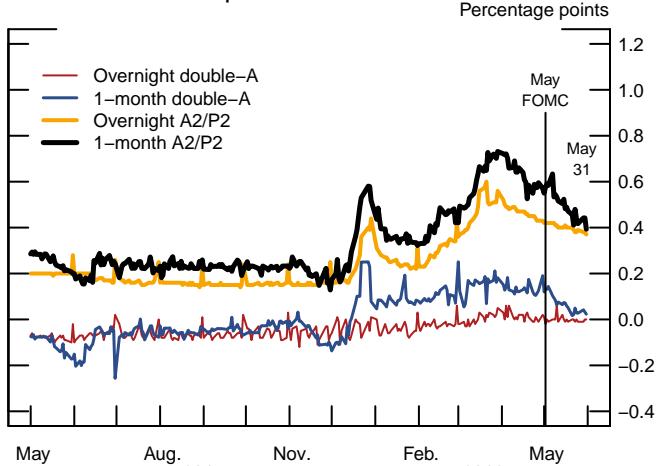
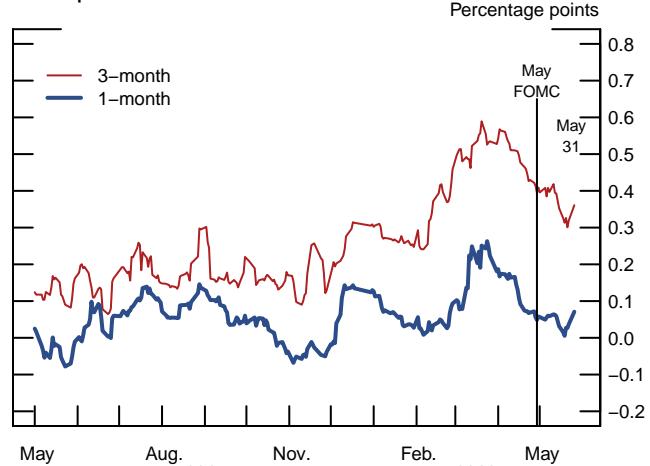
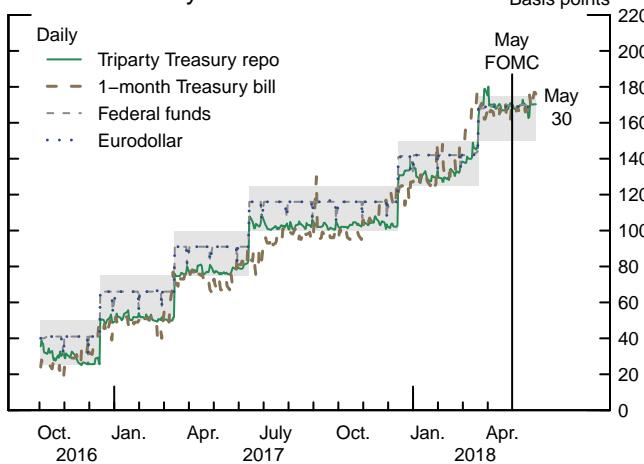
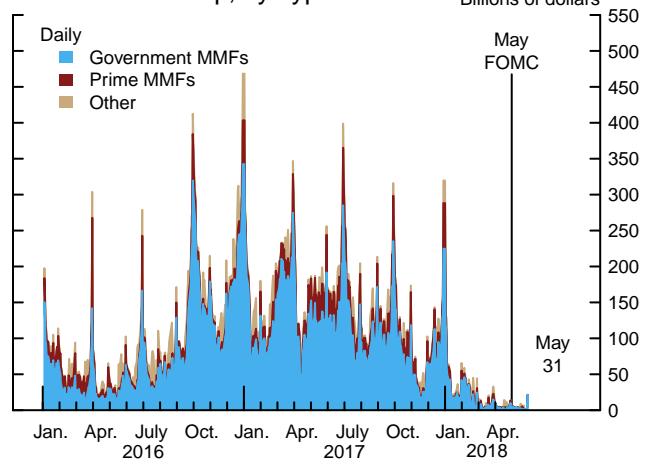
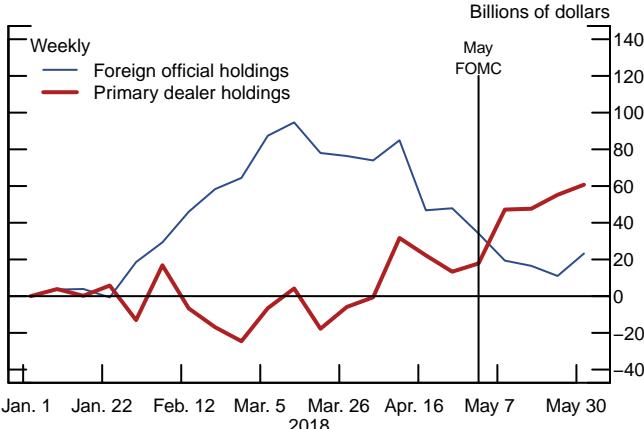
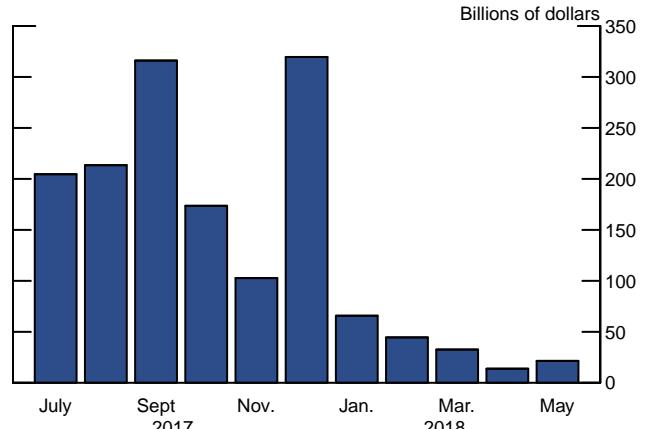
The forecast aside, the main lesson we take away from this exercise is that the current near-term spread, which arguably serves as a proxy for market expectations of Federal Reserve policy, suggests the market is putting fairly low odds on a recession-induced rate cut over the next four quarters. More generally, our findings do not support appealing to the long-term spread for a different signal about year-ahead economic growth.

**Figure 2: Estimated Probabilities of Recession**



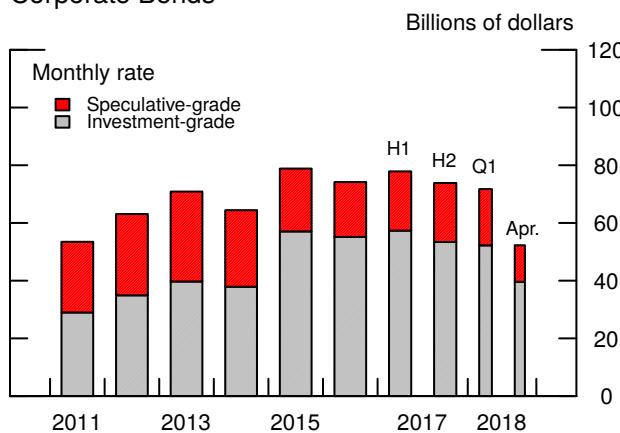
<sup>3</sup> Controls included the level of the 30-day Treasury bill rate and the “excess bond premium” from Simon Gilchrist and Egon Zakrajsek (2012), “Credit Spreads and Business Cycle Fluctuations,” *American Economic Review*, vol. 102 (June), pp. 1692–720. The controls were included in separate estimations to test whether our main findings are robust to the inclusion of the controls. Figure 2 shows results from a specification without the controls to isolate and illustrate the effect of the near-term slope.

In another departure from the standard literature, we drop from the estimation any observations in which the economy was already in recession in the previous quarter. This choice enables us to estimate the probability of transition into recession, rather than the probability of either transitioning or remaining in recession, which most studies estimate. This change lowers the current recession probability estimate based on the far-term spread from about 30 percent to 20 percent. We also drop observations during which the effective lower bound was binding, following other recent studies.

**Short-Term Funding Markets and Federal Reserve Operations****Nonfinancial CP Spreads****CD Spreads to OIS****Selected Money Market Rates****ON RRP Take-Up, by Type****Cumulative Change in Net Treasury Positions****ON RRP Take-Up on Month-Ends**

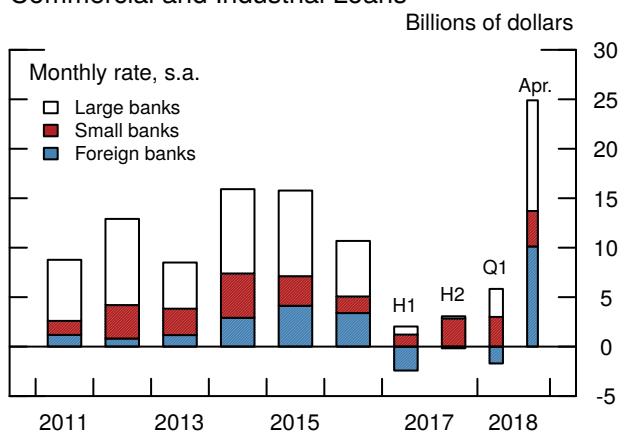
## Business Finance

### Gross Issuance of Nonfinancial Corporate Bonds



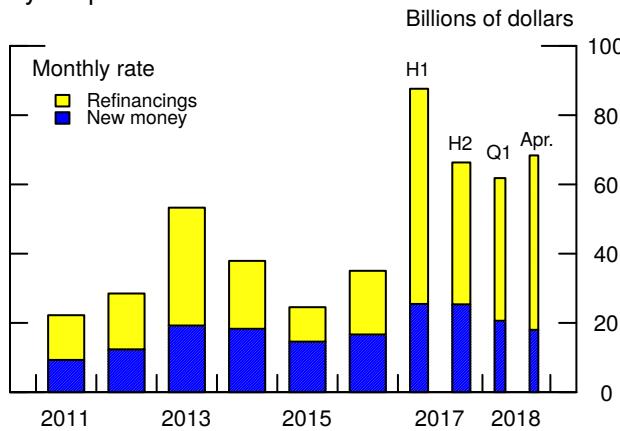
Note: Bonds are categorized by Moody's, Standard & Poor's, and Fitch.  
Source: Mergent Fixed Income Securities Database.

### Commercial and Industrial Loans



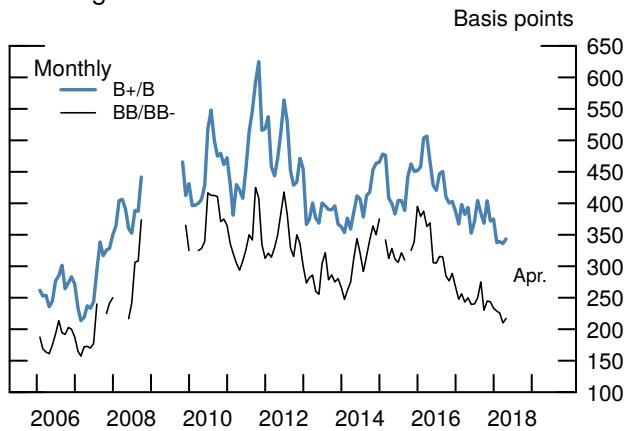
Source: Staff calculations, Federal Reserve Board, Form FR 2644, Weekly Report of Selected Assets and Liabilities of Domestically Chartered Commercial Banks and U.S. Branches and Agencies of Foreign Banks.

### Institutional Leveraged Loan Issuance, by Purpose



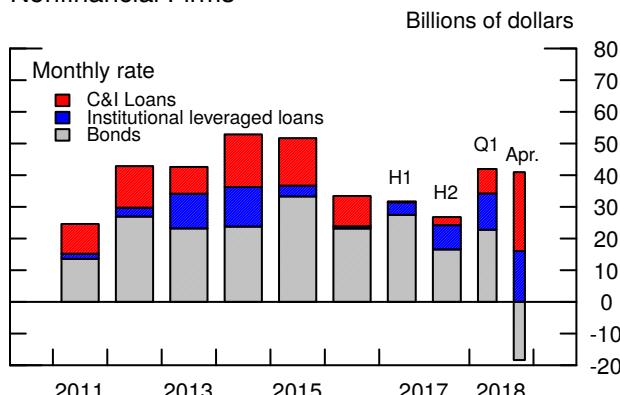
Source: Thomson Reuters LPC LoanConnector.

### Average Spread of New-Issue Institutional Leveraged Loans



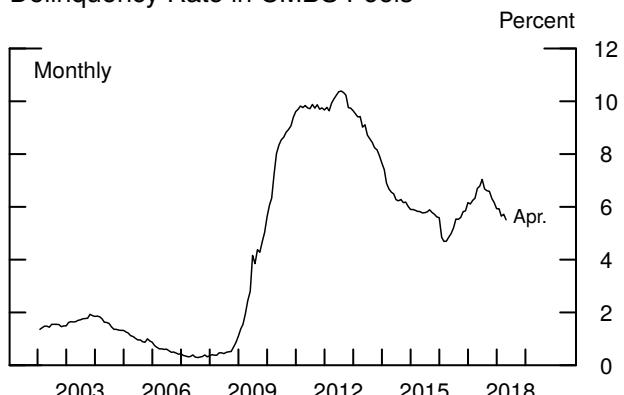
Note: Breaks in the series represent periods with no issuance. Spreads are calculated against 3-month LIBOR. The spreads do not include up-front fees.  
Source: S&P LCD.

### Selected Components of Net Debt Financing, Nonfinancial Firms

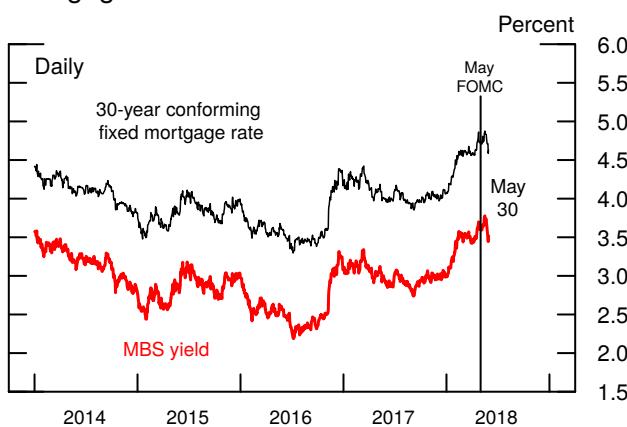


Note: C&I is commercial and industrial.  
Source: Federal Reserve Board; Thomson Reuters LPC; Mergent Fixed Income Securities Database.

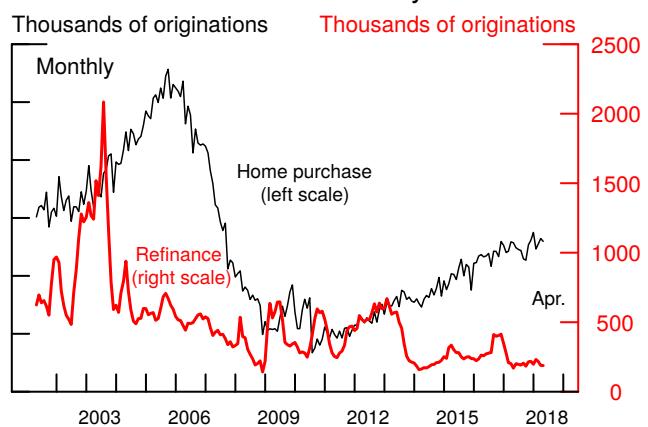
### Delinquency Rate in CMBS Pools



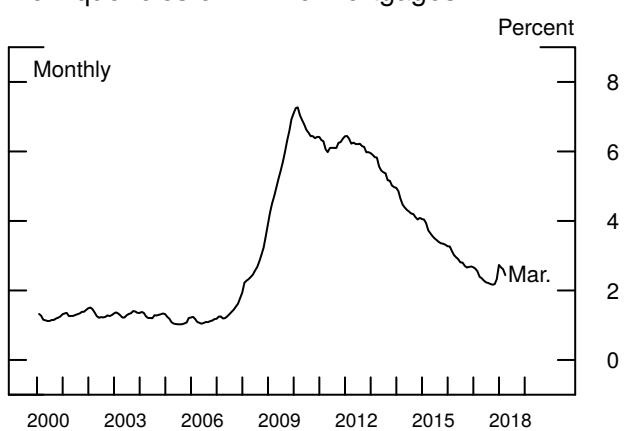
Note: The delinquency rate is the percent of commercial mortgages in CMBS pools 30 days or more past due.  
Source: Citigroup.

**Mortgage Rate and MBS Yield**

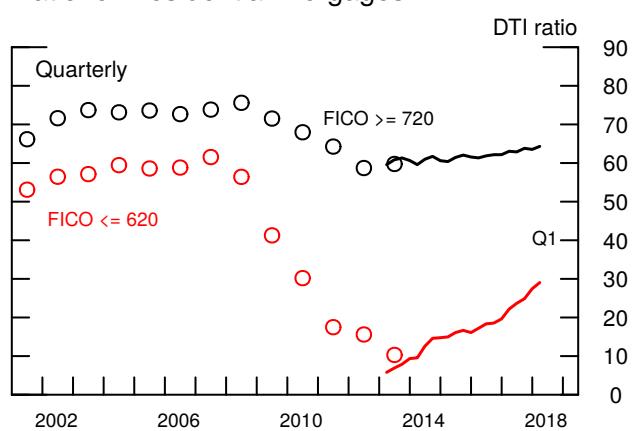
Note: The mortgage-backed securities (MBS) yield is the Fannie Mae 30-year current-coupon rate.  
Source: For MBS yield, Barclays; for mortgage rate, Optimal Blue.

**Purchase and Refinance Activity**

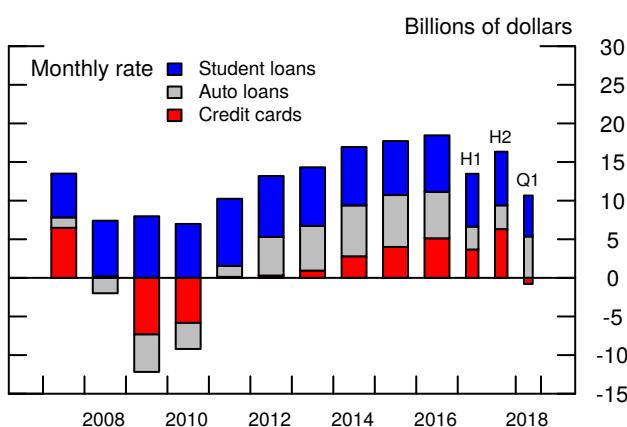
Note: The data are seasonally adjusted by Federal Reserve Board staff.  
Source: For values prior to 2017, data reported under the Home Mortgage Disclosure Act of 1975; for values in and after 2017, staff estimates.

**Delinquencies on Prime Mortgages**

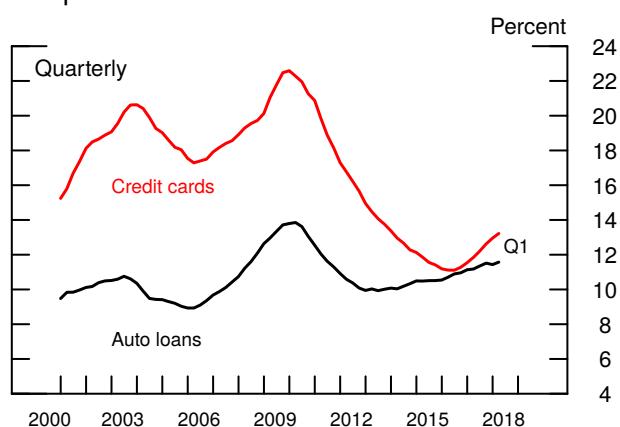
Note: The delinquency rate is the percent of loans 90 or more days past due or in foreclosure.  
Source: LPS Applied Analytics/Black Knight.

**Maximum Allowed Debt-Service-to-Income Ratio for Residential Mortgages**

Source: For frontiers shown with circles, McDash and CoreLogic; for frontiers shown with solid lines, Optimal Blue.

**Consumer Credit Flows**

Note: The data are seasonally adjusted by Federal Reserve Board staff.  
Source: Federal Reserve Board.

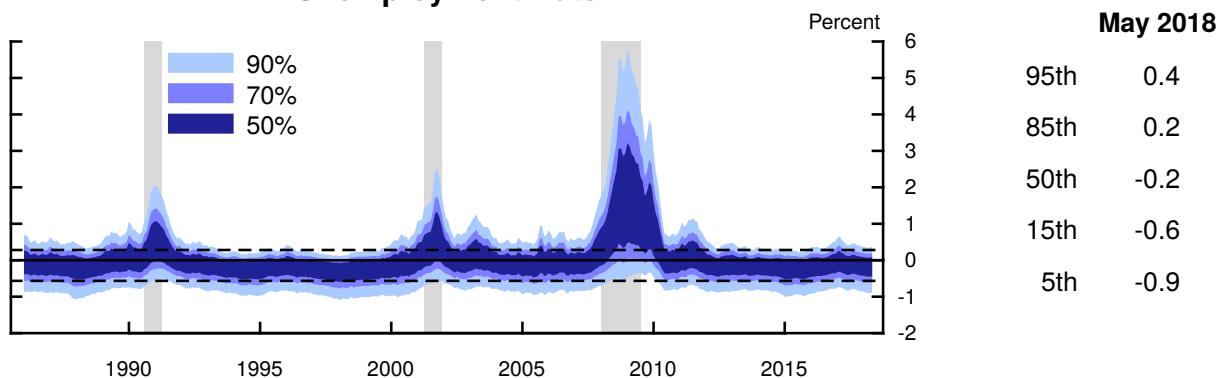
**Delinquency Rates on Consumer Loans for Subprime Borrowers**

Note: Delinquency rates measure the percent of balances that are at least 30 days past due, excluding severe derogatory loans. Subprime refers to credit scores below 620. Credit scores lagged 4 quarters. 4-quarter moving average.

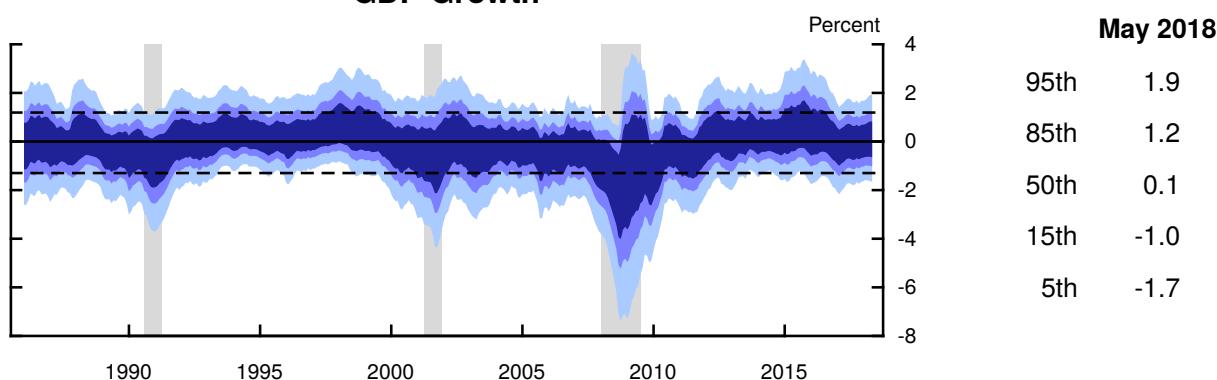
Source: FRBNY/Equifax Consumer Credit Panel.

## Time-Varying Macroeconomic Risk

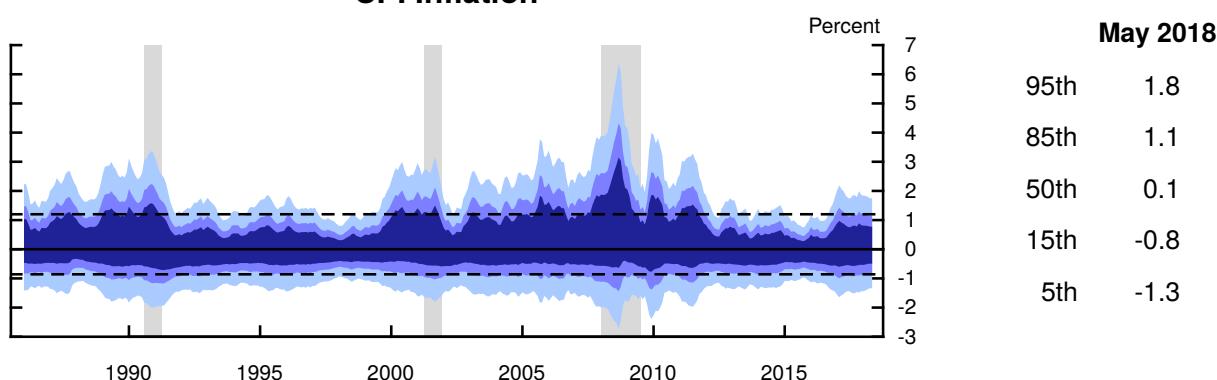
### Unemployment Rate



### GDP Growth



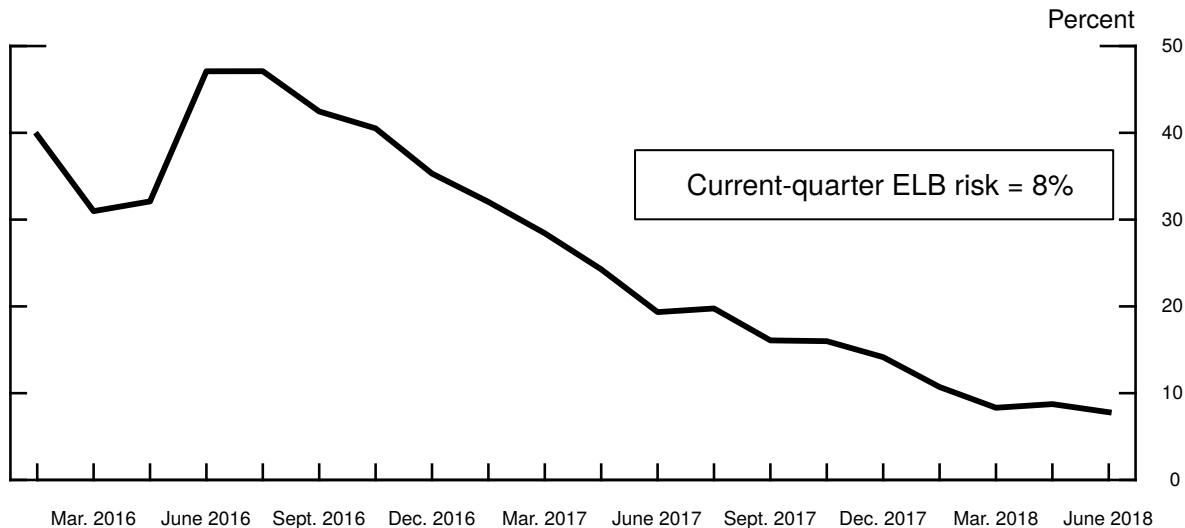
### CPI Inflation



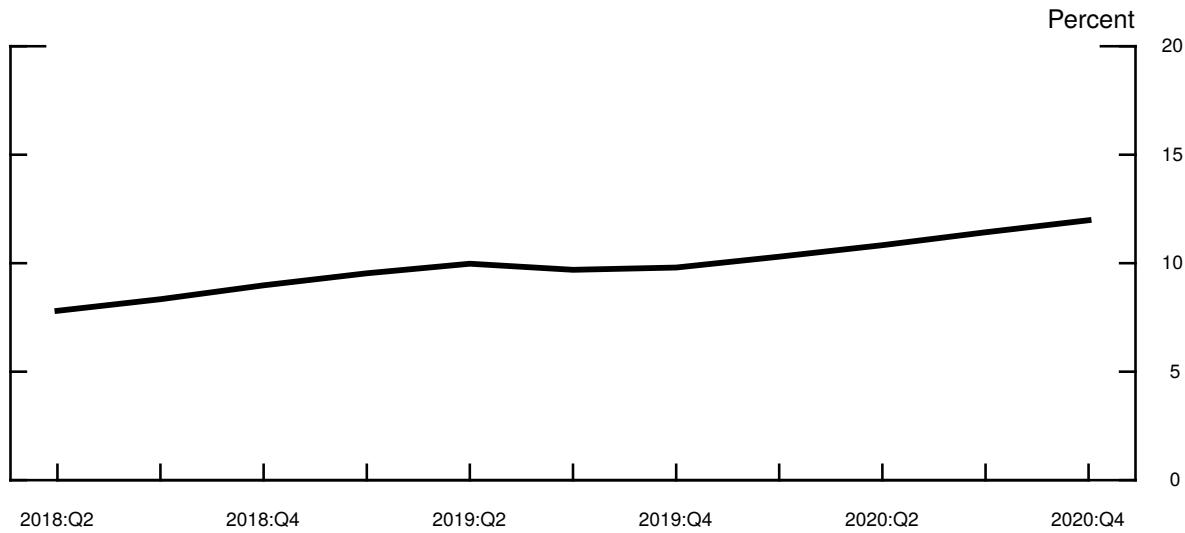
Note: The exhibit shows estimates of quantiles of the distribution of errors for four-quarter-ahead staff forecasts. The estimates are conditioned on indicators of real activity, inflation, financial market strain, and the volatility of high-frequency macroeconomic indicators. The tables show selected quantiles of the predictive distributions for the respective variables as of the current Tealbook. Dashed lines denote the median 15<sup>th</sup> and 85<sup>th</sup> percentiles. Gray shaded bars indicate recession periods as defined by the National Bureau of Economic Research.

## Effective Lower Bound Risk Estimate

### ELB Risk since Liftoff



### ELB Risk over the Projection Period



Note: The figures show the probability that the federal funds rate reaches the effective lower bound (ELB) over the next 3 years starting in the given quarter. Details behind the computation of the ELB risk measure are provided in the box "A Guidepost for Dropping the Effective Lower Bound Risk from the Assessment of Risks" in the Risks and Uncertainty section of the April 2017 Tealbook A. The lower panel computes ELB risk over a forward-looking moving 3-year window using stochastic simulations in FRB/US beginning in the current quarter. The simulations are computed around the Tealbook baseline.

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

Measure and scenario	2018		2019	2020	2021	2022-23
	H1	H2				
<i>Real GDP</i>						
Tealbook baseline and extension	2.8	2.7	2.4	1.8	1.5	1.1
Financial correction with return to ELB	2.8	-.1	-1.0	.9	2.7	2.7
Supply constraints	2.8	2.8	2.3	1.7	1.5	1.0
Positive hysteresis	2.8	2.8	2.8	2.2	2.0	1.3
Misperceived lower natural rate	2.8	2.8	2.5	1.9	1.7	1.2
Heightened risk of euro-area breakup	2.8	1.2	1.5	2.0	1.9	1.3
EME turbulence and stronger dollar	2.8	2.5	1.7	1.5	1.6	1.3
<i>Unemployment rate<sup>1</sup></i>						
Tealbook baseline and extension	3.8	3.6	3.4	3.4	3.6	4.1
Financial correction with return to ELB	3.8	4.9	6.5	6.2	5.4	4.1
Supply constraints	3.8	3.6	3.6	3.7	3.8	4.3
Positive hysteresis	3.8	3.6	3.4	3.2	3.3	3.8
Misperceived lower natural rate	3.8	3.5	3.2	3.1	3.1	3.4
Heightened risk of euro-area breakup	3.8	3.8	4.1	4.1	4.2	4.5
EME turbulence and stronger dollar	3.8	3.6	3.7	3.9	4.1	4.4
<i>Total PCE prices</i>						
Tealbook baseline and extension	2.3	1.8	1.9	2.0	2.0	2.1
Financial correction with return to ELB	2.3	1.7	1.5	1.5	1.8	2.0
Supply constraints	2.3	2.6	2.6	2.5	2.4	2.3
Positive hysteresis	2.3	1.8	1.9	2.0	2.1	2.1
Misperceived lower natural rate	2.3	1.8	1.9	1.9	2.0	2.0
Heightened risk of euro-area breakup	2.3	.5	1.1	1.6	1.8	2.0
EME turbulence and stronger dollar	2.3	1.2	1.6	2.0	2.2	2.3
<i>Core PCE prices</i>						
Tealbook baseline and extension	2.1	1.7	2.0	2.1	2.1	2.2
Financial correction with return to ELB	2.1	1.6	1.6	1.6	1.9	2.0
Supply constraints	2.1	2.5	2.7	2.6	2.4	2.3
Positive hysteresis	2.1	1.7	2.1	2.1	2.1	2.2
Misperceived lower natural rate	2.1	1.7	2.0	2.0	2.0	2.1
Heightened risk of euro-area breakup	2.1	.8	1.3	1.7	1.9	2.0
EME turbulence and stronger dollar	2.1	1.3	1.8	2.1	2.2	2.3
<i>Federal funds rate<sup>1</sup></i>						
Tealbook baseline and extension	1.7	2.5	3.8	4.5	4.8	4.4
Financial correction with return to ELB	1.7	1.2	.1	.2	.9	2.9
Supply constraints	1.7	2.5	3.9	4.8	5.0	4.6
Positive hysteresis	1.7	2.5	3.7	4.5	4.7	4.3
Misperceived lower natural rate	1.7	2.5	3.8	4.6	4.8	4.4
Heightened risk of euro-area breakup	1.7	2.4	2.7	3.3	3.7	3.9
EME turbulence and stronger dollar	1.7	2.3	3.5	4.3	4.6	4.3

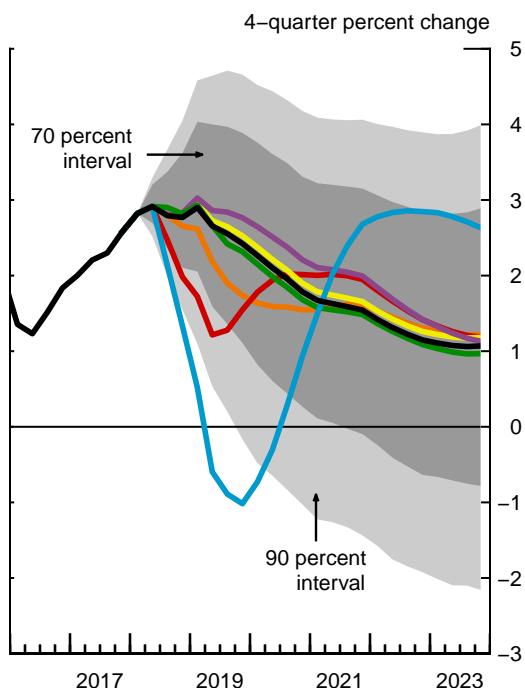
1. Percent, average for the final quarter of the period.

## Forecast Confidence Intervals and Alternative Scenarios

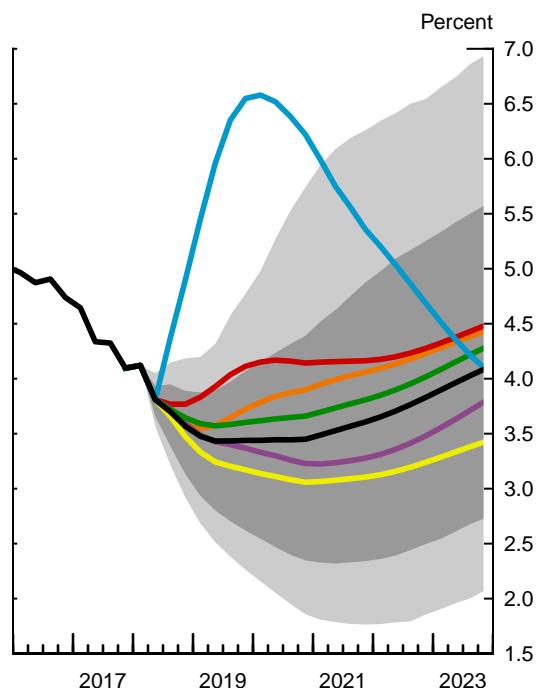
Confidence Intervals Based on FRB/US Stochastic Simulations

- Tealbook baseline and extension
- Financial correction with return to ELB
- Supply constraints
- Positive hysteresis
- Misperceived lower natural rate
- Heightened risk of euro-area breakup
- EME turbulence and stronger dollar

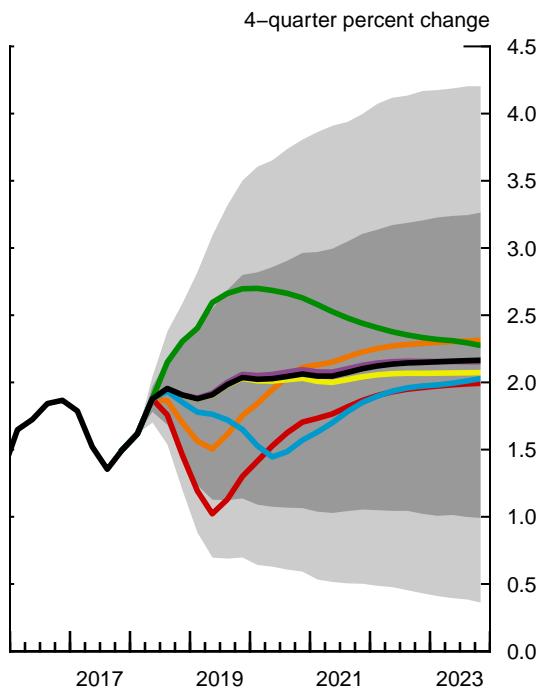
Real GDP



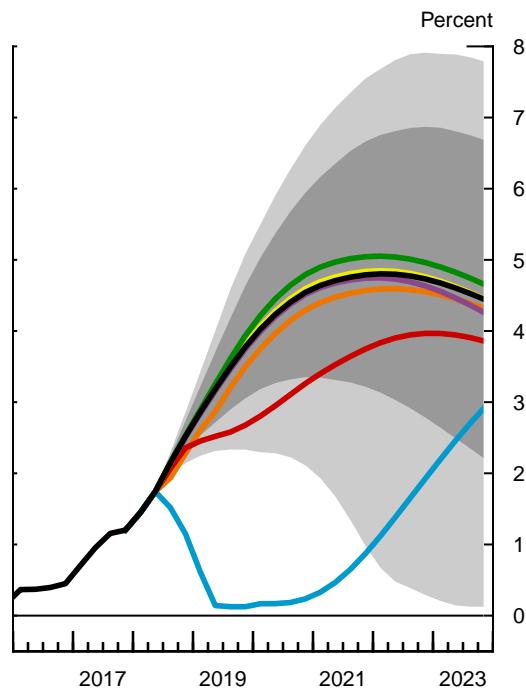
Unemployment Rate



PCE Prices excluding Food and Energy



Federal Funds Rate



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

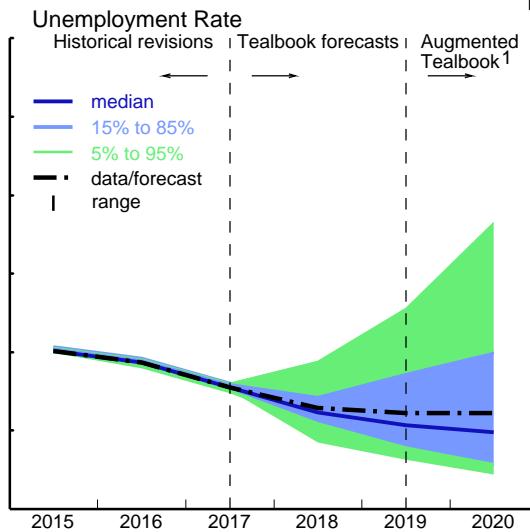
Measure	2018	2019	2020	2021	2022	2023
<i>Real GDP</i> <i>(percent change, Q4 to Q4)</i>						
Projection	2.8	2.4	1.8	1.5	1.1	1.1
Confidence interval						
Tealbook forecast errors	1.5–4.3	.2–3.9	-.8–3.2	...	...	...
FRB/US stochastic simulations	2.1–3.6	1.1–3.9	.3–3.3	-.1–3.2	-.6–2.9	-.8–2.9
<i>Civilian unemployment rate</i> <i>(percent, Q4)</i>						
Projection	3.6	3.4	3.4	3.6	3.8	4.1
Confidence interval						
Tealbook forecast errors	3.2–3.9	2.5–4.5	2.1–5.0	...	...	...
FRB/US stochastic simulations	3.1–3.9	2.6–4.1	2.3–4.4	2.3–4.9	2.5–5.3	2.7–5.6
<i>PCE prices, total</i> <i>(percent change, Q4 to Q4)</i>						
Projection	2.1	1.9	2.0	2.0	2.1	2.1
Confidence interval						
Tealbook forecast errors	1.4–2.6	1.0–3.5	1.0–3.4	...	...	...
FRB/US stochastic simulations	1.5–2.5	.9–2.7	.9–2.9	.9–3.1	.9–3.2	.9–3.3
<i>PCE prices excluding food and energy</i> <i>(percent change, Q4 to Q4)</i>						
Projection	1.9	2.0	2.1	2.1	2.1	2.2
Confidence interval						
Tealbook forecast errors	1.6–2.2	1.4–2.7	...	...	...	...
FRB/US stochastic simulations	1.5–2.3	1.1–2.8	1.1–3.0	1.1–3.1	1.0–3.2	1.0–3.3
<i>Federal funds rate</i> <i>(percent, Q4)</i>						
Projection	2.5	3.8	4.5	4.8	4.7	4.4
Confidence interval						
FRB/US stochastic simulations	2.3–2.7	3.1–4.6	3.4–5.9	3.2–6.7	2.8–6.9	2.2–6.7

Note: Shocks underlying FRB/US stochastic simulations are randomly drawn from the 1969–2016 set of model equation residuals. Intervals derived from Tealbook forecast errors are based on projections made from 1980 to 2016 for real GDP and unemployment and from 1998 to 2016 for PCE prices. The intervals for real GDP, unemployment, and total PCE prices are extended into 2020 using information from the Blue Chip survey and forecasts from the CBO and CEA.

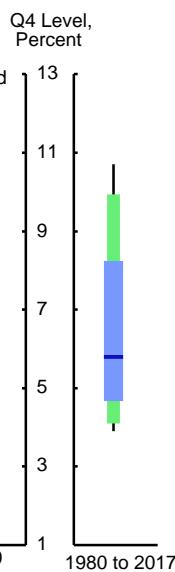
... Not applicable.

## Prediction Intervals Derived from Historical Tealbook Forecast Errors

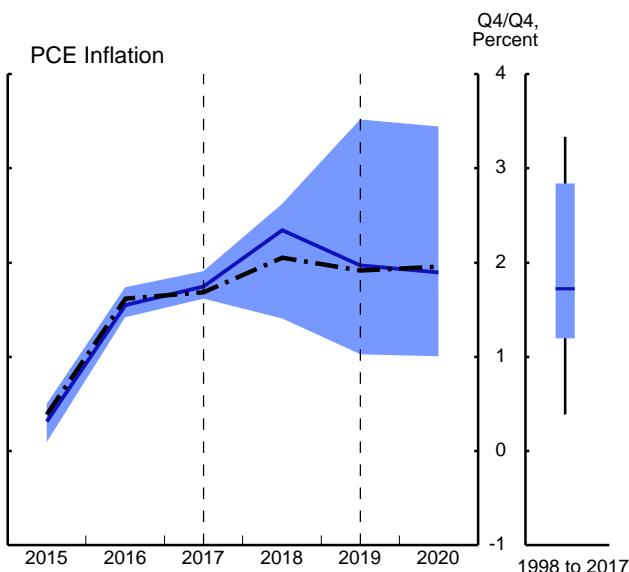
### Forecast Error Percentiles



### Historical Distributions

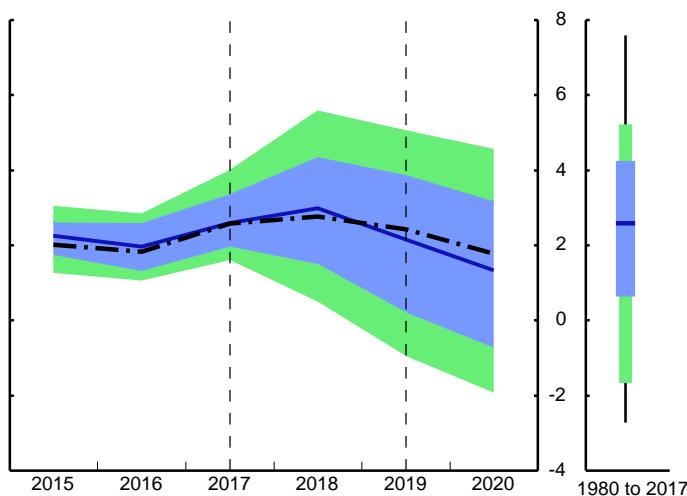


### PCE Inflation

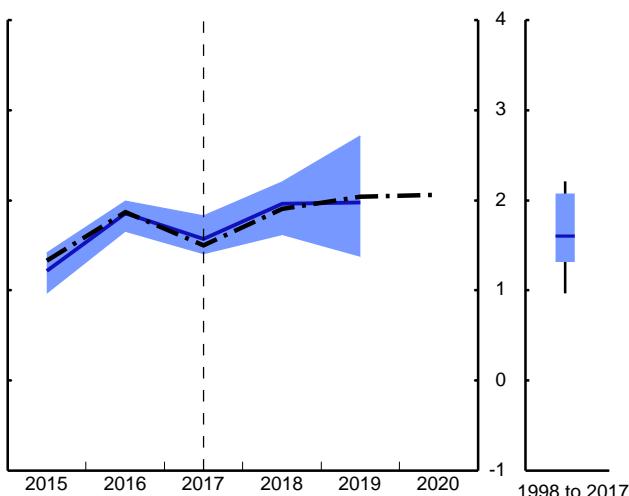


Risks & Uncertainty

### Real GDP Growth

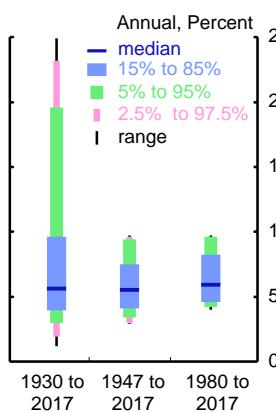


### Core PCE Inflation

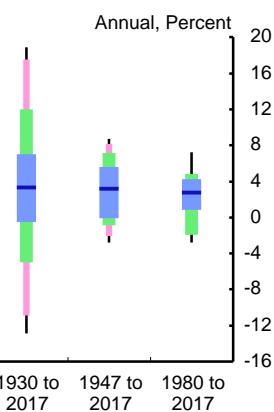


### Historical Distributions

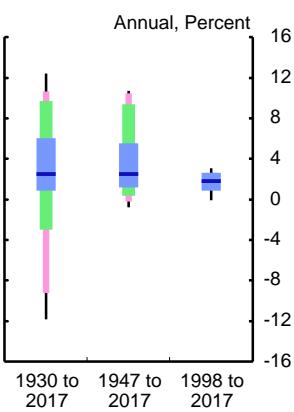
#### Unemployment Rate



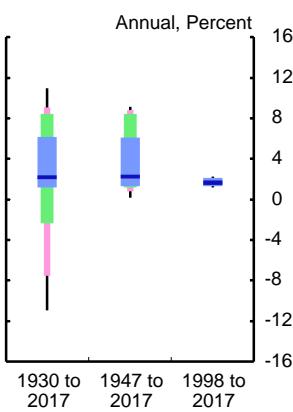
#### Real GDP Growth



#### PCE Inflation



#### Core PCE Inflation



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

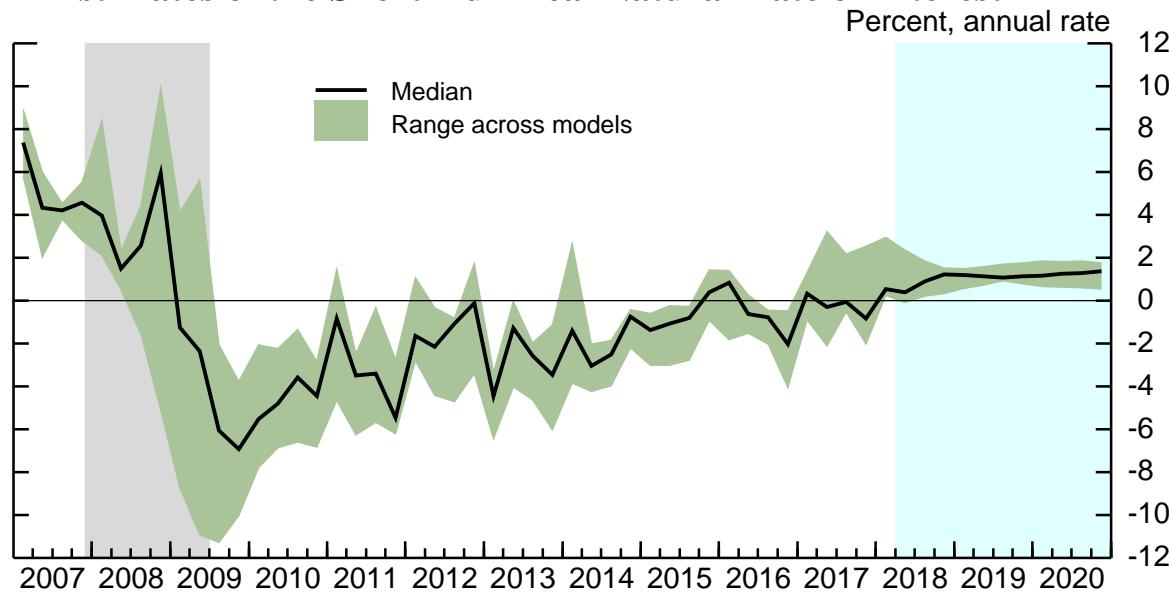
1. Augmented Tealbook prediction intervals use 1- and 2-year-ahead forecast errors from Blue Chip, CBO, and CEA to extend the Tealbook prediction intervals through 2020.

**Alternative Model Forecasts**  
(Percent change, Q4 to Q4, except as noted)

Measure and projection	2018		2019		2020	
	March Tealbook	Current Tealbook	March Tealbook	Current Tealbook	March Tealbook	Current Tealbook
<i>Real GDP</i>						
Staff	2.9	2.8	2.6	2.4	2.1	1.8
FRB/US	2.1	2.5	2.0	1.7	1.7	1.3
EDO	2.3	2.8	2.3	2.3	2.4	2.3
<i>Unemployment rate<sup>1</sup></i>						
Staff	3.5	3.6	3.1	3.4	3.1	3.4
FRB/US	3.9	3.8	3.9	3.8	4.0	4.0
EDO	4.2	4.0	4.4	4.2	4.7	4.5
<i>Total PCE prices</i>						
Staff	1.8	2.1	2.0	1.9	2.1	2.0
FRB/US	2.0	2.2	1.8	1.8	1.8	1.8
EDO	2.0	2.0	1.9	1.8	2.0	1.9
<i>Core PCE prices</i>						
Staff	1.9	1.9	2.1	2.0	2.2	2.1
FRB/US	2.1	2.0	1.9	1.9	1.8	1.9
EDO	2.0	1.9	1.9	1.8	2.0	1.9
<i>Federal funds rate<sup>1</sup></i>						
Staff	2.7	2.5	4.0	3.8	5.0	4.5
FRB/US	2.4	2.4	3.2	3.1	3.5	3.4
EDO	2.4	2.4	3.1	3.1	3.5	3.5

1. Percent, average for Q4.

### Estimates of the Short-Run Real Natural Rate of Interest



Note: Estimates are based on the four models from the System DSGE project; for more information, see the box "Estimates of the Short-Run Real Natural Rate of Interest" in the March 2016 Tealbook. The gray shaded bar indicates a period of recession as defined by the National Bureau of Economic Research.

## Assessment of Key Macroeconomic Risks

### Probability of Inflation Events

(4 quarters ahead)

Probability that the 4-quarter change in total PCE prices will be . . .	Staff	FRB/US	EDO	BVAR
<i>Greater than 3 percent</i>				
Current Tealbook	.07	.07	.02	.11
Previous Tealbook	.06	.07	.05	.09
<i>Less than 1 percent</i>				
Current Tealbook	.11	.11	.12	.11
Previous Tealbook	.13	.10	.06	.12

### Probability of Unemployment Events

(4 quarters ahead)

Probability that the unemployment rate will . . .	Staff	FRB/US	EDO	BVAR
<i>Increase by 1 percentage point</i>				
Current Tealbook	.01	.02	.14	.02
Previous Tealbook	.00	.02	.16	.06
<i>Decrease by 1 percentage point</i>				
Current Tealbook	.13	.03	.04	.12
Previous Tealbook	.35	.04	.05	.02

### Probability of Near-Term Recession

Probability that real GDP declines in the next two quarters	Staff	FRB/US	EDO	BVAR	Factor Model
Current Tealbook	.01	.01	.04	.04	.00
Previous Tealbook	.01	.02	.05	.05	.02

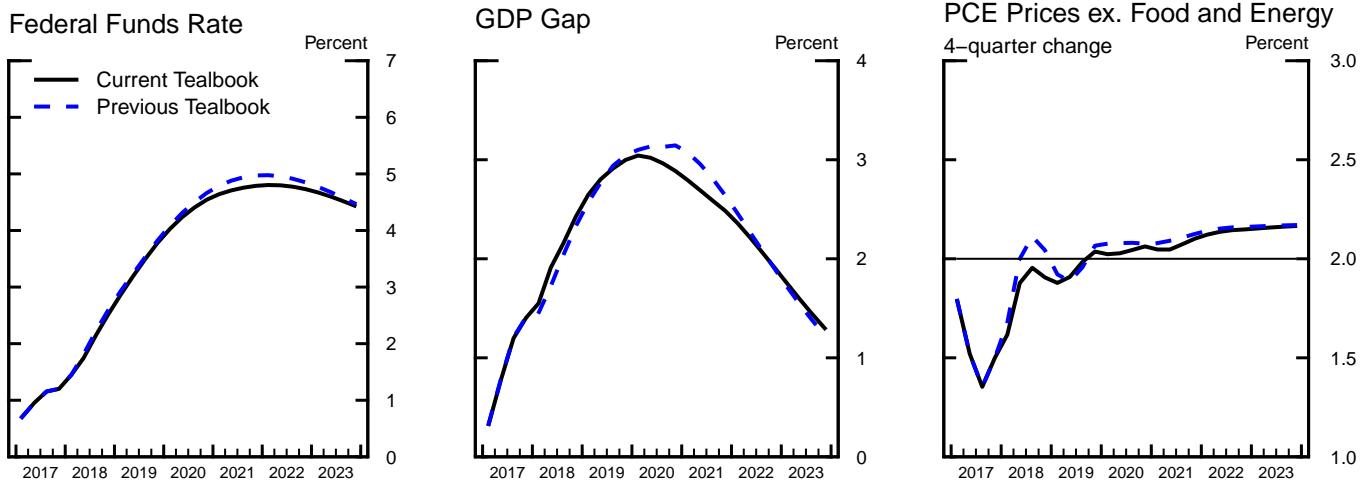
Note: "Staff" represents stochastic simulations in FRB/US around the staff baseline; baselines for FRB/US, BVAR, EDO, and the factor model are generated by those models themselves, up to the current-quarter estimate. Data for the current quarter are taken from the staff estimate for the second Tealbook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

## Policy Rules and the Staff Projection

### Near-Term Prescriptions of Selected Simple Policy Rules<sup>1</sup>

	(Percent)	<u>2018:Q3</u>	<u>2018:Q4</u>
Taylor (1999) rule	<b>4.46</b>	<b>4.65</b>	
<i>Previous Tealbook</i>	4.57	4.75	
Taylor (1993) rule	<b>3.44</b>	<b>3.50</b>	
<i>Previous Tealbook</i>	3.60	3.65	
First-difference rule	<b>2.12</b>	<b>2.47</b>	
<i>Previous Tealbook projection</i>	2.18	2.59	
Flexible price-level targeting rule	<b>1.63</b>	<b>1.54</b>	
<i>Previous Tealbook projection</i>	1.66	1.61	
<i>Addendum:</i>			
Tealbook baseline	<b>2.15</b>	<b>2.52</b>	

### Key Elements of the Staff Projection



### A Medium-Term Notion of the Equilibrium Real Federal Funds Rate<sup>2</sup>

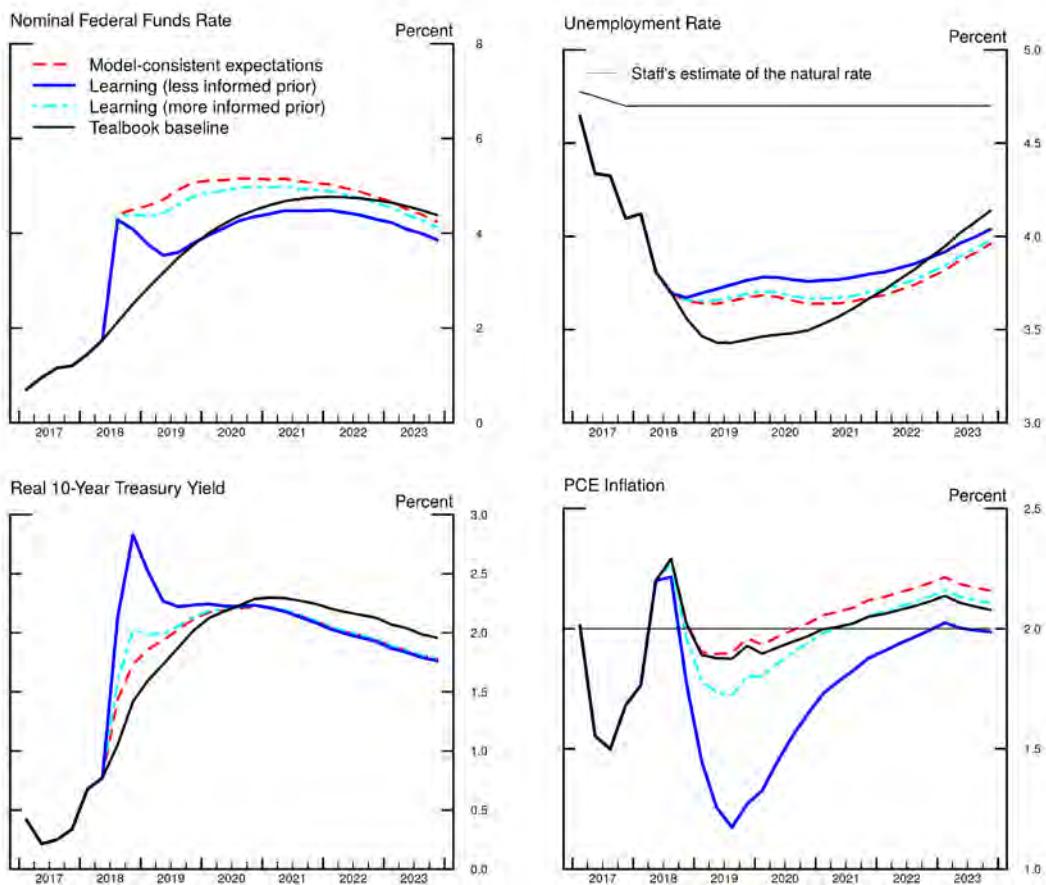
(Percent)

	Current Value	Previous Tealbook
Tealbook baseline		
FRB/US $r^*$	3.19	3.40
Average projected real federal funds rate	1.50	1.53
SEP-consistent baseline		
FRB/US $r^*$	1.49	
Average projected real federal funds rate	.61	

1. For rules that have a lagged policy rate as a right-hand-side variable, the lines denoted "Previous Tealbook projection" report prescriptions based on the previous Tealbook's staff outlook for inflation and the output gap, but conditional on the current-Tealbook value of the lagged policy rate.

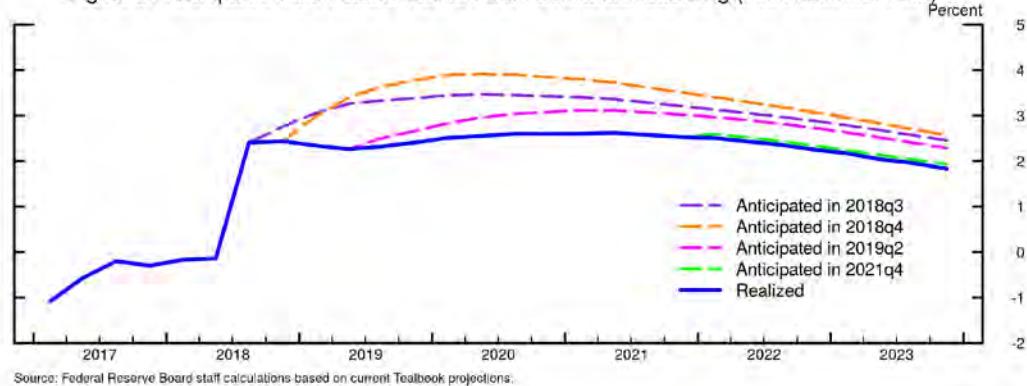
2. The "FRB/US  $r^*$ " is the level of the real federal funds rate that, if maintained over a 12-quarter period (beginning in the current quarter) in the FRB/US model, sets the output gap equal to zero in the final quarter of that period given either the Tealbook or SEP-consistent projection. The SEP-consistent baseline corresponds to the March 2018 median SEP responses. The "Average projected real federal funds rate" is calculated under the Tealbook and SEP-consistent baseline projections over the same 12-quarter period as FRB/US  $r^*$ .

Figure 1. Economic Outcomes



Source: Federal Reserve Board staff calculations based on current Tealbook projections.

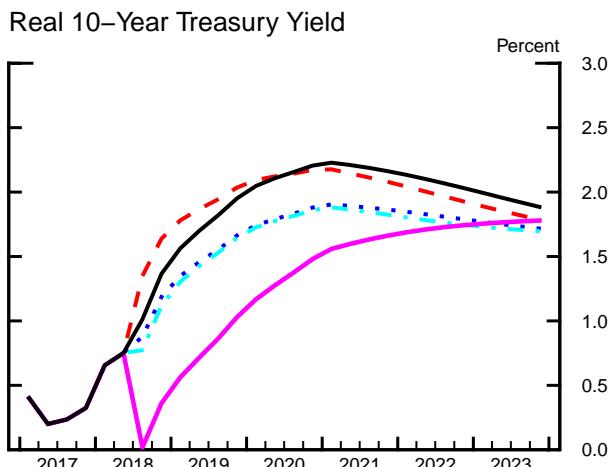
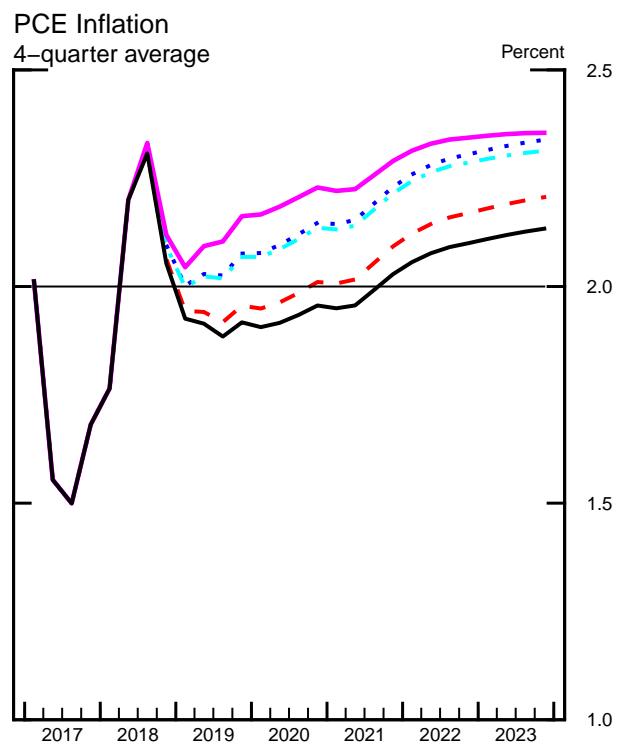
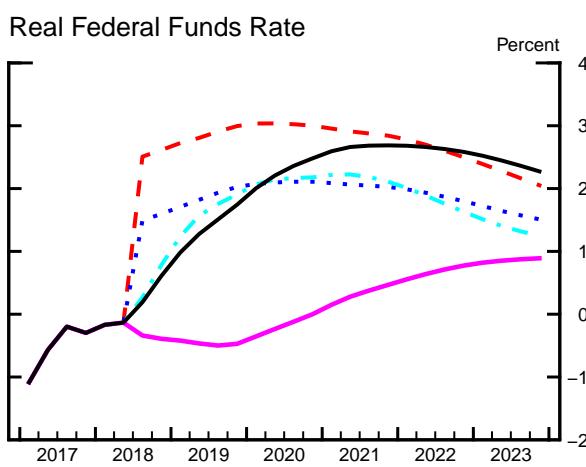
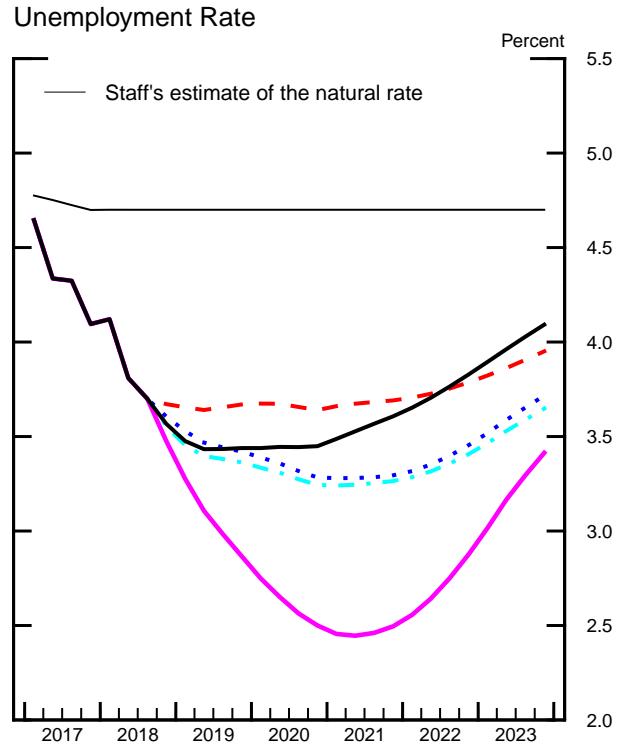
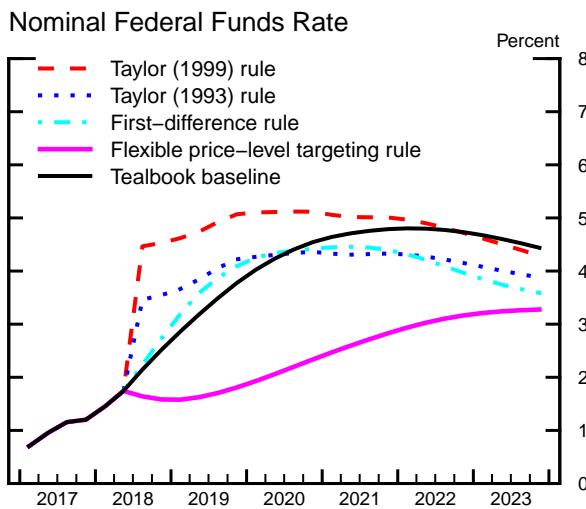
Figure 2. Anticipated Real Federal Funds Rate Paths under Learning (Less Informed Prior)



Source: Federal Reserve Board staff calculations based on current Tealbook projections.

## Simple Policy Rule Simulations

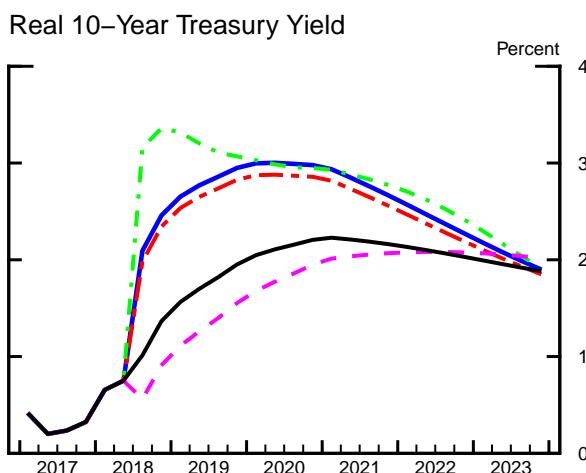
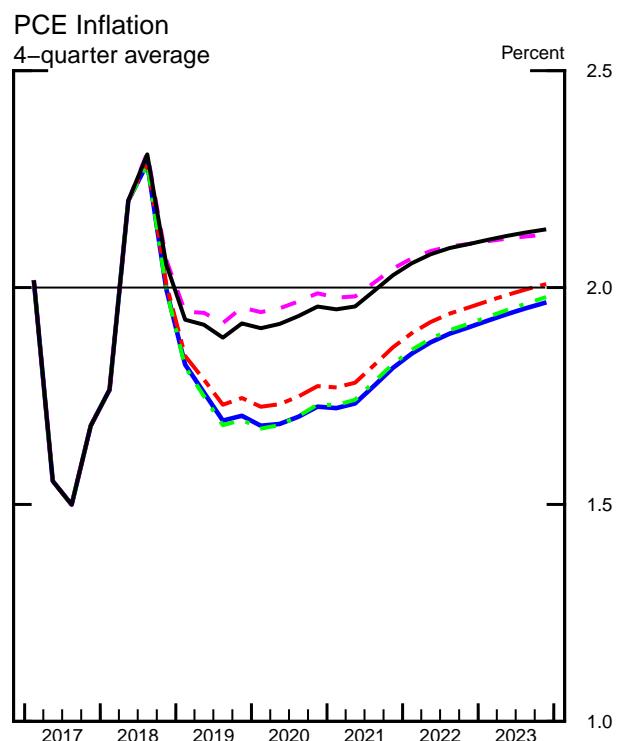
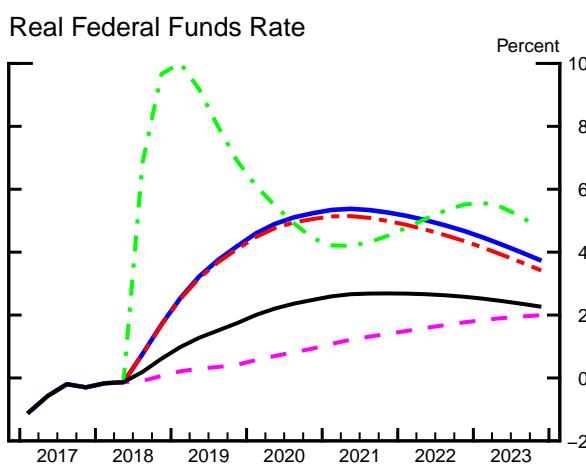
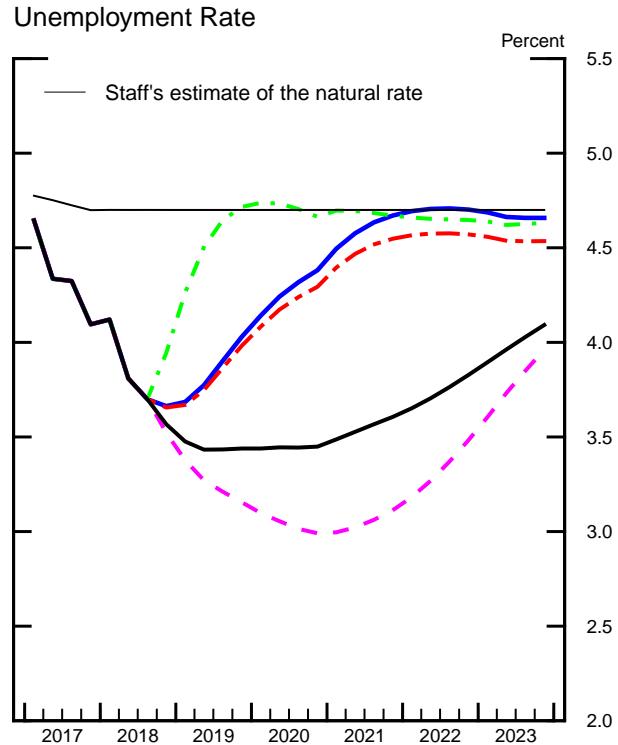
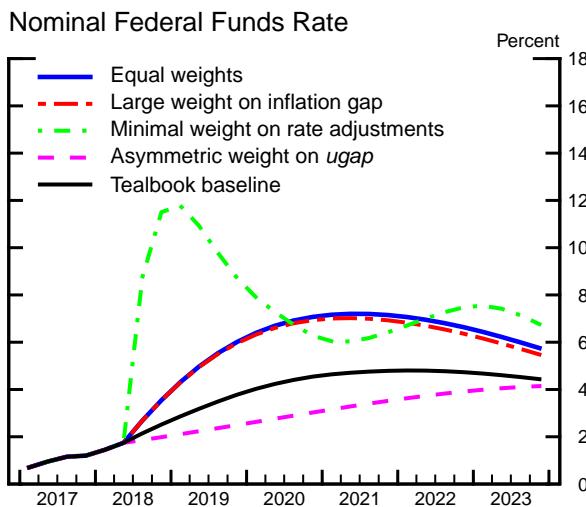
## Monetary Policy Strategies



Note: The policy rule simulations in this exhibit are based on rules that respond to core inflation rather than to headline inflation. This choice of rule specification was made in light of a tendency for current and near-term core inflation rates to outperform headline inflation rates as predictors of the medium-term behavior of headline inflation.

## Optimal Control Simulations under Commitment

Monetary Policy Strategies



Note: Each set of lines corresponds to an optimal control policy under commitment in which policymakers minimize a discounted weighted sum of squared deviations of 4-quarter headline PCE inflation from the Committee's 2 percent objective, of squared deviations of the unemployment rate from the staff's estimate of the natural rate, and of squared changes in the federal funds rate. The weights vary across simulations. See the appendix for technical details and the box "Optimal Control and the Loss Function" in the June 2016 Tealbook B for a motivation.

**Outcomes of Simple Policy Rule Simulations**  
 (Percent change, annual rate, from end of preceding period except as noted)

Outcome and strategy	2018	2019	2020	2021	2022	2023
<i>Nominal federal funds rate<sup>1</sup></i>						
Taylor (1999)	4.5	5.1	5.1	5.0	4.7	4.3
Taylor (1993)	3.5	4.2	4.4	4.3	4.2	3.9
First-difference	2.7	4.1	4.4	4.4	4.0	3.6
Flexible price-level targeting	1.6	1.8	2.3	2.8	3.2	3.3
Extended Tealbook baseline	2.5	3.8	4.5	4.8	4.7	4.4
<i>Real GDP</i>						
Taylor (1999)	2.6	2.2	1.8	1.7	1.3	1.2
Taylor (1993)	2.7	2.6	2.1	1.8	1.3	1.1
First-difference	2.8	2.6	2.0	1.8	1.3	1.2
Flexible price-level targeting	3.0	3.4	2.5	1.8	1.0	.8
Extended Tealbook baseline	2.8	2.4	1.8	1.5	1.1	1.1
<i>Unemployment rate<sup>1</sup></i>						
Taylor (1999)	3.7	3.7	3.6	3.7	3.8	4.0
Taylor (1993)	3.6	3.4	3.3	3.3	3.5	3.7
First-difference	3.6	3.4	3.2	3.3	3.4	3.6
Flexible price-level targeting	3.5	2.9	2.5	2.5	2.9	3.4
Extended Tealbook baseline	3.6	3.4	3.4	3.6	3.8	4.1
<i>Total PCE prices</i>						
Taylor (1999)	2.1	2.0	2.0	2.1	2.2	2.2
Taylor (1993)	2.1	2.1	2.1	2.2	2.3	2.3
First-difference	2.1	2.1	2.1	2.2	2.3	2.3
Flexible price-level targeting	2.1	2.2	2.2	2.3	2.3	2.4
Extended Tealbook baseline	2.1	1.9	2.0	2.0	2.1	2.1
<i>Core PCE prices</i>						
Taylor (1999)	1.9	2.1	2.1	2.2	2.2	2.2
Taylor (1993)	1.9	2.2	2.3	2.3	2.4	2.4
First-difference	1.9	2.2	2.2	2.3	2.3	2.3
Flexible price-level targeting	2.0	2.3	2.3	2.4	2.4	2.4
Extended Tealbook baseline	1.9	2.0	2.1	2.1	2.1	2.2

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

**Outcomes of Simple Policy Rule Simulations, Quarterly**  
 (4-quarter percent change, except as noted)

Outcome and strategy	2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>Nominal federal funds rate<sup>1</sup></i>								
Taylor (1999)	1.4	1.7	4.5	4.5	4.6	4.7	4.9	5.1
Taylor (1993)	1.4	1.7	3.5	3.5	3.7	3.8	4.1	4.2
First-difference	1.4	1.7	2.2	2.7	3.2	3.6	3.9	4.1
Flexible price-level targeting	1.4	1.7	1.6	1.6	1.6	1.6	1.7	1.8
Extended Tealbook baseline	1.4	1.7	2.1	2.5	2.9	3.2	3.5	3.8
<i>Real GDP</i>								
Taylor (1999)	2.8	2.9	2.8	2.6	2.7	2.3	2.2	2.2
Taylor (1993)	2.8	2.9	2.8	2.7	2.9	2.7	2.6	2.6
First-difference	2.8	2.9	2.8	2.8	3.0	2.8	2.7	2.6
Flexible price-level targeting	2.8	2.9	2.8	3.0	3.3	3.4	3.5	3.4
Extended Tealbook baseline	2.8	2.9	2.8	2.8	2.9	2.7	2.6	2.4
<i>Unemployment rate<sup>1</sup></i>								
Taylor (1999)	4.1	3.8	3.7	3.7	3.7	3.6	3.7	3.7
Taylor (1993)	4.1	3.8	3.7	3.6	3.5	3.5	3.4	3.4
First-difference	4.1	3.8	3.7	3.6	3.5	3.4	3.4	3.4
Flexible price-level targeting	4.1	3.8	3.7	3.5	3.3	3.1	3.0	2.9
Extended Tealbook baseline	4.1	3.8	3.7	3.6	3.5	3.4	3.4	3.4
<i>Total PCE prices</i>								
Taylor (1999)	1.8	2.2	2.3	2.1	1.9	1.9	1.9	2.0
Taylor (1993)	1.8	2.2	2.3	2.1	2.0	2.0	2.0	2.1
First-difference	1.8	2.2	2.3	2.1	2.0	2.0	2.0	2.1
Flexible price-level targeting	1.8	2.2	2.3	2.1	2.0	2.1	2.1	2.2
Extended Tealbook baseline	1.8	2.2	2.3	2.1	1.9	1.9	1.9	1.9
<i>Core PCE prices</i>								
Taylor (1999)	1.6	1.9	2.0	1.9	1.9	1.9	2.0	2.1
Taylor (1993)	1.6	1.9	2.0	1.9	2.0	2.0	2.1	2.2
First-difference	1.6	1.9	2.0	1.9	2.0	2.0	2.1	2.2
Flexible price-level targeting	1.6	1.9	2.0	2.0	2.0	2.1	2.2	2.3
Extended Tealbook baseline	1.6	1.9	2.0	1.9	1.9	1.9	2.0	2.0

1. Percent, average for the quarter.

### Outcomes of Optimal Control Simulations under Commitment

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

Outcome and strategy	2018	2019	2020	2021	2022	2023
<i>Nominal federal funds rate<sup>1</sup></i>						
Equal weights	3.5	6.0	7.1	7.1	6.6	5.8
Large weight on inflation gap	3.5	6.0	6.9	6.9	6.4	5.5
Minimal weight on rate adjustments	11.5	8.7	6.3	6.4	7.5	6.8
Asymmetric weight on <i>ugap</i>	2.0	2.5	3.0	3.5	3.9	4.1
Extended Tealbook baseline	2.5	3.8	4.5	4.8	4.7	4.4
<i>Real GDP</i>						
Equal weights	2.5	1.4	1.1	1.4	1.4	1.4
Large weight on inflation gap	2.6	1.5	1.2	1.4	1.4	1.4
Minimal weight on rate adjustments	2.1	.6	1.7	1.9	1.5	1.4
Asymmetric weight on <i>ugap</i>	2.9	2.9	2.1	1.6	.9	.8
Extended Tealbook baseline	2.8	2.4	1.8	1.5	1.1	1.1
<i>Unemployment rate<sup>1</sup></i>						
Equal weights	3.7	4.0	4.4	4.7	4.7	4.7
Large weight on inflation gap	3.7	4.0	4.3	4.5	4.6	4.5
Minimal weight on rate adjustments	3.9	4.7	4.7	4.7	4.6	4.6
Asymmetric weight on <i>ugap</i>	3.5	3.2	3.0	3.1	3.5	4.0
Extended Tealbook baseline	3.6	3.4	3.4	3.6	3.8	4.1
<i>Total PCE prices</i>						
Equal weights	2.0	1.7	1.7	1.8	1.9	2.0
Large weight on inflation gap	2.0	1.7	1.8	1.9	2.0	2.0
Minimal weight on rate adjustments	2.0	1.7	1.7	1.8	1.9	2.0
Asymmetric weight on <i>ugap</i>	2.1	2.0	2.0	2.0	2.1	2.1
Extended Tealbook baseline	2.1	1.9	2.0	2.0	2.1	2.1
<i>Core PCE prices</i>						
Equal weights	1.8	1.8	1.8	1.9	2.0	2.0
Large weight on inflation gap	1.9	1.9	1.9	1.9	2.0	2.0
Minimal weight on rate adjustments	1.8	1.8	1.8	1.9	2.0	2.0
Asymmetric weight on <i>ugap</i>	1.9	2.1	2.1	2.1	2.1	2.2
Extended Tealbook baseline	1.9	2.0	2.1	2.1	2.1	2.2

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

**Outcomes of Optimal Control Simulations under Commitment, Quarterly**  
 (4-quarter percent change, except as noted)

Outcome and strategy	2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>Nominal federal funds rate<sup>1</sup></i>								
Equal weights	1.4	1.7	2.7	3.5	4.3	5.0	5.5	6.0
Large weight on inflation gap	1.4	1.7	2.7	3.5	4.3	5.0	5.5	6.0
Minimal weight on rate adjustments	1.4	1.7	8.8	11.5	11.8	10.9	9.8	8.7
Asymmetric weight on <i>ugap</i>	1.4	1.7	1.9	2.0	2.1	2.2	2.4	2.5
Extended Tealbook baseline	1.4	1.7	2.1	2.5	2.9	3.2	3.5	3.8
<i>Real GDP</i>								
Equal weights	2.8	2.9	2.8	2.5	2.4	1.9	1.6	1.4
Large weight on inflation gap	2.8	2.9	2.8	2.6	2.5	2.0	1.6	1.5
Minimal weight on rate adjustments	2.8	2.9	2.8	2.1	1.7	.9	.4	.6
Asymmetric weight on <i>ugap</i>	2.8	2.9	2.8	2.9	3.1	3.0	3.0	2.9
Extended Tealbook baseline	2.8	2.9	2.8	2.8	2.9	2.7	2.6	2.4
<i>Unemployment rate<sup>1</sup></i>								
Equal weights	4.1	3.8	3.7	3.7	3.7	3.8	3.9	4.0
Large weight on inflation gap	4.1	3.8	3.7	3.7	3.7	3.7	3.9	4.0
Minimal weight on rate adjustments	4.1	3.8	3.7	3.9	4.3	4.5	4.6	4.7
Asymmetric weight on <i>ugap</i>	4.1	3.8	3.7	3.5	3.4	3.3	3.2	3.2
Extended Tealbook baseline	4.1	3.8	3.7	3.6	3.5	3.4	3.4	3.4
<i>Total PCE prices</i>								
Equal weights	1.8	2.2	2.3	2.0	1.8	1.8	1.7	1.7
Large weight on inflation gap	1.8	2.2	2.3	2.0	1.8	1.8	1.7	1.7
Minimal weight on rate adjustments	1.8	2.2	2.3	2.0	1.8	1.7	1.7	1.7
Asymmetric weight on <i>ugap</i>	1.8	2.2	2.3	2.1	1.9	1.9	1.9	2.0
Extended Tealbook baseline	1.8	2.2	2.3	2.1	1.9	1.9	1.9	1.9
<i>Core PCE prices</i>								
Equal weights	1.6	1.9	1.9	1.8	1.8	1.7	1.8	1.8
Large weight on inflation gap	1.6	1.9	1.9	1.9	1.8	1.8	1.8	1.9
Minimal weight on rate adjustments	1.6	1.9	1.9	1.8	1.8	1.7	1.8	1.8
Asymmetric weight on <i>ugap</i>	1.6	1.9	2.0	1.9	1.9	1.9	2.0	2.1
Extended Tealbook baseline	1.6	1.9	2.0	1.9	1.9	1.9	2.0	2.0

1. Percent, average for the quarter.

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

	Nominal GDP		Real GDP		PCE price index		Core PCE price index		Unemployment rate <sup>1</sup>	
Interval	04/20/18	06/01/18	04/20/18	06/01/18	04/20/18	06/01/18	04/20/18	06/01/18	04/20/18	06/01/18
<i>Quarterly</i>										
2017:Q1	3.3	3.3	1.2	1.2	2.2	2.2	1.8	1.8	4.6	4.6
Q2	4.1	4.1	3.1	3.1	.3	.3	.9	.9	4.3	4.3
Q3	5.3	5.3	3.2	3.2	1.5	1.5	1.3	1.3	4.3	4.3
Q4	5.3	5.3	2.9	2.9	2.7	2.7	1.9	1.9	4.1	4.1
2018:Q1	4.4	4.2	1.7	2.2	2.8	2.6	2.5	2.3	4.1	4.1
Q2	4.7	5.8	2.9	3.4	2.2	2.0	2.2	2.0	4.0	3.8
Q3	4.8	4.8	3.0	2.7	1.8	2.0	1.8	1.6	3.8	3.7
Q4	4.7	4.7	2.9	2.8	1.5	1.7	1.7	1.7	3.6	3.6
2019:Q1	5.1	4.7	2.9	2.7	1.9	2.0	2.0	2.2	3.4	3.5
Q2	4.8	4.9	2.7	2.5	1.9	1.9	2.1	2.1	3.3	3.4
Q3	4.7	4.3	2.6	2.3	1.9	1.8	2.1	1.9	3.3	3.4
Q4	4.3	4.1	2.3	2.3	2.0	1.8	2.1	2.0	3.3	3.4
<i>Two-quarter<sup>2</sup></i>										
2017:Q2	3.7	3.7	2.1	2.1	1.2	1.2	1.4	1.4	4.4	4.4
Q4	5.3	5.3	3.0	3.0	2.1	2.1	1.6	1.6	4.2	4.2
2018:Q2	4.6	5.0	2.3	2.8	2.5	2.3	2.4	2.1	4.1	4.3
Q4	4.8	4.7	2.9	2.7	1.7	1.8	1.7	1.7	4.2	4.2
2019:Q2	4.9	4.8	2.8	2.6	1.9	2.0	2.1	2.1	4.2	4.2
Q4	4.5	4.2	2.4	2.3	1.9	1.8	2.1	1.9	4.0	4.0
<i>Four-quarter<sup>3</sup></i>										
2016:Q4	3.4	3.4	1.8	1.8	1.6	1.6	1.9	1.9	-3	-3
2017:Q4	4.5	4.5	2.6	2.6	1.7	1.7	1.5	1.5	-6	-6
2018:Q4	4.7	4.9	2.6	2.8	2.1	2.1	2.0	1.9	-5	-5
2019:Q4	4.7	4.5	2.6	2.4	1.9	1.9	2.1	2.0	-3	-2
2020:Q4	4.2	3.9	2.1	1.8	2.0	2.0	2.1	2.1	0	0
<i>Annual</i>										
2016	2.8	2.8	1.5	1.5	1.2	1.2	1.8	1.8	4.9	4.9
2017	4.1	4.1	2.3	2.3	1.7	1.7	1.5	1.5	4.4	4.4
2018	4.8	4.9	2.6	2.8	2.1	2.1	2.0	1.8	3.9	3.8
2019	4.8	4.7	2.8	2.6	1.8	1.9	2.0	2.0	3.3	3.4
2020	4.4	4.1	2.2	2.0	2.0	1.9	2.1	2.0	3.3	3.4

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

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

Item	2017			2018			2019			2017 <sup>1</sup>			2018 <sup>1</sup>			2019 <sup>1</sup>		
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2017	2018 <sup>1</sup>	2019 <sup>1</sup>	2020 <sup>1</sup>			
Real GDP <i>Previous Tealbook</i>	3.1	3.2	2.9	2.2	3.4	2.7	2.8	2.7	2.5	2.3	2.3	2.6	2.8	2.4	1.8			
3.1	3.2	2.9	1.7	2.9	3.0	2.9	2.9	2.7	2.6	2.3	2.3	2.6	2.6	2.4	2.1			
Final sales <i>Previous Tealbook</i>	3.0	2.4	3.4	2.1	3.1	2.9	2.8	2.8	2.5	2.3	2.2	2.9	2.7	2.5	1.8			
3.0	2.4	3.4	.7	2.8	3.3	3.3	3.1	2.8	2.5	2.5	2.5	2.9	2.5	2.7	2.1			
Priv. dom. final purch. <i>Previous Tealbook</i>	3.3	2.2	4.8	2.1	3.2	3.0	2.8	2.8	2.6	2.4	2.4	3.3	2.8	2.7	2.1			
3.3	2.2	4.8	1.6	2.8	3.2	3.0	3.0	2.9	2.7	2.5	2.5	3.3	2.6	2.8	2.4			
Personal cons. expend. <i>Previous Tealbook</i>	3.3	2.2	4.0	1.0	2.9	2.4	2.3	2.6	2.5	2.5	2.5	2.8	2.8	2.2	2.6	2.3		
3.3	2.2	4.0	1.2	2.2	2.6	2.5	2.8	2.7	2.6	2.5	2.5	2.8	2.8	2.1	2.7	2.5		
Durables	7.6	8.6	13.7	-2.6	7.8	4.8	3.6	2.1	2.1	2.0	2.0	7.3	7.3	3.3	2.1	1.7		
Nondurables	4.2	2.3	4.8	-.4	2.4	1.9	2.6	2.7	2.7	2.6	2.6	3.1	1.8	2.7	2.4			
Services	2.3	1.1	2.3	1.8	2.3	2.1	2.1	2.7	2.6	2.6	2.6	2.1	2.1	2.1	2.6	2.3		
Residential investment <i>Previous Tealbook</i>	-7.3	-4.7	12.8	-1.7	-.9	-.7	1.2	-.8	1.4	.9	.8	2.6	-.5	.6	1.5			
-7.3	-4.7	12.8	-4.1	-2.1	5.0	5.1	1.6	1.6	1.8	1.8	1.8	2.6	.9	1.7	3.3			
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	6.7	4.7	6.8	9.2	6.1	7.8	5.6	5.1	4.3	3.4	3.4	6.3	7.1	3.7	1.3			
6.7	4.7	6.8	5.7	8.0	6.2	5.0	4.7	4.3	3.5	3.5	3.5	6.3	6.2	3.7	1.7			
Equipment & intangibles <i>Previous Tealbook</i>	6.6	8.4	7.0	7.7	5.1	7.1	5.9	5.8	4.7	3.7	2.5	6.7	6.5	4.2	1.6			
6.6	8.4	7.0	5.8	6.4	5.8	5.3	5.5	4.8	4.0	2.6	6.7	5.8	4.2	4.2	2.0			
Nonres. structures <i>Previous Tealbook</i>	7.0	-7.0	6.3	14.2	9.6	10.0	4.3	2.8	3.1	2.2	1.6	5.0	9.5	2.4	.4			
7.0	-7.0	6.3	5.6	13.5	7.5	4.2	2.3	2.7	1.8	1.4	5.0	7.7	2.0	.5				
Net exports <sup>2</sup> <i>Previous Tealbook</i> <sup>2</sup>	-614	-598	-654	-651	-646	-642	-640	-652	-669	-682	-669	-622	-646	-661	-720			
-614	-598	-654	-676	-671	-663	-651	-642	-650	-659	-663	-659	-622	-665	-654	-696			
Exports	3.5	2.1	7.0	4.2	5.0	5.8	4.2	4.5	4.0	4.2	3.4	5.0	4.8	4.0	3.0			
Imports	1.5	-.7	14.1	2.8	2.8	5.0	2.7	3.1	4.9	5.6	4.4	4.7	3.3	4.5	4.3			
Gov't. cons. & invest. <i>Previous Tealbook</i>	-.2	.7	3.0	1.1	1.0	1.9	1.7	1.6	2.3	2.2	2.4	.7	1.4	2.1	1.8			
-.2	.7	3.0	-1.2	1.2	2.2	2.7	1.7	2.3	2.2	2.4	.7	1.2	2.2	1.9				
Federal	1.9	1.3	3.2	1.7	1.1	3.5	3.2	2.6	4.4	4.3	4.6	1.0	2.4	4.0	3.0			
Defense	4.7	2.4	5.5	1.8	2.0	4.2	4.0	3.0	5.0	5.0	5.3	2.3	3.0	4.7	3.3			
Nonddefense	-1.9	-.2	1.6	-.3	2.5	2.1	2.0	2.8	3.3	3.6	3.6	1.5	2.9	2.7				
State & local	-1.5	.2	2.9	.8	.9	.9	.9	1.0	1.0	1.0	1.0	.5	.9	1.0	1.0			
Change in priv. inventories <sup>2</sup> <i>Previous Tealbook</i> <sup>2</sup>	5	39	16	20	33	25	25	23	19	19	20	15	26	20	20			
5	39	16	58	62	47	30	20	16	18	10	15	49	16	5				

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	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Real GDP <i>Previous Tealbook</i>	1.7 1.7	1.3 2.7	2.7 2.7	2.7 2.0	2.0 2.0	1.8 1.9	2.6 2.9	2.6 2.7	2.8 2.7	2.4 2.6
Final sales <i>Previous Tealbook</i>	1.5 1.5	1.7 2.3	2.0 2.6	2.9 4.1	2.0 2.9	1.9 2.5	2.5 3.3	2.5 3.3	2.7 2.6	2.5 2.7
Priv. dom. final purch. <i>Previous Tealbook</i>	2.6 2.6	2.3 2.3	2.6 4.1	4.1 4.1	2.9 2.9	2.5 2.5	3.3 3.3	2.8 2.6	2.7 2.6	2.1 2.4
Personal cons. expend. <i>Previous Tealbook</i>	1.5 1.5	1.3 1.3	2.0 2.0	3.6 3.6	3.0 3.0	2.8 2.8	2.8 2.8	2.2 2.1	2.6 2.7	2.3 2.5
Durables	4.8	7.2	5.2	8.7	6.4	7.0	7.3	3.3	2.1	1.7
Nondurables	.4	.8	2.6	2.8	2.5	3.1	1.8	2.7	2.4	2.4
Services	1.4	.6	1.3	3.0	2.6	2.3	2.1	2.1	2.6	2.3
Residential investment <i>Previous Tealbook</i>	6.0 6.0	15.7 15.7	6.8 6.8	6.3 6.3	10.3 10.3	2.5 2.5	2.6 2.6	-5 -5	.6 1.7	1.5 3.3
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	9.0 9.0	5.2 5.2	4.8 4.8	6.1 6.1	.3 .3	.7 .7	6.3 6.3	7.1 6.2	3.7 3.7	1.3 1.7
Equipment & intangibles <i>Previous Tealbook</i>	9.2 9.2	5.5 5.5	4.5 4.5	5.3 5.3	3.3 3.3	-1 -1	6.7 6.7	6.5 6.7	4.2 5.8	1.6 4.2
Nonres. structures <i>Previous Tealbook</i>	8.0 8.0	4.1 4.1	5.8 5.8	8.8 8.8	-9.1 -9.1	3.5 3.5	5.0 5.0	9.5 9.5	2.4 2.4	.4 .5
Net exports <sup>1</sup> <i>Previous Tealbook</i>	-459 -459	-447 -447	-405 -405	-428 -428	-545 -545	-586 -586	-622 -622	-646 -665	-661 -654	-720 -696
Exports	4.2	2.2	5.9	3.0	-1.8	.6	5.0	4.8	4.0	3.0
Imports	3.5	.3	2.5	6.2	2.9	2.7	4.7	3.3	4.5	4.3
Gov't. cons. & invest. <i>Previous Tealbook</i>	-3.0 -3.0	-2.2 -2.2	-2.8 -.5	.5 .5	1.6 1.6	.4 .4	.7 .7	1.4 1.4	2.1 2.1	1.8 1.9
Federal	-4.0	-2.1	-6.7	-1.2	1.2	-.3	1.0	2.4	4.0	3.0
Defense	-4.1	-3.9	-7.1	-4.0	.0	-1.4	2.3	3.0	4.7	3.3
Nondefense	-3.9	1.0	-6.0	3.5	2.9	1.2	-.9	1.5	2.9	2.7
State & local	-2.3	-2.3	-.1	1.5	1.9	.8	.5	.9	1.0	1.0
Change in priv. inventories <sup>1</sup> <i>Previous Tealbook</i>	38 38	55 55	79 79	68 101	101 101	33 33	15 15	26 49	20 16	20 5

1. Billions of chained (2009) dollars.

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

Item	2017			2018				2019				2017 <sup>1</sup>				2018 <sup>1</sup>		2019 <sup>1</sup>		2020 <sup>1</sup>	
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2017	2018 <sup>1</sup>	2019 <sup>1</sup>	2019 <sup>1</sup>	2018 <sup>1</sup>	2019 <sup>1</sup>	2019 <sup>1</sup>	2020 <sup>1</sup>		
Real GDP <i>Previous Tealbook</i>	3.1	3.2	2.9	2.2	3.4	2.7	2.8	2.7	2.5	2.3	2.3	2.6	2.8	2.4	1.8	2.6	2.6	2.6	2.1		
Final sales <i>Previous Tealbook</i>	2.9	2.4	3.4	2.1	3.1	2.9	2.8	2.8	2.5	2.3	2.2	2.9	2.7	2.4	1.8	2.5	2.5	2.7	2.1		
Priv. dom. final purch. <i>Previous Tealbook</i>	2.8	1.9	4.1	.7	2.7	3.3	3.3	3.1	2.7	2.5	2.5	2.9	2.5	2.7	2.7	2.3	2.3	2.3	1.8		
Personal cons. expend. <i>Previous Tealbook</i>	2.2	1.5	2.8	.8	1.5	1.8	1.7	1.9	1.9	1.8	1.7	2.0	2.0	1.5	1.8	1.4	1.4	1.4	1.6		
Durables	.6	.6	1.0	-.2	-.6	.4	.3	.2	.2	.1	.1	.5	.3	.2	.1	.3	.3	.2	.1		
Nondurables	.6	.3	.7	-.1	.4	.3	.4	.4	.4	.4	.4	.5	.3	.4	.4	.3	.3	.3	.1		
Services	1.1	.5	1.1	.8	1.1	1.0	1.0	1.3	1.2	1.2	1.2	1.0	1.0	1.2	1.2	1.0	1.0	1.2	1.1		
Residential investment <i>Previous Tealbook</i>	-.3	-.2	.5	-.1	-.0	.0	.0	.1	.0	.0	.0	.1	.1	.0	.0	.0	.0	.0	.1		
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	.8	.6	.8	1.1	.8	1.0	.7	.7	.6	.6	.4	.3	.8	.9	.5	.8	.8	.8	.2		
Equipment & intangibles <i>Previous Tealbook</i>	.8	.6	.8	.7	.7	.5	.7	.6	.6	.5	.5	.4	.2	.6	.6	.6	.6	.6	.2		
Nonres. structures <i>Previous Tealbook</i>	.6	.8	.7	.6	.6	.6	.5	.5	.5	.5	.4	.3	.6	.6	.4	.4	.6	.4	.2		
Net exports <i>Previous Tealbook</i>	.2	-.2	.2	.4	.3	.3	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.0		
Exports	.4	.3	.8	.5	.6	.7	.5	.5	.5	.5	.4	.4	.6	.6	.5	.5	.6	.5	.4		
Imports	-.2	.1	-2.0	-.4	-.4	-.8	-.4	-.5	-.7	-.8	-.7	-.7	-.7	-.5	-.7	-.5	-.7	-.7	-.7		
Gov't. cons. & invest. <i>Previous Tealbook</i>	0	.1	.5	.2	.2	.3	.3	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3		
Federal Defense	0	.1	.1	.2	.1	.1	.2	.2	.2	.2	.2	.3	.3	.3	.3	.1	.1	.1	.2		
Nondefense	.2	.1	.2	.1	.1	.1	.1	.1	.1	.1	.1	.2	.2	.1	.1	.1	.1	.1	.1		
State & local	-.1	.0	.3	.0	.0	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.0	.0	.1	.1		
Change in priv. inventories <i>Previous Tealbook</i>	.1	.8	-.5	.1	.3	-.2	.0	-.1	-.1	0	.0	-.2	-.3	.1	.0	.0	.0	.0	.0		

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)

Class II FOMC – Restricted (FR)

Authorized for Public Release

June 1, 2018

Item	2017				2018				2019				2020 <sup>1</sup>			
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	2017 <sup>1</sup>	2018 <sup>1</sup>	2019 <sup>1</sup>	2020 <sup>1</sup>
GDP chain-wt. price index	1.0	2.1	2.3	1.9	2.3	2.1	1.8	1.9	2.4	2.0	1.8	1.9	2.0	2.0	2.0	2.1
<i>Previous Tealbook</i>	1.0	2.1	2.3	2.7	1.8	1.8	2.2	2.0	2.0	2.0	2.0	1.9	2.0	2.1	2.1	2.1
PCE chain-wt. price index	.3	1.5	2.7	2.6	2.0	1.7	2.0	1.9	1.8	1.8	1.7	2.1	1.9	2.1	1.9	2.0
<i>Previous Tealbook</i>	.3	1.5	2.7	2.8	2.2	1.8	1.5	1.9	1.9	2.0	1.7	2.1	1.9	2.1	1.9	2.0
Energy	-16.0	8.4	27.7	12.9	3.1	9.0	.2	-1.1	-1.3	-1.3	-1.3	6.2	-1.3	-1.3	-1.0	-1.0
<i>Previous Tealbook</i>	-16.0	8.4	27.7	12.7	2.6	1.4	-2.2	-2.3	-1.8	-1.7	-1.6	7.6	3.5	-1.9	-1.1	-1.1
Food	2.0	.2	.2	1.7	1.8	2.3	2.3	2.3	2.3	2.3	2.3	.7	1.5	2.3	2.3	2.3
<i>Previous Tealbook</i>	2.0	.2	.2	1.6	2.0	2.3	2.3	2.3	2.3	2.3	2.3	.7	1.5	2.3	2.3	2.3
Ex. food & energy	.9	1.3	1.9	2.3	2.0	1.6	1.7	2.2	2.1	1.9	2.0	1.5	1.9	2.0	2.0	2.1
<i>Previous Tealbook</i>	.9	1.3	1.9	2.5	2.2	1.8	1.7	2.0	2.1	2.1	2.1	1.5	2.0	2.1	2.1	2.1
Ex. food & energy, market based	.3	1.0	1.5	2.3	2.2	1.6	1.5	2.0	1.9	1.8	1.8	1.2	1.9	1.9	1.9	1.9
<i>Previous Tealbook</i>	.3	1.0	1.5	2.3	2.2	1.7	1.4	1.8	1.9	1.9	1.9	1.2	1.9	1.9	1.9	1.9
CPI	.1	2.1	3.3	3.5	2.0	2.7	2.1	2.3	2.2	2.1	2.1	2.1	2.6	2.2	2.2	2.3
<i>Previous Tealbook</i>	.1	2.1	3.3	3.5	2.2	2.2	1.8	2.1	2.2	2.2	2.2	2.1	2.4	2.2	2.2	2.3
Ex. food & energy	.8	1.8	2.2	3.0	1.9	2.2	2.2	2.5	2.5	2.4	2.4	2.4	2.4	2.2	2.2	2.3
<i>Previous Tealbook</i>	.8	1.8	2.2	3.0	2.3	2.3	2.1	2.4	2.5	2.5	2.5	2.5	2.4	2.5	2.5	2.5
ECI, hourly compensation <sup>2</sup>	2.2	3.1	1.9	4.0	2.4	2.4	2.5	2.8	2.8	2.8	2.8	2.6	2.8	2.8	2.8	2.9
<i>Previous Tealbook</i>	2.2	3.1	1.9	2.6	2.4	2.4	2.4	2.6	2.7	2.7	2.7	2.6	2.5	2.7	2.7	2.7
Business sector	1.6	3.2	-.4	.8	2.4	1.0	1.0	1.2	1.0	.8	.8	.9	1.3	.9	.9	.9
Output per hour	1.6	3.2	-.4	.8	.7	1.6	1.6	.9	1.0	.9	.6	.9	1.2	.9	.9	.9
<i>Previous Tealbook</i>	1.6	3.2	-.4	.8	.7	1.6	1.6	.9	1.0	.9	.6	.9	1.2	.9	.9	.9
Compensation per hour	.6	4.2	2.1	4.1	1.8	3.6	4.0	4.0	4.0	4.0	4.0	2.8	3.4	4.0	4.0	4.0
<i>Previous Tealbook</i>	.5	4.1	1.7	3.9	2.7	3.8	3.8	3.9	3.9	3.9	3.9	2.7	3.5	3.9	3.9	3.9
Unit labor costs	-1.0	.9	2.6	3.3	-.6	2.6	2.9	2.8	3.0	3.1	3.1	1.8	2.0	3.0	3.0	3.0
<i>Previous Tealbook</i>	-1.0	.9	2.2	3.0	2.0	2.2	2.1	2.9	3.0	3.0	3.0	1.8	2.3	3.0	3.0	3.0
Core goods imports chain-wt. price index <sup>3</sup>	2.5	1.1	1.5	2.8	2.6	-.2	.6	.8	.6	.6	.5	1.3	1.4	.6	.6	.6
<i>Previous Tealbook</i>	2.5	1.1	1.5	2.8	3.6	1.8	.9	.7	.6	.6	.5	1.3	2.3	.6	.6	.6

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	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
GDP chain-wt. price index <i>Previous Tealbook</i>	1.9 1.9	1.9 1.9	1.6 1.6	1.6 1.6	1.0 1.0	1.5 1.5	1.9 1.9	2.0 2.0	2.0 2.1	2.1 2.1
PCE chain-wt. price index <i>Previous Tealbook</i>	2.7 2.7	1.8 1.8	1.2 1.2	1.2 1.2	.4 .4	1.6 1.6	1.7 1.7	2.1 2.1	1.9 1.9	2.0 2.0
Energy <i>Previous Tealbook</i>	12.0 12.0	2.3 2.3	-2.5 -2.5	-6.5 -6.5	-16.2 -16.2	2.2 2.2	7.6 7.6	6.2 3.5	-1.3 -1.9	-1.0 -1.1
Food <i>Previous Tealbook</i>	5.1 5.1	1.2 1.2	.7 .7	2.6 2.6	.3 .3	-1.7 -1.7	.7 .7	1.5 1.5	2.3 2.3	2.3 2.3
Ex. food & energy <i>Previous Tealbook</i>	1.9 1.9	1.8 1.8	1.5 1.5	1.5 1.5	1.3 1.3	1.9 1.9	1.5 1.5	1.9 2.0	2.0 2.1	2.1 2.1
Ex. food & energy; market based <i>Previous Tealbook</i>	1.9 1.9	1.5 1.5	1.1 1.1	1.2 1.2	1.1 1.1	1.5 1.5	1.2 1.2	1.9 1.9	1.9 1.9	1.9 1.9
CPI <i>Previous Tealbook</i>	3.3 3.3	1.9 1.9	1.2 1.2	1.2 1.2	.4 .4	1.8 1.8	2.1 2.1	2.6 2.4	2.2 2.2	2.3 2.3
Ex. food & energy <i>Previous Tealbook</i>	2.2 2.2	1.9 1.9	1.7 1.7	1.7 1.7	2.0 2.0	2.2 2.2	1.7 1.7	2.3 2.4	2.5 2.5	2.5 2.5
ECI, hourly compensation <sup>1</sup> <i>Previous Tealbook</i>	2.2 2.2	1.8 1.8	2.0 2.0	2.3 2.3	1.9 1.9	2.2 2.2	2.6 2.6	2.8 2.5	2.8 2.7	2.9 2.7
Business sector										
Output per hour <i>Previous Tealbook</i>	-1 -1	-1 -1	1.9 1.9	.1 .1	.7 .7	1.1 1.0	.9 .9	1.3 1.2	.9 .9	.9 .9
Compensation per hour <i>Previous Tealbook</i>	.5 .5	5.9 5.9	-1 -1	2.9 2.9	3.1 3.1	-1 -2	2.8 2.7	3.4 3.5	4.0 3.9	4.0 3.9
Unit labor costs <i>Previous Tealbook</i>	.6 .6	6.0 6.0	-2.0 -2.0	2.8 2.8	2.4 2.4	-1.2 -1.2	1.8 1.8	2.0 2.3	3.0 3.0	3.0 3.0
Core goods imports chain-wt. price index <sup>2</sup> <i>Previous Tealbook</i>	4.3 4.3	.1 .1	-1.5 -1.5	.3 .3	-3.7 -3.7	-2 -2	1.3 1.3	1.4 2.3	.6 .6	.6 .6

1. Private-industry workers.

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

## Other Macroeconomic Indicators

Item	2017				2018				2019				2017 <sup>1</sup>	2018 <sup>1</sup>	2019 <sup>1</sup>	2020 <sup>1</sup>
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1				
<i>Employment and production</i>																
Nonfarm payroll employment <sup>2</sup>	190	142	221	218	191	195	179	172	161	155	145	182	196	158	129	
Unemployment rate <sup>3</sup>	4.3	4.3	4.1	4.1	3.8	3.7	3.6	3.5	3.4	3.4	4.1	3.6	3.4	3.4	3.4	
<i>Previous Tealbook</i> <sup>3</sup>	4.3	4.3	4.1	4.1	3.8	3.6	3.4	3.3	3.3	3.3	4.1	3.6	3.3	3.3	3.3	
Natural rate of unemployment <sup>3</sup>	4.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	
<i>Previous Tealbook</i> <sup>3</sup>	4.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	
Employment-to-Population Ratio <sup>3</sup>	60.1	60.2	60.1	60.3	60.4	60.4	60.5	60.5	60.6	60.6	60.1	60.5	60.6	60.5	60.5	
Employment-to-Population Trend <sup>3</sup>	59.8	59.7	59.7	59.6	59.6	59.5	59.5	59.5	59.4	59.4	59.7	59.5	59.4	59.5	59.2	
Output gap <sup>4</sup>	.8	1.2	1.4	1.6	1.9	2.2	2.5	2.7	2.8	3.0	3.0	3.1	3.1	3.0	2.9	
<i>Previous Tealbook</i> <sup>4</sup>	.8	1.2	1.4	1.5	1.7	2.1	2.4	2.6	2.8	3.0	3.1	3.1	3.1	3.1	3.2	
Industrial production <sup>5</sup>	5.0	-1.5	7.7	2.3	6.3	2.0	4.0	3.4	2.3	1.2	1.0	3.0	3.7	2.0	1.1	
<i>Previous Tealbook</i> <sup>5</sup>	5.0	-1.5	7.8	4.5	4.4	2.9	2.9	2.0	1.5	.9	1.0	3.0	3.7	1.4	1.3	
Manufacturing industr. prod. <sup>5</sup>	2.4	-2.1	5.2	1.4	4.0	2.1	3.1	2.4	2.1	1.9	1.4	1.8	2.6	1.9	1.0	
<i>Previous Tealbook</i> <sup>5</sup>	2.4	-2.1	5.5	3.1	2.5	2.7	2.1	1.9	2.1	1.7	1.2	1.9	2.6	1.7	1.3	
Capacity utilization rate - mfg. <sup>3</sup>	74.9	74.4	75.2	75.2	75.7	75.9	76.2	76.4	76.6	76.7	76.8	75.2	76.2	76.8	76.9	
<i>Previous Tealbook</i> <sup>3</sup>	74.9	74.4	75.2	75.6	75.8	76.0	76.2	76.3	76.5	76.7	76.7	75.2	76.2	76.7	77.1	
Housing starts <sup>6</sup>	1.2	1.2	1.3	1.3	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.3	
Light motor vehicle sales <sup>6</sup>	16.8	17.1	17.7	17.1	17.1	17.3	17.2	17.2	17.1	17.0	16.9	17.1	17.2	17.0	16.7	
<i>Income and saving</i>																
Nominal GDP <sup>5</sup>	4.1	5.3	5.3	4.2	5.8	4.8	4.7	4.7	4.9	4.3	4.1	4.5	4.9	4.5	3.9	
Real disposable pers. income <sup>5</sup>	2.7	.7	1.2	3.3	1.7	2.6	3.1	4.3	2.2	1.8	2.2	1.9	2.7	2.6	2.4	
<i>Previous Tealbook</i> <sup>5</sup>	2.7	.7	1.1	4.3	1.7	2.5	2.0	4.9	2.1	1.8	1.9	1.8	2.6	2.7	2.2	
Personal saving rate <sup>3</sup>	3.7	3.4	2.7	3.1	2.8	2.9	3.1	3.5	3.4	3.2	3.2	2.7	3.1	3.2	3.3	
<i>Previous Tealbook</i> <sup>3</sup>	3.7	3.4	2.6	3.3	3.2	3.2	3.1	3.6	3.5	3.3	3.1	2.6	3.1	3.1	3.0	
Corporate profits <sup>7</sup>	2.8	18.1	-.2	-2.2	4.0	.5	2.0	3.6	7.3	4.2	2.8	2.7	1.0	4.5	1.9	
Profit share of GNP <sup>3</sup>	10.9	11.2	11.1	10.9	10.9	10.8	10.7	10.7	10.8	10.8	10.8	11.1	10.7	10.8	10.6	
Gross national saving rate <sup>3</sup>	17.2	17.7	16.8	16.9	16.8	16.6	16.6	16.5	16.4	16.4	16.3	16.8	16.6	16.3	15.8	
Net national saving rate <sup>3</sup>	2.0	2.6	1.6	1.8	1.7	1.5	1.5	1.2	1.2	1.1	.9	1.6	1.5	.9	.2	

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

2.

Average monthly change, thousands.

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

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

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

5. Percent change, annual rate.

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

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

## Greensheets

### Other Macroeconomic Indicators

(Change from fourth quarter of previous year to fourth quarter of year indicated, unless otherwise noted)

Item	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<i>Employment and production</i>										
Nonfarm payroll employment <sup>1</sup>	174	179	192	250	226	195	182	196	158	129
Unemployment rate <sup>2</sup>	8.7	7.8	7.0	5.7	5.0	4.7	4.1	3.6	3.4	3.4
<i>Previous Tealbook</i> <sup>4</sup>	8.7	7.8	7.0	5.7	5.0	4.7	4.1	3.6	3.3	3.3
Natural rate of unemployment <sup>2</sup>	5.9	5.6	5.4	5.1	4.9	4.8	4.7	4.7	4.7	4.7
<i>Previous Tealbook</i> <sup>2</sup>	5.9	5.6	5.4	5.1	4.9	4.8	4.7	4.7	4.7	4.7
Employment-to-Population Ratio <sup>2</sup>	58.5	58.7	58.5	59.3	59.4	59.8	60.1	60.5	60.6	60.5
Employment-to-Population Trend <sup>2</sup>	60.7	60.3	60.2	60.1	59.9	59.8	59.7	59.5	59.4	59.2
Output gap <sup>3</sup>	-4.7	-3.9	-3.0	-9	-1	3	1.4	2.5	3.0	2.9
<i>Previous Tealbook</i> <sup>3</sup>	-4.7	-3.9	-3.0	-9	-1	3	1.4	2.4	3.1	3.2
Industrial production <sup>4</sup>	3.2	2.2	2.3	3.4	-3.3	-5	3.0	3.7	2.0	1.1
<i>Previous Tealbook</i> <sup>4</sup>	3.2	2.2	2.3	3.4	-3.3	-5	3.0	3.7	1.4	1.3
Manufacturing industr. prod. <sup>4</sup>	2.8	1.4	1.1	1.4	-1.6	-1	1.8	2.6	1.9	1.0
<i>Previous Tealbook</i> <sup>4</sup>	2.8	1.4	1.1	1.4	-1.6	-1	1.9	2.6	1.7	1.3
Capacity utilization rate - mfg. <sup>2</sup>	74.5	74.7	75.1	76.3	75.4	74.4	75.2	76.2	76.8	76.9
<i>Previous Tealbook</i> <sup>2</sup>	74.5	74.7	75.1	76.3	75.4	74.4	75.2	76.2	76.7	77.1
Housing starts <sup>5</sup>	.6	.8	.9	1.0	1.1	1.2	1.2	1.3	1.3	1.3
Light motor vehicle sales <sup>5</sup>	12.7	14.4	15.5	16.5	17.4	17.5	17.1	17.2	17.0	16.7
<i>Income and saving</i>										
Nominal GDP <sup>4</sup>	3.6	3.2	4.3	4.3	3.1	3.4	4.5	4.9	4.5	3.9
Real disposable pers. income <sup>4</sup>	1.7	5.1	-2.8	4.9	3.2	2	1.9	2.7	2.6	2.4
<i>Previous Tealbook</i> <sup>4</sup>	1.7	5.1	-2.8	4.9	3.2	2	1.8	2.6	2.7	2.2
Personal saving rate <sup>2</sup>	5.8	9.2	4.7	5.9	6.1	3.6	2.7	3.1	3.2	3.3
<i>Previous Tealbook</i> <sup>2</sup>	5.8	9.2	4.7	5.9	6.1	3.6	2.6	3.1	3.1	3.0
Corporate profits <sup>6</sup>	6.8	.6	4.7	7.4	-11.1	8.7	2.7	1.0	4.5	1.9
Profit share of GNP <sup>2</sup>	12.3	12.0	12.0	12.4	10.7	11.3	11.1	10.7	10.8	10.6
Gross national saving rate <sup>2</sup>	16.1	18.0	18.2	19.5	19.0	17.2	16.8	16.6	16.3	15.8
Net national saving rate <sup>2</sup>	.8	2.9	3.1	4.7	4.1	2.1	1.6	1.5	.9	.2

1. Average monthly change, thousands.

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

3. Percent difference between actual and potential output; 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 Government-Sector Accounts and Related Items**

Item	2015	2016	2017	2018	2019	2020	2017		2018		
							Q4	Q1	Q2	Q3	
<b>Unified federal budget<sup>1</sup></b>											
Receipts	3,250	3,268	3,316	3,337	3,437	3,594	770	727	1,058	782	
Outlays	3,688	3,853	3,982	4,092	4,462	4,774	994	1,102	1,024	970	
Surplus/deficit	-438	-585	-665	-755	-1,024	-1,180	-225	-375	33	-189	
<i>Percent of GDP</i>					Percent of GDP						
Surplus/deficit	-2.4	-3.2	-3.5	-3.8	-4.9	-5.4	-4.6	-7.5	.7	-3.7	
<i>Previous Tealbook</i>	-2.4	-3.2	-3.5	-3.9	-4.9	-5.3	-4.6	-7.5	.2	-3.8	
Primary surplus/deficit	-1.2	-1.9	-2.1	-2.1	-2.9	-3.0	-2.9	-5.9	2.6	-2.6	
Net interest	1.2	1.3	1.4	1.6	1.9	2.4	1.7	1.6	2.0	1.1	
Cyclically adjusted surplus/deficit	-2.0	-3.1	-3.8	-4.6	-6.2	-6.9	-5.3	-8.2	-.3	-4.8	
Federal debt held by public	72.9	76.7	76.5	77.8	79.2	81.9	75.0	77.2	76.6	76.4	
<b>Government in the NIPA<sup>2</sup></b>											
Purchases	1.6	.4	.7	1.4	2.1	1.8	3.0	1.1	1.0	1.9	
Consumption	1.9	.6	.4	.9	1.5	1.3	1.3	1.0	.4	1.2	
Investment	.4	-.5	2.4	3.3	4.5	3.7	10.6	1.0	3.2	4.9	
State and local construction	.0	-2.3	-1.9	.8	1.0	1.0	20.6	-2.2	2.2	2.2	
Real disposable personal income	3.2	.2	1.9	2.7	2.6	2.4	1.2	3.3	1.7	2.6	
Contribution from transfers <sup>3</sup>	.7	.3	.2	.5	.9	.7	-.1	.5	.3	.7	
Contribution from taxes <sup>3</sup>	-1.4	.2	-1.1	-.4	-.6	-.6	-1.2	.6	-.5	-.6	
<b>Government employment</b>					Average net change in monthly payrolls, thousands						
Federal	3	3	-1	-0	2	1	-3	-1	-2	1	
State and local	10	14	3	3	9	9	1	-1	3	4	
<b>Fiscal indicators<sup>2</sup></b>											
Fiscal effect (FE) <sup>4</sup>	.4	.5	.0	.3	.9	.8	.2	-.2	.2	.6	
Discretionary policy actions (FI)	.4	.1	.2	.5	.7	.5	.6	.5	.5	.6	
<i>Previous Tealbook</i>	.4	.1	.2	.6	.8	.5	.6	.1	.6	.8	
Federal purchases	.1	.0	.1	.2	.3	.2	.2	.1	.1	.2	
State and local purchases	.2	.1	.1	.1	.1	.1	.3	.1	.1	.1	
Taxes and transfers	.1	.1	.0	.3	.3	.2	.1	.3	.3	.3	
Cyclical	-.3	-.1	-.2	-.2	-.1	.0	-.2	-.1	-.2	-.3	
Other	.4	.4	-.1	-.1	.4	.3	-.3	-.6	.0	.2	

1. Annual values stated on a fiscal year basis. Quarterly values not seasonally adjusted.

2. Annual values refer to the change from fourth quarter of previous year to fourth quarter of year indicated.

3. Percentage point contribution to change in real disposable personal income, annual basis.

4. The FE measure captures the total contribution of the government sector to the growth of real GDP (excluding multiplier effects). It equals the sum of the direct contributions to real GDP growth from all changes in federal purchases and state and local purchases, plus the estimated contribution to real household consumption and business investment that is induced by changes in transfer and tax policies. FI (fiscal impetus) is the portion of FE attributable to discretionary fiscal policy actions (for example, a legislated change in tax revenues).

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

Measure and country	2017				2018				Projected 2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Real GDP<sup>1</sup></b>												
Total foreign	3.0	3.2	2.6	2.8	3.1	2.8	2.7	2.8	2.8	2.8	2.9	2.5
<i>Previous Tealbook</i>	3.2	3.1	2.5	2.7	2.9	2.9	2.9	2.9	2.8	2.8	2.9	2.5
Advanced foreign economies	3.0	3.4	2.1	1.9	1.2	2.1	1.9	1.9	1.7	1.7	2.0	1.3
Canada	4.0	4.6	1.7	1.7	1.3	2.4	2.3	2.3	2.1	2.1	2.1	2.1
Japan	2.6	2.0	2.0	.6	-.6	1.3	.9	.8	.8	3.1	-3.8	
United Kingdom	1.3	1.0	1.9	1.6	.4	1.4	1.6	1.6	1.6	1.7	1.7	1.7
Euro area	2.6	2.9	2.8	2.7	1.6	2.1	1.8	1.5	1.4	1.4	1.5	1.6
Germany	3.6	2.6	3.0	2.5	1.2	2.0	1.8	1.7	1.6	1.5	1.5	1.5
Emerging market economies	3.0	3.1	3.0	3.6	5.0	3.5	3.5	3.7	3.8	3.8	3.8	3.8
Asia	5.4	5.1	5.7	4.5	6.3	4.6	4.8	4.9	4.8	4.7	4.7	4.7
Korea	4.0	2.6	5.7	-.8	4.4	3.1	3.3	3.4	3.2	3.1	3.1	
China	6.9	7.0	6.6	6.5	7.2	6.7	6.3	6.3	6.2	6.2	6.1	
Latin America	1.4	1.5	.3	3.0	3.9	2.5	2.3	2.6	2.8	2.9	2.9	
Mexico	1.5	1.4	-.2	3.6	4.6	3.0	2.6	2.8	2.9	2.9	3.0	
Brazil	4.4	2.4	1.1	.9	1.8	1.6	2.4	2.5	3.0	3.0	3.0	
<i>Consumer prices<sup>2</sup></i>												
Total foreign	3.0	2.0	2.3	3.0	2.6	2.6	2.1	2.9	2.6	2.5	2.5	2.4
<i>Previous Tealbook</i>	3.0	2.0	2.3	3.0	2.6	2.6	2.6	2.4	2.4	2.4	2.4	2.8
Advanced foreign economies	2.2	.4	1.2	2.1	2.6	1.7	2.2	1.7	1.6	1.6	1.6	2.5
Canada	2.6	.2	1.4	3.0	3.6	3.0	2.6	2.2	2.2	2.1	2.0	2.0
Japan	-.3	.1	.7	1.9	2.5	-1.7	1.5	.9	.8	.9	1.0	6.5
United Kingdom	3.7	3.0	2.4	3.0	2.4	2.4	2.6	2.5	2.5	2.4	2.3	
Euro area	2.7	.3	1.0	1.7	2.0	2.2	2.2	1.7	1.5	1.5	1.5	
Germany	2.2	.3	1.7	2.3	1.1	2.4	2.6	2.1	2.1	2.2	2.3	2.4
Emerging market economies	3.5	3.1	3.1	3.7	2.6	2.4	3.5	3.2	3.1	3.1	3.0	
Asia	1.2	1.6	2.1	3.0	1.8	1.7	3.1	2.8	2.8	2.7	2.7	
Korea	2.6	.7	2.2	.5	1.6	2.7	3.5	3.5	3.2	3.1	3.1	
China	.0	2.1	2.2	2.9	1.5	1.3	2.9	2.5	2.5	2.5	2.5	
Latin America	9.2	6.8	5.5	5.4	4.7	3.8	4.6	4.1	4.0	3.9	3.7	
Mexico	9.3	6.7	5.4	5.0	4.1	3.1	3.9	3.4	3.6	3.5	3.3	
Brazil	3.2	2.3	2.3	3.6	3.1	2.7	4.3	4.3	4.3	4.3	4.3	

<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)

Class II FOMC – Restricted (FR)

Authorized for Public Release

June 1, 2018

Measure and country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Projected
<b>Real GDP<sup>1</sup></b>											
Total foreign	3.2	2.2	3.0	2.9	2.0	2.7	2.9	2.9	2.7	2.7	2.7
<i>Previous Tealbook</i>	3.2	2.2	3.0	2.8	2.1	2.7	2.9	2.9	2.8	2.8	2.7
Advanced foreign economies	1.8	3	2.5	2.0	1.2	1.9	2.6	1.8	1.7	1.7	1.7
Canada	3.1	.7	3.6	2.5	.3	2.0	3.0	2.1	2.1	1.8	
Japan	.2	.3	2.8	-.3	1.2	1.5	1.8	.6	.2	.9	
United Kingdom	1.3	1.5	2.6	3.3	2.1	2.0	1.4	1.3	1.7	1.7	
Euro area	.5	-1.1	.8	1.5	2.0	1.9	2.8	1.7	1.5	1.6	
Germany	2.4	.2	1.6	1.9	1.3	1.9	2.9	1.7	1.5	1.4	
Emerging market economies	4.6	4.2	3.5	3.7	2.9	3.4	3.2	3.9	3.8	3.7	
Asia	5.1	5.8	5.4	5.0	4.5	4.9	5.2	5.2	4.7	4.6	
Korea	2.9	2.1	3.5	2.8	3.2	2.6	2.8	3.6	3.1	3.0	
China	8.7	8.0	7.6	7.1	6.8	6.8	6.8	6.6	6.2	5.9	
Latin America	4.0	3.0	1.7	2.7	1.5	2.1	1.5	2.8	2.9	3.0	
Mexico	3.9	3.0	1.2	3.4	2.8	3.3	1.6	3.2	2.9	3.0	
Brazil	2.6	2.6	2.6	-.1	-5.5	-2.4	2.2	2.1	3.0	2.6	
<i>Consumer prices<sup>2</sup></i>											
Total foreign	3.4	2.3	2.4	2.0	1.4	1.9	1.9	2.6	2.5	2.6	2.4
<i>Previous Tealbook</i>	3.4	2.3	2.4	2.0	1.4	1.9	1.9	2.6	2.6	2.5	2.4
Advanced foreign economies	2.2	1.3	1.0	1.2	.4	.9	1.5	2.0	2.0	1.9	1.6
Canada	2.7	1.0	1.0	2.0	1.3	1.4	1.8	2.8	2.1	2.1	2.0
Japan	-.3	-2	1.4	2.6	.1	.3	.6	.8	.8	.8	1.0
United Kingdom	4.6	2.6	2.1	.9	.1	1.2	3.0	2.5	2.4	2.1	
Euro area	2.9	2.3	.8	.2	.7	1.4	2.0	1.5	1.5	1.6	
Germany	2.6	1.9	1.4	.4	.2	1.0	1.6	2.1	2.2	2.2	
Emerging market economies	4.3	3.1	3.4	2.7	2.1	2.7	3.4	2.9	3.1	3.0	
Asia	4.4	2.6	3.1	1.8	1.5	2.0	2.0	2.4	2.8	2.7	
China	3.9	1.7	1.1	1.0	.9	1.5	1.5	2.8	3.2	3.0	
Latin America	4.6	2.1	2.9	1.5	1.5	2.1	1.8	2.1	2.5	2.5	
Mexico	4.1	4.4	4.2	3.4	4.3	6.7	4.3	4.3	3.8	3.5	
Brazil	3.5	4.1	3.6	4.2	2.3	3.3	6.6	3.6	3.4	3.2	
	6.7	5.6	5.8	6.5	10.4	7.1	2.8	3.6	4.3	4.3	

<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**

	<i>Billions of dollars, s.a.a.r.</i>								<i>Projected</i>			
	<i>2017</i>				<i>2018</i>				<i>2019</i>			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>U.S. current account balance</i>												
<i>Previous Tealbook</i>	<b>-451.5</b>	<b>-495.0</b>	<b>-405.9</b>	<b>-512.6</b>	<b>-565.6</b>	<b>-547.6</b>	<b>-575.4</b>	<b>-599.6</b>	<b>-656.6</b>	<b>-673.6</b>	<b>-714.8</b>	<b>-749.7</b>
Current account as percent of GDP	-2.4	-2.6	-2.1	-2.6	-2.8	-2.7	-2.8	-2.9	-3.1	-3.2	-3.3	-3.5
<i>Previous Tealbook</i>	<b>-2.4</b>	<b>-2.6</b>	<b>-2.1</b>	<b>-2.6</b>	<b>-2.8</b>	<b>-2.7</b>	<b>-2.8</b>	<b>-2.8</b>	<b>-3.1</b>	<b>-3.0</b>	<b>-3.1</b>	<b>-3.2</b>
Net goods & services	-551.4	-565.8	-541.1	-615.5	-653.5	-641.7	-644.7	-643.4	-655.8	-646.9	-657.8	-675.7
Investment income, net	215.2	217.8	248.9	243.7	229.6	233.1	214.4	185.0	149.2	112.3	88.2	67.1
Direct, net	297.3	294.3	318.1	310.5	318.0	323.1	327.6	320.7	308.0	294.5	294.5	297.4
Portfolio, net	-82.1	-76.5	-69.2	-66.8	-88.4	-90.0	-113.2	-135.7	-158.8	-182.2	-206.3	-230.3
Other income and transfers, net	-115.3	-147.0	-113.8	-140.8	-141.7	-139.0	-145.1	-141.1	-150.0	-139.0	-145.1	-141.1
<i>Annual Data</i>												
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2019	2019	2020
<i>U.S. current account balance</i>												
<i>Previous Tealbook</i>	<b>444.6</b>	<b>-426.2</b>	<b>-349.5</b>	<b>-373.0</b>	<b>-434.6</b>	<b>-451.7</b>	<b>-466.2</b>	<b>-565.4</b>	<b>-572.0</b>	<b>-698.7</b>	<b>-842.2</b>	
Current account as percent of GDP	-2.9	-2.6	-2.1	-2.1	-2.1	-2.4	-2.4	-2.4	-2.4	-2.8	-3.3	-3.8
<i>Previous Tealbook</i>	<b>-2.9</b>	<b>-2.6</b>	<b>-2.1</b>	<b>-2.1</b>	<b>-2.1</b>	<b>-2.4</b>	<b>-2.4</b>	<b>-2.4</b>	<b>-2.4</b>	<b>-2.8</b>	<b>-3.1</b>	<b>-3.5</b>
Net goods & services	-548.6	-536.8	-461.9	-489.5	-500.4	-504.8	-568.4	-645.8	-645.8	-659.1	-714.3	
Investment income, net	219.2	216.1	215.4	221.3	192.7	186.8	231.4	215.5	215.5	104.2	15.9	
Direct, net	288.7	285.5	283.3	276.7	266.5	258.8	305.1	322.4	322.4	298.6	302.8	
Portfolio, net	-69.5	-69.4	-67.9	-55.4	-73.8	-72.0	-73.7	-106.8	-106.8	-194.4	-286.9	
Other income and transfers, net	-115.1	-105.5	-103.1	-104.8	-126.9	-133.7	-129.2	-141.7	-141.7	-143.8	-143.8	

## Abbreviations

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AFE	advanced foreign economy
BLS	Bureau of Labor Statistics
BOC	Bank of Canada
BOE	Bank of England
CDS	credit default swap
C&I	commercial and industrial
CMBS	commercial mortgage-backed securities
CME	Chicago Mercantile Exchange
CPH	compensation per hour
CPI	consumer price index
CRE	commercial real estate
DSGE	dynamic stochastic general equilibrium
ECB	European Central Bank
ECI	employment cost index
EDO model	Estimated Dynamic Optimization-based model (a medium-scale New Keynesian DSGE model of the U.S. economy)
ELB	effective lower bound
EME	emerging market economy
EU	European Union
FOMC	Federal Open Market Committee; also, the Committee
FPLT	flexible price-level targeting
FRB/US model	A large-scale macroeconometric model of the U.S. economy
GDP	gross domestic product
GO	general obligation
IMF	International Monetary Fund
IOER	interest on excess reserves

LFPR	labor force participation rate
LIBOR	London interbank offered rate
MBS	mortgage-backed securities
MCE	model-consistent expectations
Michigan survey	University of Michigan Surveys of Consumers
NAFTA	North American Free Trade Agreement
NBER	National Bureau of Economic Research
NIT	nominal income targeting
OIS	overnight index swap
ON RRP	overnight reverse repurchase agreement
OPEC	Organization of the Petroleum Exporting Countries
PCE	personal consumption expenditures
PMI	purchasing managers index
repo	repurchase agreement
SEP	Summary of Economic Projections
sFRB	small FRB/US
SIGMA	A calibrated multicountry DSGE model
SLOOS	Senior Loan Officer Opinion Survey on Bank Lending Practices
SOFR	Secured Overnight Financing Rate
SOMA	System Open Market Account
S&P	Standard & Poor's
SPF	Survey of Professional Forecasters
TFP	total factor productivity
TIPS	Treasury Inflation-Protected Securities
VIX	one-month-ahead option-implied volatility on the S&P 500 index

**Prefatory Note**

The attached document represents the most complete and accurate version available based on original files from the FOMC Secretariat at the Board of Governors of the Federal Reserve System.

Please note that some material may have been redacted from this document if that material was received on a confidential basis. Redacted material is indicated by occasional gaps in the text or by gray boxes around non-text content. All redacted passages are exempt from disclosure under applicable provisions of the Freedom of Information Act.

Class I FOMC – Restricted Controlled (FR)

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# Report to the FOMC on Economic Conditions and Monetary Policy



## Book B Monetary Policy Alternatives

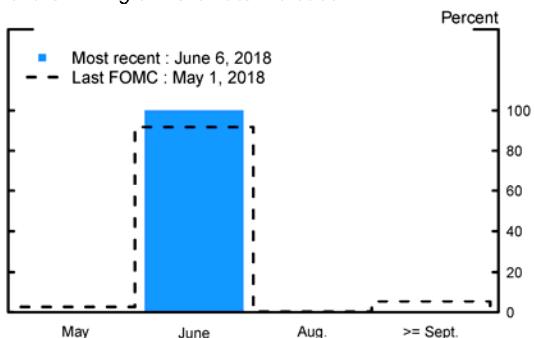
June 7, 2018

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

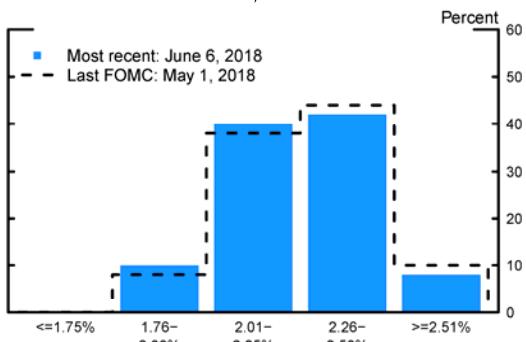
Figure 1: Market-Implied Probability Distribution of the Timing of Next Rate Increase



Note: Probabilities implied by a binomial tree fitted to settlement prices on federal funds futures contracts, assuming the next policy action is either no change or a 25 basis point increase in the target range and no intervening moves. The "Most Recent" path takes into account the anticipated effect of the adjustment in IOER discussed in the May FOMC meeting minutes.

Source: CME Group; Federal Reserve Board staff estimates.

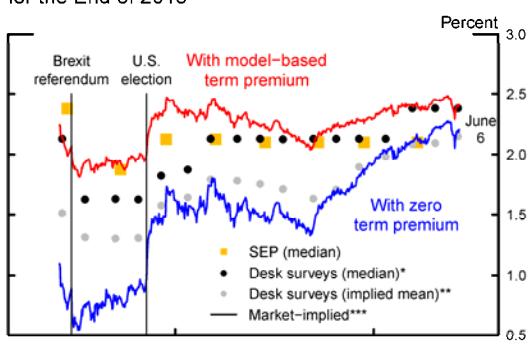
Figure 3: Market-Implied Probability Distribution of the Federal Funds Rate, Year-End 2018



Note: Estimated from federal funds futures options for the average federal funds rate in January 2019 without adjusting for risk premiums.

Source: CME Group; Federal Reserve Board staff estimates.

Figure 5: Historical Federal Funds Rate Expectations for the End of 2018



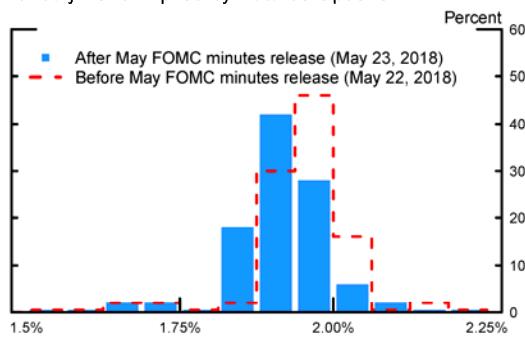
\* Median of the respondents' modal forecast for the federal funds rate.

\*\* Estimated from respondents' year-end probability distributions.

\*\*\* Zero term premium path is estimated using overnight index swap quotes with a spline approach and no term premium adjustment. Model-based term premium path is estimated using a term structure model maintained by Board staff and corrects for term premiums.

Source: Bloomberg, Blue Chip Financial Forecasts, FRBNY, Federal Reserve Board staff estimates.

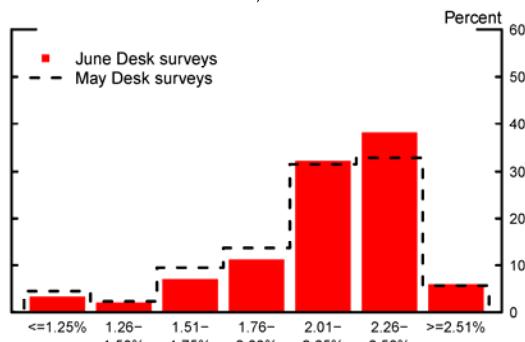
Figure 2: Distribution of the Federal Funds Rate for July 2018 Implied by Futures Options



Note: Estimated from federal funds futures options for the average federal funds rate in July 2018 without adjusting for risk premiums.

Source: CME Group; Federal Reserve Board staff estimates.

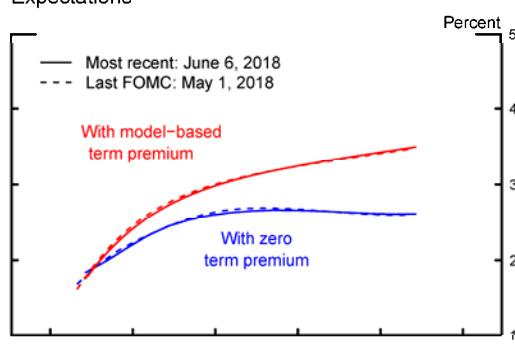
Figure 4: Desk Survey Average Probability Distribution of the Federal Funds Rate, Year-End 2018



Note: Probabilities are averages of the probabilities assigned by respondents to different ranges of the federal funds rate at the end of 2018.

Source: FRBNY.

Figure 6: Market-Implied Federal Funds Rate Expectations



Note: Zero term premium path is estimated using overnight index swap quotes with a spline approach and a term premium of zero basis points.

Model-based term premium path is estimated using a term structure model maintained by Board staff and corrects for term premiums.

Source: Bloomberg, Federal Reserve Board staff estimates.

## Redemptions and Reinvestments of SOMA Principal Payments

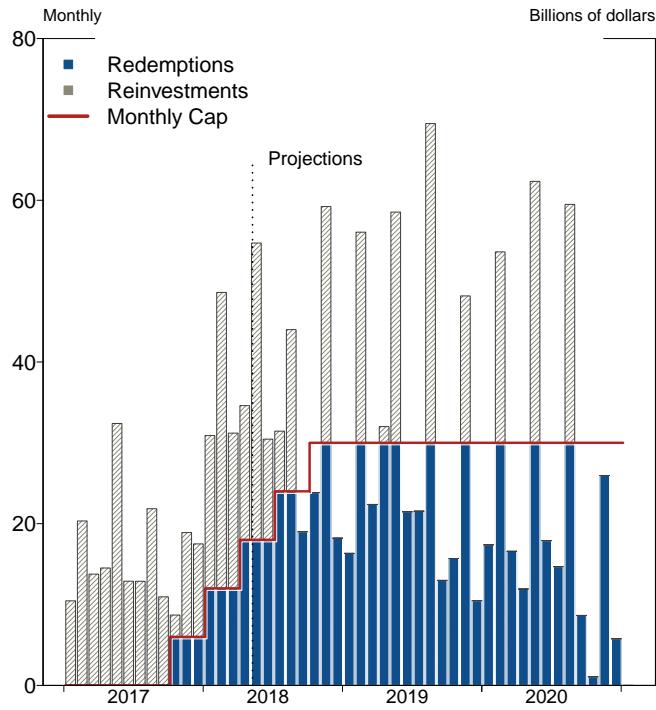
**Projections for Treasury Securities**  
(Billions of dollars)

	Redemptions		Reinvestments			
	Period	Since Oct. 2017		Period	Since Oct. 2017	
2018: Q2	54.0	108.0	65.8	167.6		
2018: Q3	67.0	175.0	27.4	195.0		
2018: Q4	72.1	247.1	29.2	224.2		
2018	229.1	247.1	197.1	224.2		
2019	270.9	517.9	114.3	338.5		
2020	209.9	727.8	85.4	423.9		

**Projections for Agency Securities**  
(Billions of dollars)

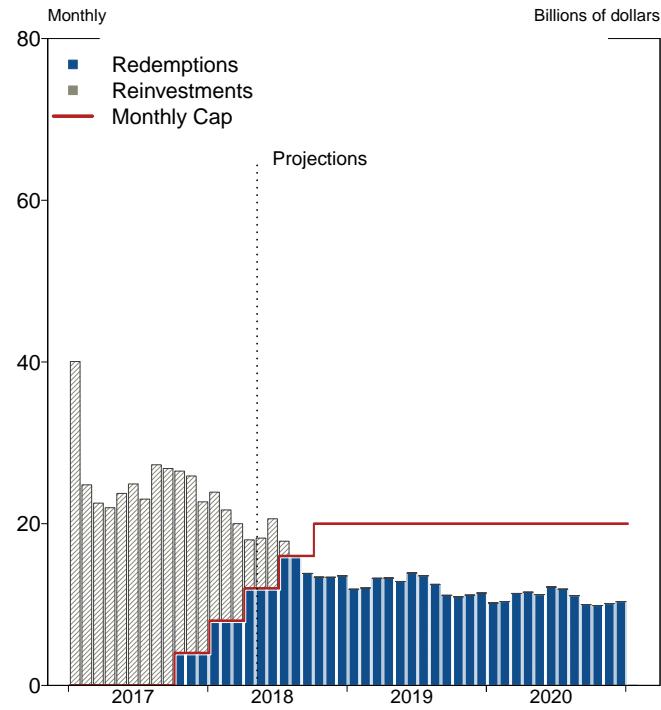
	Redemptions		Reinvestments			
	Period	Since Oct. 2017		Period	Since Oct. 2017	
2018: Q2	36.0	72.0	20.8	123.1		
2018: Q3	45.8	117.8	1.8	125.0		
2018: Q4	40.3	158.2	0.0	125.0		
2018	146.2	158.2	64.3	125.0		
2019	147.9	306.1	0.0	125.0		
2020	130.2	436.3	0.0	125.0		

**SOMA Treasury Securities Principal Payments**



Note: Projection dependent on assumed distribution of future Treasury issuance.

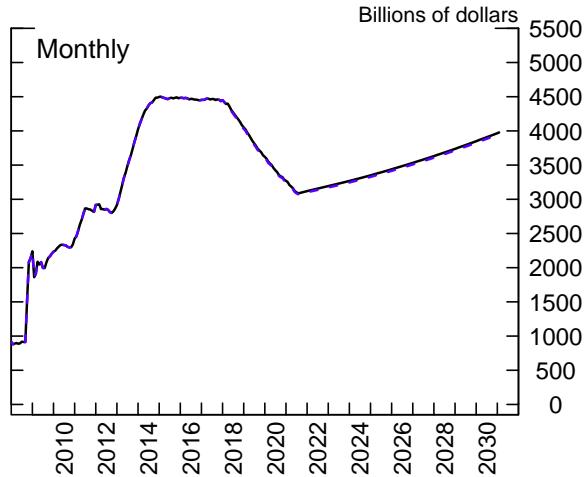
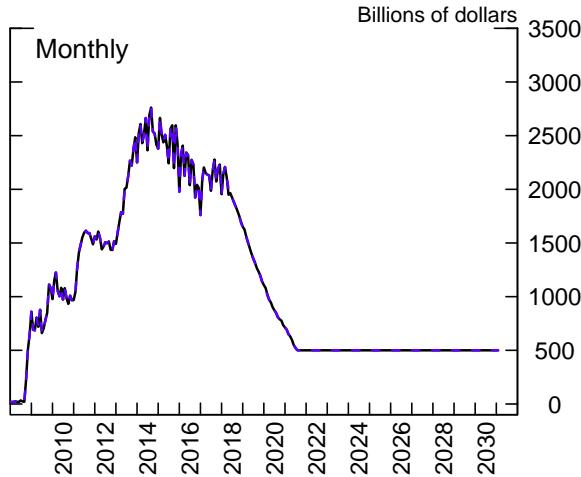
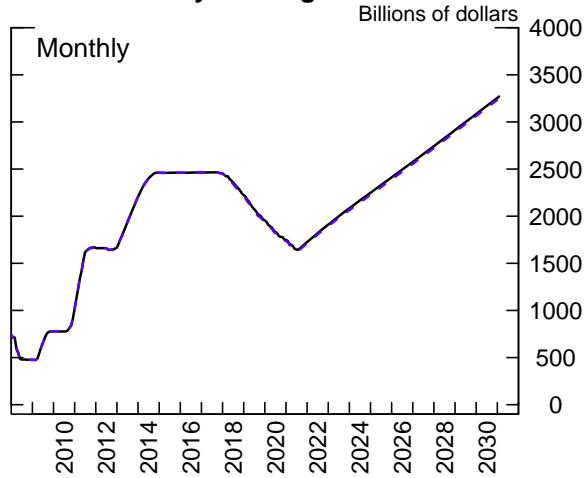
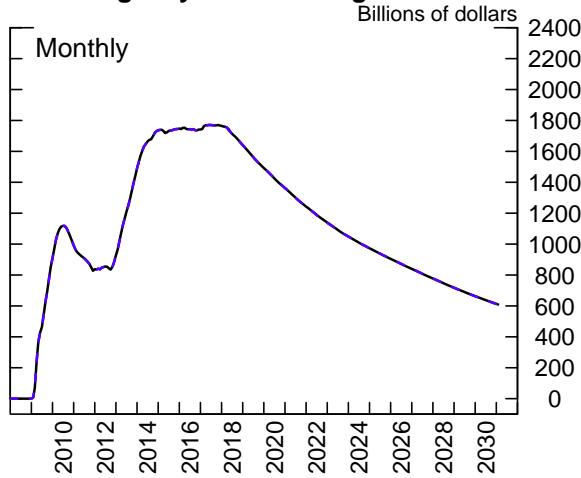
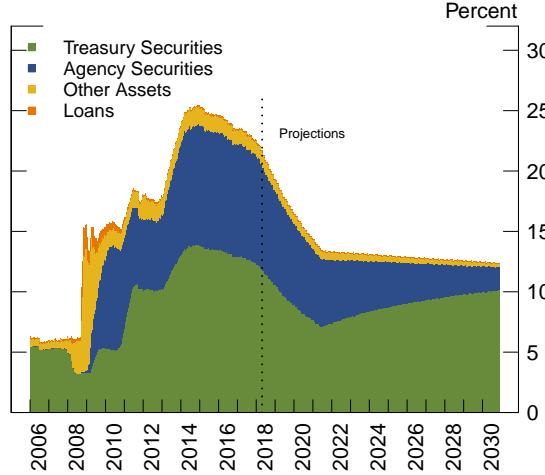
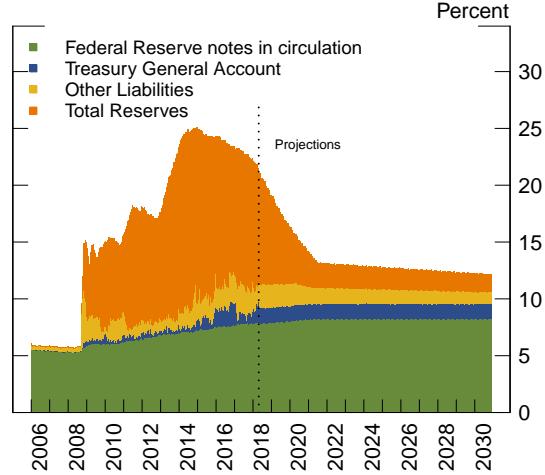
**SOMA Agency Debt and MBS Principal Payments**



Note: Projection dependent on future interest rates and housing market developments.

## Total Assets and Selected Balance Sheet Items

— June Tealbook baseline    - - April Tealbook baseline

**Total Assets****Reserve Balances****SOMA Treasury Holdings****SOMA Agency MBS Holdings****Assets as a Share of GDP****Liabilities as a Share of GDP**

**Federal Reserve Balance Sheet  
End-of-Year Projections -- June Tealbook**  
(Billions of dollars)

	Apr 30, 2018	2018	2020	2022	2024	2026	2030
Total assets	4,356	4,051	3,271	3,193	3,350	3,532	3,966
<b>Selected assets</b>							
Loans and other credit extensions*	2	0	0	0	0	0	0
Securities held outright	4,145	3,865	3,112	3,053	3,224	3,418	3,871
U.S. Treasury securities	2,395	2,223	1,748	1,911	2,249	2,576	3,255
Agency debt securities	4	2	2	2	2	2	2
Agency mortgage-backed securities	1,745	1,640	1,362	1,140	973	840	613
Unamortized premiums	153	141	111	91	76	63	43
Unamortized discounts	-14	-13	-10	-8	-7	-6	-4
Total other assets	70	57	57	57	57	57	57
Total liabilities	4,316	4,012	3,231	3,149	3,302	3,480	3,903
<b>Selected liabilities</b>							
Federal Reserve notes in circulation	1,596	1,652	1,862	1,997	2,129	2,282	2,646
Reverse repurchase agreements	263	350	275	250	250	250	250
Deposits with Federal Reserve Banks	2,451	2,005	1,088	897	919	943	1,002
Reserve balances held by depository institutions	1,949	1,653	713	500	500	500	500
U.S. Treasury, General Account	419	277	300	322	343	368	427
Other deposits	82	75	75	75	75	75	75
Earnings remittances due to the U.S. Treasury	2	0	0	0	0	0	0
Total Federal Reserve Bank capital**	39	39	40	44	48	53	63

Source: Federal Reserve H.4.1 statistical releases and staff calculations.

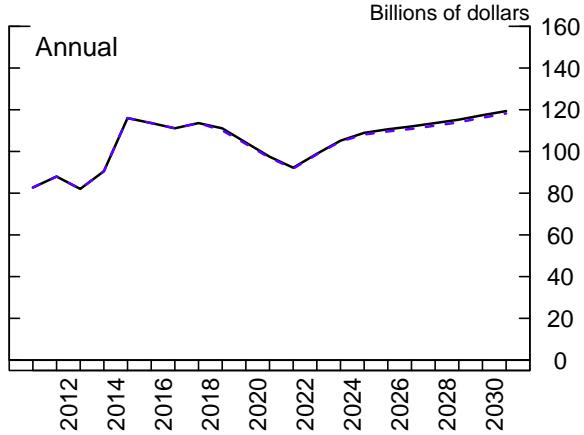
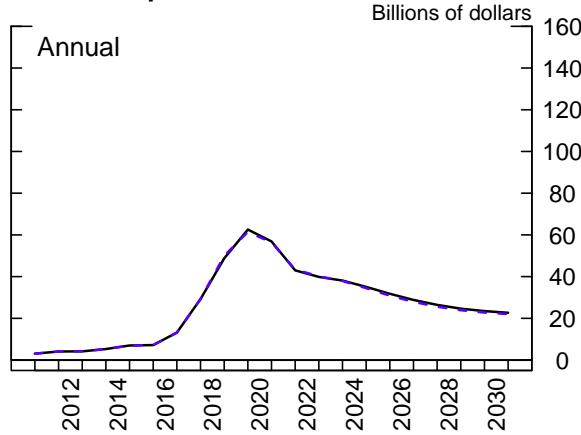
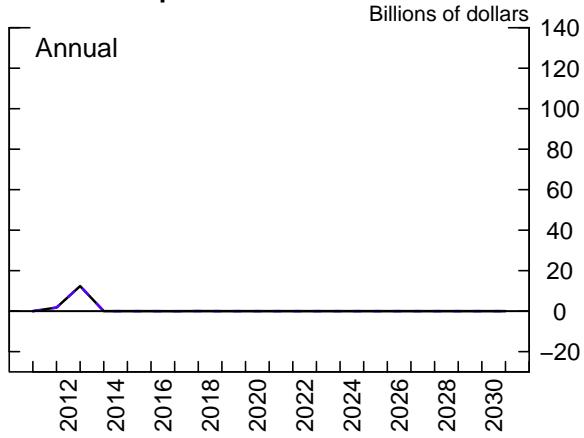
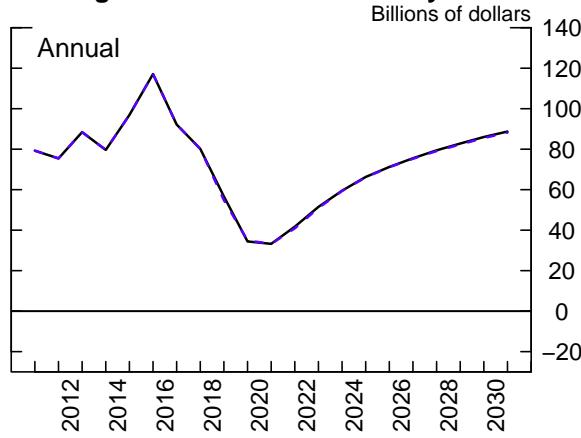
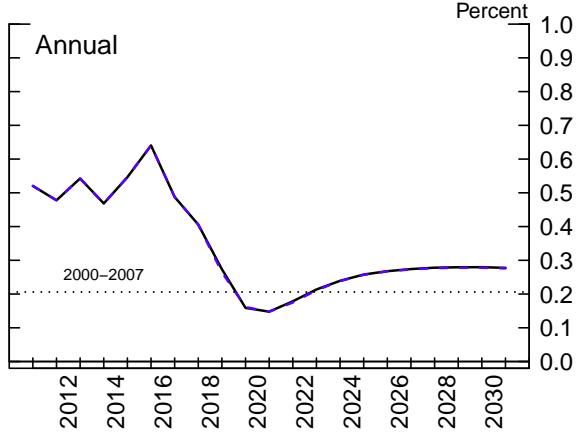
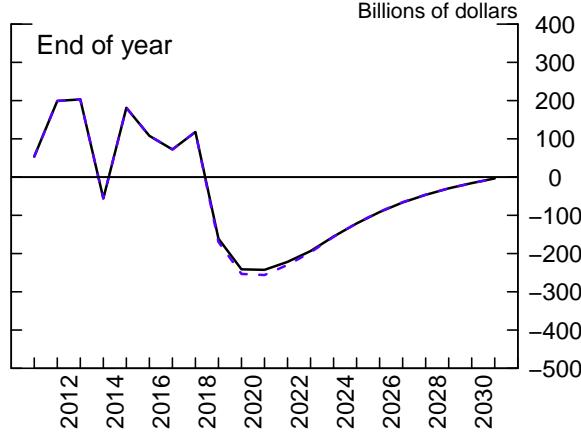
Note: Components may not sum to totals due to rounding.

\*Loans and other credit extensions includes primary, secondary, and seasonal credit; central bank liquidity swaps; and net portfolio holdings of Maiden Lane LLC.

\*\*Total capital includes capital paid-in and capital surplus accounts.

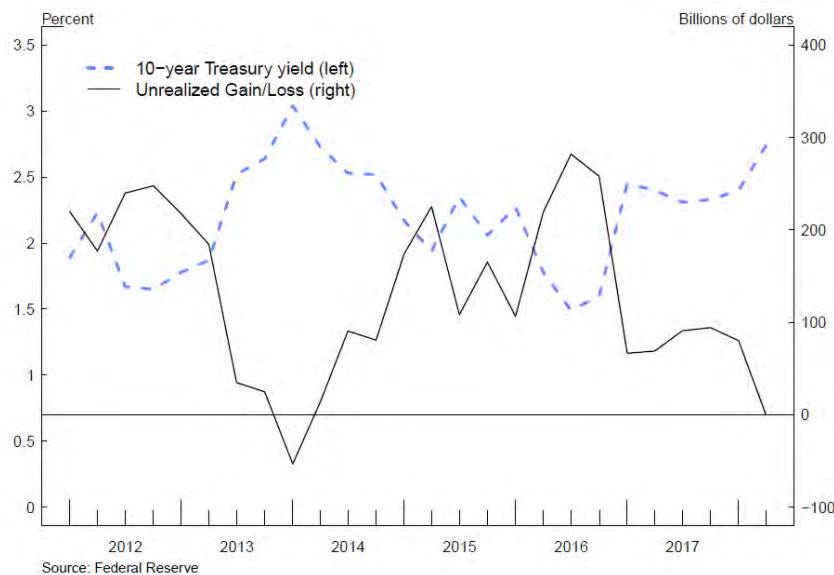
## Income Projections

— June Tealbook baseline    — April Tealbook baseline

**Interest Income****Interest Expense****Realized Capital Gains****Earnings Remittances to Treasury****Remittances as a Percent of GDP****Memo: Unrealized Gains/Losses**

unrealized gain position driven by both the historically large portfolio size and the low interest rate environment, as interest rates at that time were lower than when the securities were originally purchased. SOMA's unrealized position became negative in 2013 during the so-called "taper tantrum," and then again in the first quarter of 2018. Going forward, with interest rates expected to increase, the unrealized loss position is projected to reach about \$250 billion in two years, before narrowing as the securities acquired under the large-scale asset purchase programs approach maturity.

Figure 1: 10-year Treasury Yield and SOMA Unrealized Gain/Loss Position



The SOMA's unrealized gain or loss position does not affect the ability of the Federal Reserve to meet its responsibilities—including the conduct of monetary policy—and financial obligations. Moreover, the unrealized position has no impact on net earnings of the Federal Reserve or on its remittances to the U.S. Treasury.

When securities are sold or prepayments from MBS are received, the SOMA portfolio's gains or losses become realized and affect the Reserve Banks' net income and remittances to the Treasury.<sup>4</sup> In the unlikely event that realized losses on the SOMA portfolio resulted in negative net earnings, the Federal Reserve's remittances to the Treasury would be suspended. In this case, a deferred asset would be recorded on the Federal Reserve's balance sheet, representing the amount of net earnings that the Reserve Banks would need to realize before remittances to the Treasury would

<sup>4</sup> Any realized gains and losses are recorded in the non-interest income portion of the Combined Statements of Operations. For example, under the Maturity Extension Program, nearly \$700 billion of shorter-term Treasury securities were sold or redeemed from October 2011 until the end of 2012. As a result, total net gains of about \$15 billion were recorded over the course of this program.

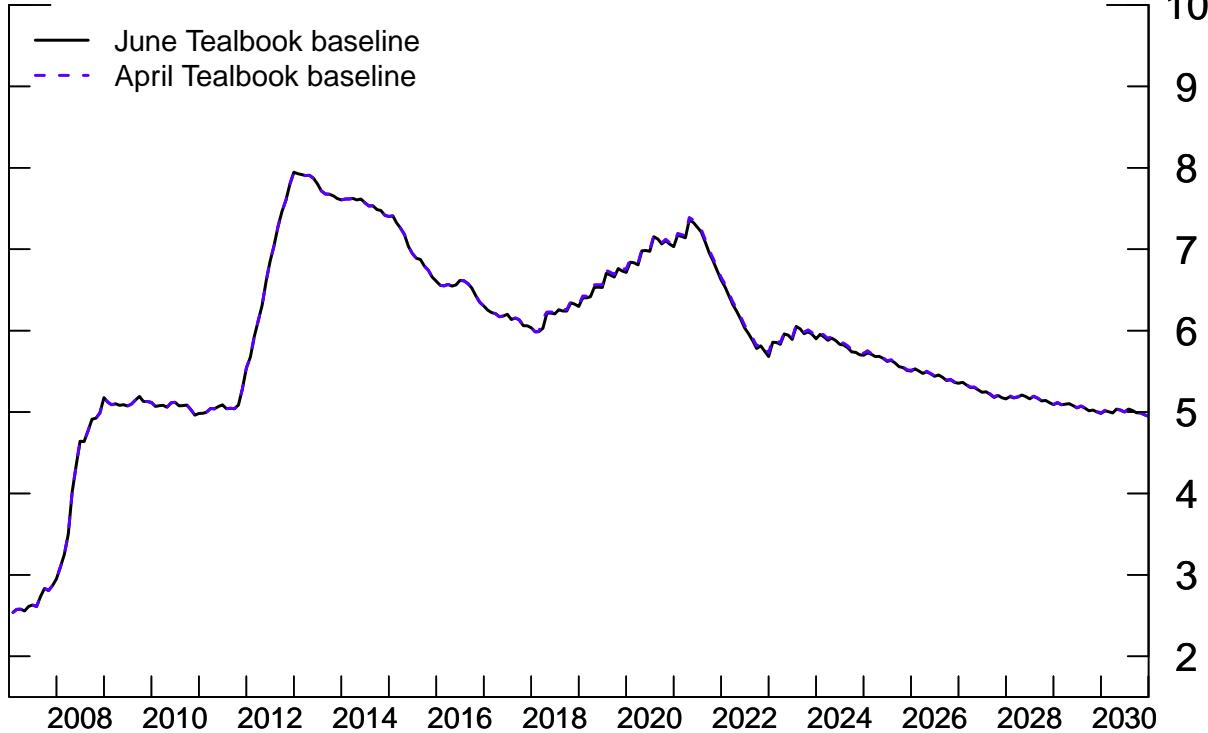
**Projections for the 10-Year Treasury Term Premium Effect**  
**(Basis Points)**

Date	June Tealbook	April Tealbook
Quarterly Averages		
2018:Q2	-82	-82
Q3	-79	-79
Q4	-76	-76
2019:Q4	-66	-66
2020:Q4	-58	-58
2021:Q4	-53	-52
2022:Q4	-49	-49
2023:Q4	-46	-46
2024:Q4	-43	-42
2025:Q4	-40	-39
2026:Q4	-37	-37
2027:Q4	-35	-35
2028:Q4	-33	-33
2029:Q4	-31	-31
2030:Q4	-29	-29

## Projections for the Characteristics of SOMA Treasury Securities Holdings

**SOMA Weighted-Average Treasury Duration**

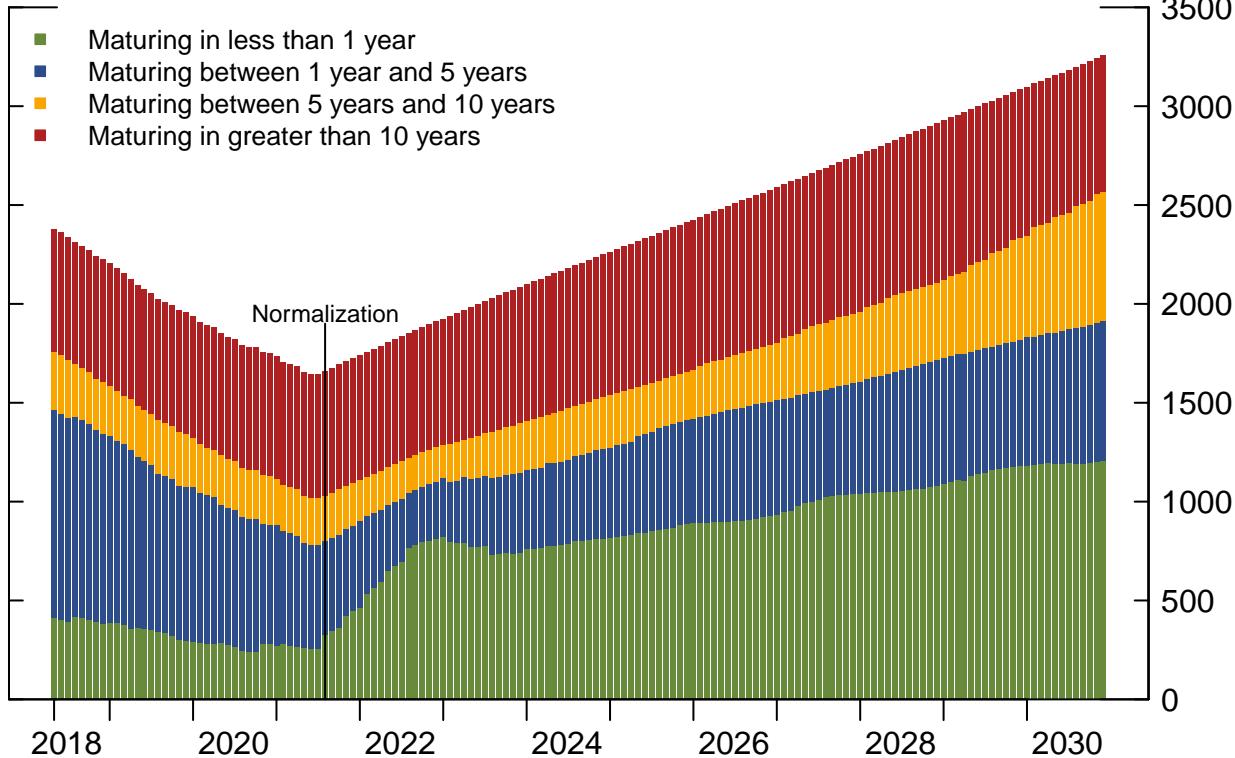
Monthly



Balance Sheet &amp; Income

**Maturity Composition of SOMA Treasury Portfolio**

June Tealbook baseline



## Abbreviations

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ABS	asset-backed securities
AFE	advanced foreign economy
BEA	Bureau of Economic Analysis, Department of Commerce
BHC	bank holding company
CDS	credit default swaps
CFTC	Commodity Futures Trading Commission
C&I	commercial and industrial
CLO	collateralized loan obligation
CMBS	commercial mortgage-backed securities
CPI	consumer price index
CRE	commercial real estate
DEDO	section in Tealbook A, “Domestic Economic Developments and Outlook”
Desk	Open Market Desk
DFMU	Designated Financial Market Utilities
ECB	European Central Bank
ELB	effective lower bound
EME	emerging market economy
EU	European Union
FAST Act	Fixing America’s Surface Transportation Act
FDIC	Federal Deposit Insurance Corporation
FOMC	Federal Open Market Committee; also, the Committee
GCF	general collateral finance
GDI	gross domestic income
GDP	gross domestic product
GSIBs	globally systemically important banking organizations
HQLA	high-quality liquid assets
IOER	interest on excess reserves
ISM	Institute for Supply Management

LIBOR	London interbank offered rate
LSAPs	large-scale asset purchases
MBS	mortgage-backed securities
MMFs	money market funds
NBER	National Bureau of Economic Research
NI	nominal income
NIPA	national income and product accounts
OIS	overnight index swap
ON RRP	overnight reverse repurchase agreement
PCE	personal consumption expenditures
QS	Quantitative Surveillance
repo	repurchase agreement
RMBS	residential mortgage-backed securities
RRP	reverse repurchase agreement
SCOOS	Senior Credit Officer Opinion Survey on Dealer Financing Terms
SEP	Summary of Economic Projections
SFA	Supplemental Financing Account
SLOOS	Senior Loan Officer Opinion Survey on Bank Lending Practices
SOMA	System Open Market Account
TBA	to be announced (for example, TBA market)
TCJA	Tax Cuts and Jobs Act of 2017
TGA	U.S. Treasury's General Account
TIPS	Treasury inflation-protected securities
TPE	Term premium effects
ZLB	zero lower bound