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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

October 18, 2019

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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 GDP growth in 2019 is well aligned with the projections from both the Survey of Professional Forecasters (SPF) and the Blue Chip consensus but is nearly  $\frac{1}{2}$  percentage point higher than the Blue Chip in 2020. The staff's unemployment rate forecast is the same as the SPF and Blue Chip projections in 2019 and close to the Blue Chip forecast in 2020.

With regard to headline PCE price inflation, the staff projection is 0.2 percentage point below the SPF projection in 2019 and 2020. Moreover, the staff's projection for core PCE price inflation is 0.2 percentage point below the SPF forecast in 2020. Otherwise, the staff's inflation projections are close to those of the Blue Chip and the SPF.

### Comparison of Tealbook and Outside Forecasts

	2019	2020
<b>GDP (Q4/Q4 percent change)</b>		
October Tealbook	2.1	2.0
Blue Chip (10/10/19)	2.2	1.6
SPF median (8/9/19)	2.2	n.a.
<b>Unemployment rate (Q4 level)</b>		
October Tealbook	3.6	3.6
Blue Chip (10/10/19)	3.6	3.7
SPF median (8/9/19)	3.6	n.a.
<b>CPI inflation (Q4/Q4 percent change)</b>		
October Tealbook	1.8	2.0
Blue Chip (10/10/19)	1.9	2.1
SPF median (8/9/19)	1.9	2.0
<b>PCE price inflation (Q4/Q4 percent change)</b>		
October Tealbook	1.4	1.7
SPF median (8/9/19)	1.6	1.9
<b>Core PCE price inflation (Q4/Q4 percent change)</b>		
October Tealbook	1.7	1.8
SPF median (8/9/19)	1.7	2.0

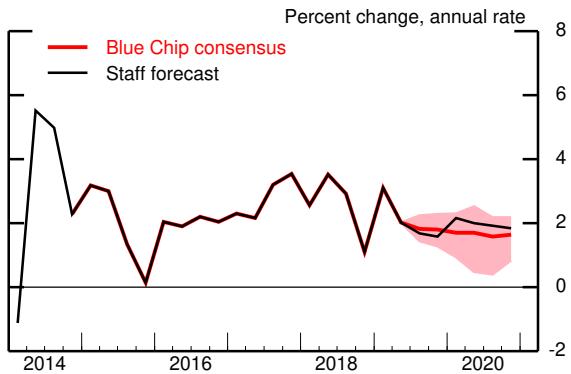
Note: SPF is the Survey of Professional Forecasters, CPI is the consumer price index, and PCE is personal consumption expenditures. Blue Chip does not provide results for overall and core PCE price inflation. The Blue Chip consensus forecast includes input from about 50 panelists, and the SPF about 40.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

n.a. Not available.

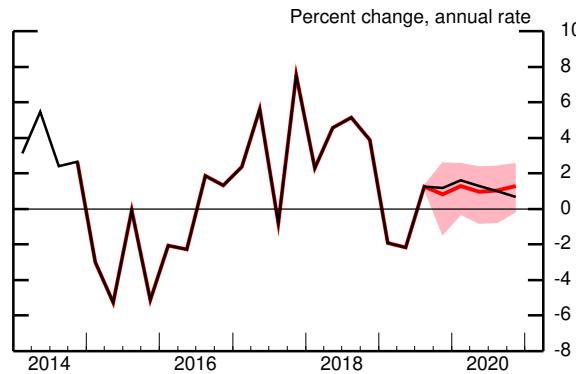
Source: Blue Chip Economic Indicators; Federal Reserve Bank of Philadelphia.

## Tealbook Forecast Compared with Blue Chip (Blue Chip survey released October 10, 2019)

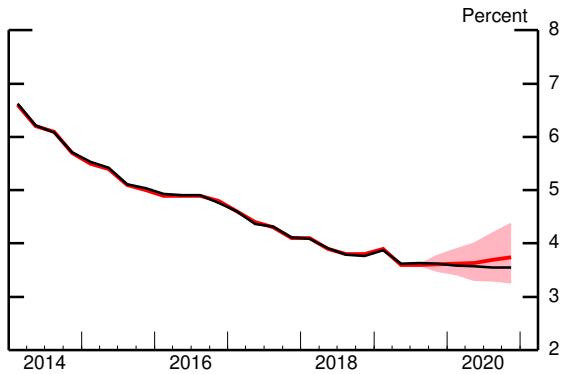
Real GDP



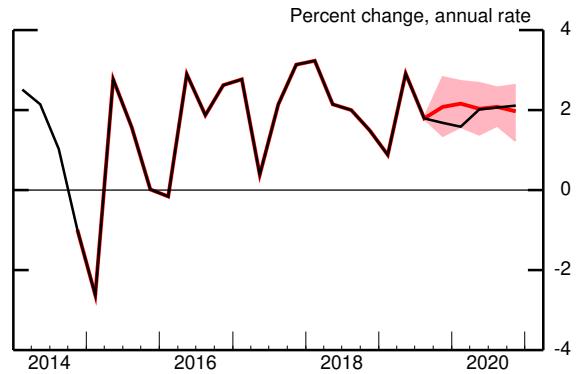
Industrial Production



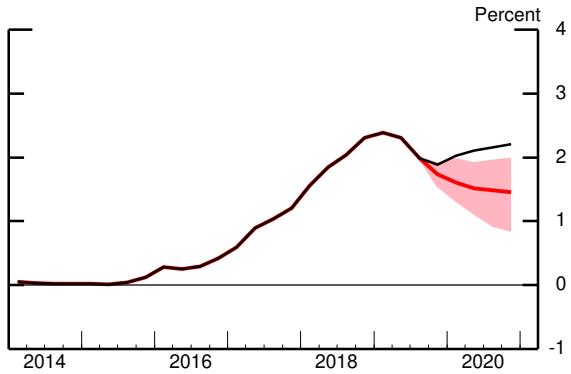
Unemployment Rate



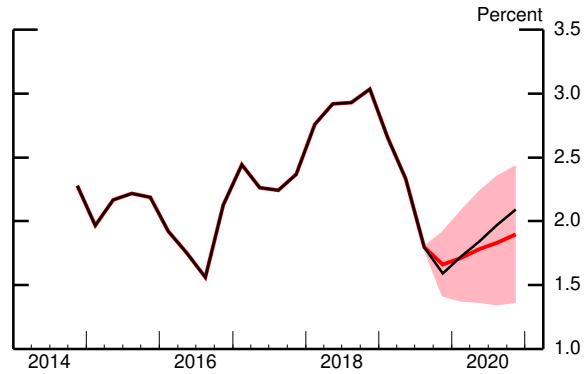
Consumer Price Index



Treasury Bill Rate



10-Year Treasury Yield

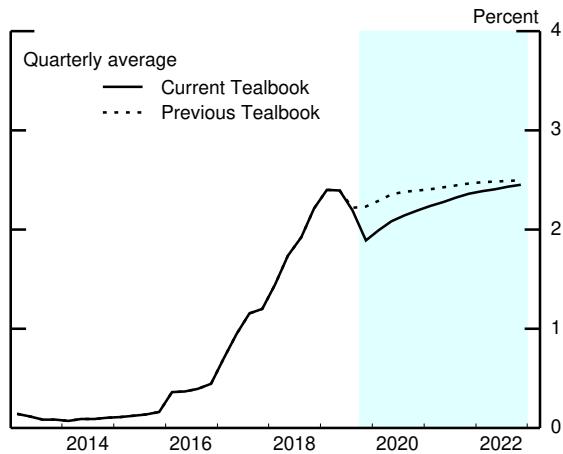


Note: The yield is for on-the-run Treasury securities. Over the forecast period, the staff's projected yield is assumed to be 15 basis points below the off-the-run yield.

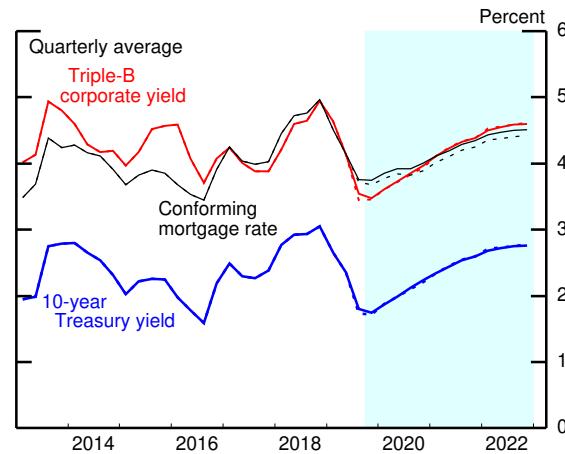
Note: The shaded area represents the area between the Blue Chip top 10 and bottom 10 averages.

## Key Background Factors underlying the Baseline Staff Projection

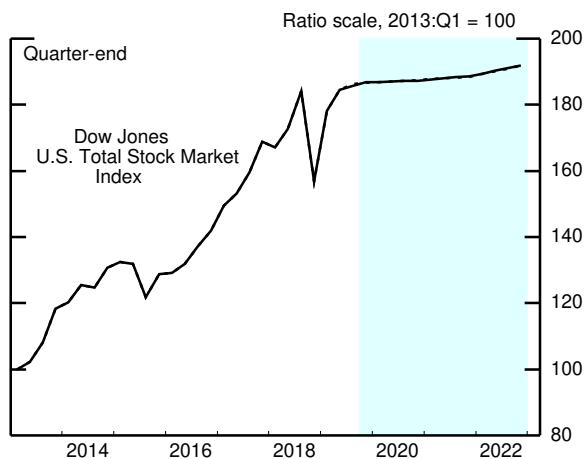
Federal Funds Rate



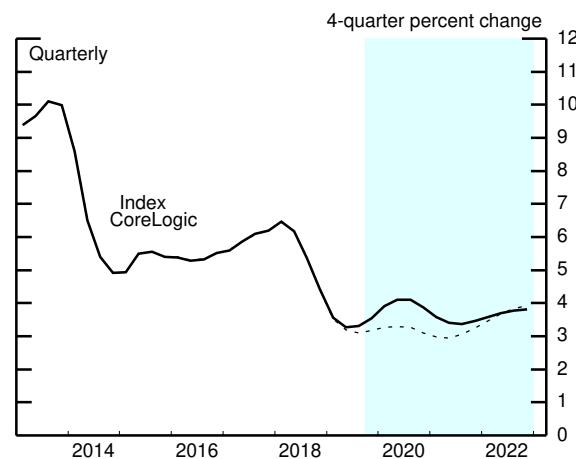
Long-Term Interest Rates



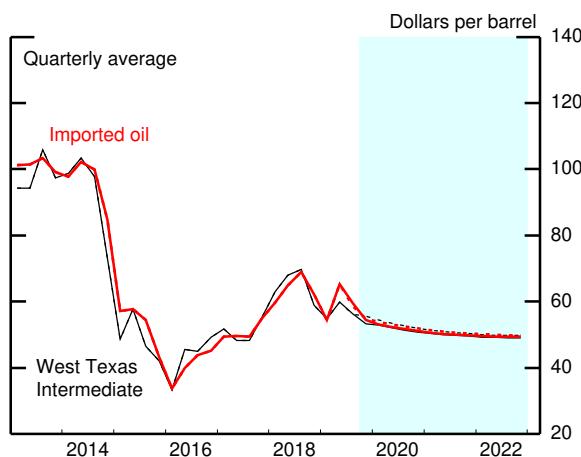
Equity Prices



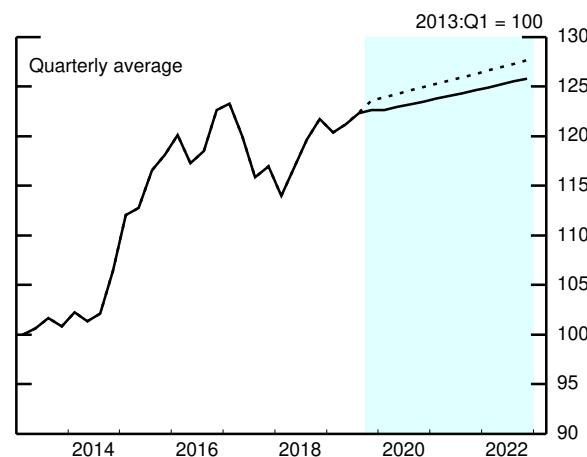
House Prices



Crude Oil Prices



Broad Real Dollar



## The Effect of Recent Tariffs on the Manufacturing Sector

As activity in the manufacturing sector has slowed this year, industry anecdotes—from the Beige Book, surveys, and numerous media reports—have pointed to trade policy as a potential culprit. The timing of the current slump in the U.S. manufacturing sector lends some credence to this idea, as the solid gains in 2017 and 2018 were followed by lackluster performance in the wake of the tariffs imposed by the United States and its trading partners. Indeed, as shown in figure 1, manufacturing IP (the solid blue line) has stepped down noticeably since the end of 2018, while the trajectory of manufacturing employment (the red dashed line) has flattened.

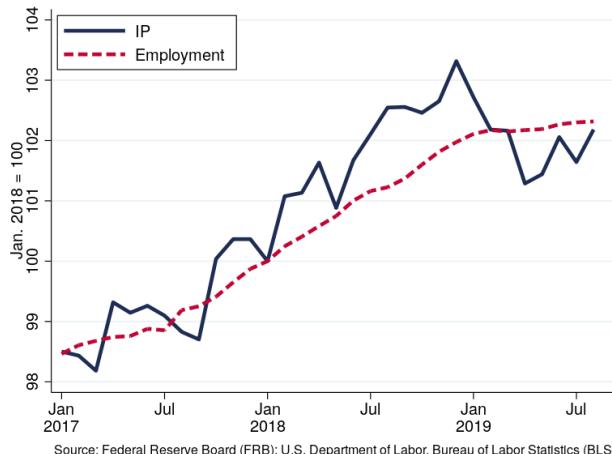
A recent memo explored the effects of tariffs on manufacturing output.<sup>1</sup> This discussion expands on that memo to update the tariff effects on output and to examine the effects on manufacturing employment. To be clear, this analysis seeks to identify the effects of changes in actual trade policy, rather than uncertainty about future trade policy.<sup>2</sup>

The approach exploits industry-level variation in three distinct channels through which tariffs could affect output or employment using the published lists of products subject to tariffs and detailed data on industry output, employment, imports, and exports.

1. **Import protection:** U.S. tariffs on industries' products protect them from foreign competition, which may boost U.S. output and employment; this channel is measured as the import value of an industry's products subject to tariffs divided by absorption (output + imports – exports).
2. **Rising input costs:** U.S. tariffs raise input costs for some industries, which may lower domestic output and employment; this channel is measured as the import value of an industry's inputs subject to tariffs divided by the cost of production, based on the BEA's input-output tables.
3. **Foreign retaliation:** U.S. trade partners retaliate by imposing tariffs on exports of some U.S. industries, which may lower domestic output and employment; this channel is measured as the value of an industry's exports subject to retaliatory tariffs divided by overall output.

The analysis estimates the relationship between detailed industry-level changes in growth rates and the measures for each of the three channels previously noted in a simple ordinary least-squares

**Figure 1. Manufacturing Industrial Production and Employment**



<sup>1</sup> See Aaron Flaaen and Justin Pierce (2019), "Effects of Recent Tariffs on Manufacturing Output," memorandum to the Federal Open Market Committee, Board of Governors of the Federal Reserve System, Division of Research and Statistics, August 26.

<sup>2</sup> For research on uncertainty, see Dario Caldara, Matteo Iacoviello, Patrick Molligo, Andrea Prestipino, and Andrea Raffo (2019), "The Economic Effects of Trade Policy Uncertainty," International Finance Discussion Papers 1256 (Washington: Board of Governors of the Federal Reserve System, September), <https://doi.org/10.17016/IFDP.2019.1256>.

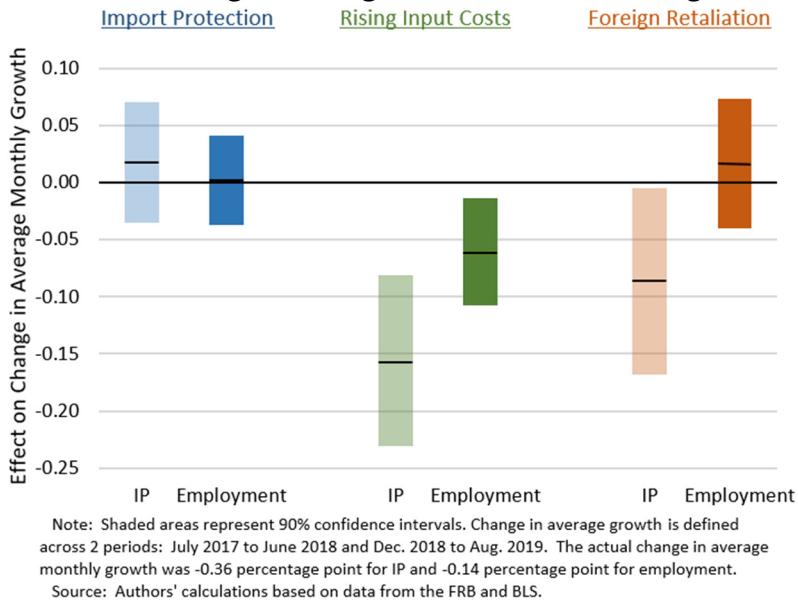
regression. The dependent variable is the change in the average monthly growth rate of either manufacturing IP or employment across two periods: July 2017 to June 2018, when the manufacturing sector was expanding, and December 2018 to August 2019, when manufacturing IP contracted on net. In addition, the regression includes controls for the export share of each industry's output and the import share of domestic absorption to account for general exposure to international conditions such as changes in the value of the dollar and foreign GDP growth (these controls may also serve as a coarse proxy for exposure to trade policy uncertainty).

The black lines in figure 2 report the estimated effects of each tariff channel on the change in average monthly growth rates for manufacturing IP (light bars) and employment (dark bars) within their 90 percent confidence intervals (height of bars). As shown in the figure, higher exposure to rising input costs (green bars) and foreign retaliation (orange bars) is associated with statistically significantly lower IP growth.<sup>3</sup>

Figure 2 also reveals a link between tariffs and manufacturing employment growth, but the relationship thus far is not as strong. While higher exposure to rising input costs is associated with lower employment growth, the effect is somewhat smaller in magnitude than for IP, and there is no effect of retaliatory tariffs.<sup>4</sup> Finally, there is no statistically significant relationship between import protection (blue bars) and either manufacturing IP or employment growth.

All told, the estimates indicate that the new tariffs account for about two-thirds of the change in manufacturing IP growth since December 2018 and for about 40 percent of the change in employment growth.<sup>5</sup> This analysis, therefore, still leaves room for other factors cited in the Beige Book and elsewhere—such as effects from trade policy uncertainty, weak global growth, and the recent slowdown in business investment—to play a role in the manufacturing downturn.

**Figure 2. Tariff Effects on Change in Average Growth in Manufacturing: IP and Employment**



<sup>3</sup> The negative relationship between rising input costs and manufacturing production is supported by other research findings that tariffs on inputs have lowered export growth by U.S. firms; see Ryan Monarch (2019), “Recent Weakness in U.S. Exports: Supply Chain Effects of the 2018–2019 Tariffs,” briefing delivered to the Board of Governors of the Federal Reserve System, Division of International Finance, October 7.

<sup>4</sup> In results not reported here, the analysis indicates that tariffs do not explain meaningful portions of the declines in other labor market measures such as production worker employment and hours worked, though data for these measures are not as detailed as data for IP and manufacturing employment for all workers.

<sup>5</sup> Estimates based on alternative time periods are qualitatively similar but tend to be less precise, and they can be larger or smaller in magnitude depending on the time periods considered.

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

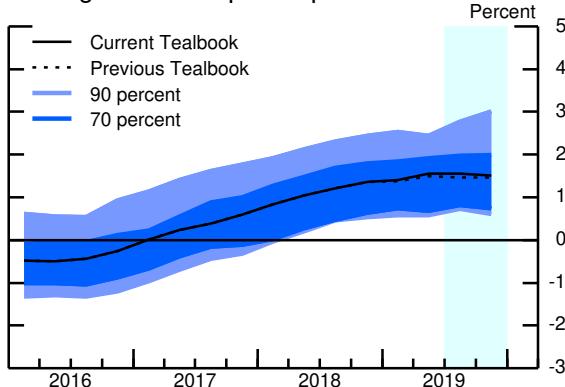
(Percent change at annual rate from final quarter of preceding period except as noted)

Measure	2017	2018	2019	2019 Q2	2019 Q3	2019 Q4
<b>Output gap<sup>1</sup></b>	<b>.6</b>	<b>1.4</b>	<b>1.5</b>	<b>1.5</b>	<b>1.6</b>	<b>1.5</b>
<i>Previous Tealbook</i>	.6	1.4	1.5	1.5	1.5	1.5
Real GDP	2.8	2.5	2.1	2.0	1.7	1.6
<i>Previous Tealbook</i>	2.8	2.5	2.1	1.9	1.7	1.8
Measurement error in GDP	.1	-.1	.1	-.4	-.2	.0
<i>Previous Tealbook</i>	.1	-.1	.2	-.3	.0	.0
Potential output	1.8	1.8	1.8	1.8	1.8	1.8
<i>Previous Tealbook</i>	1.8	1.8	1.8	1.8	1.8	1.8

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.

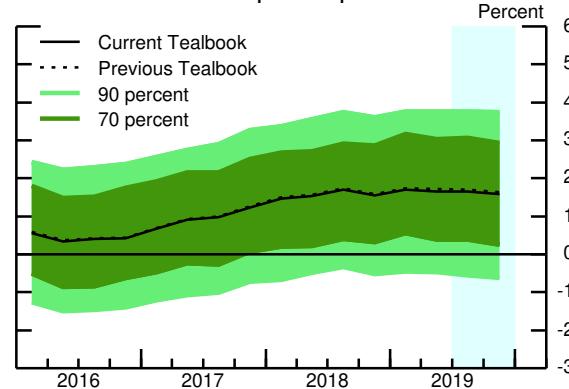
### Judgmental Output Gap



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

Source: Various macroeconomic data; staff assumptions.

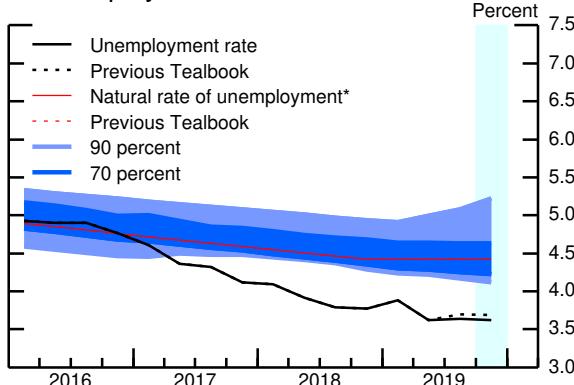
### Model-Based Output Gap



Note: Shaded regions denote model-computed uncertainty bands.

Source: Various macroeconomic data; staff assumptions.

### Unemployment Rate

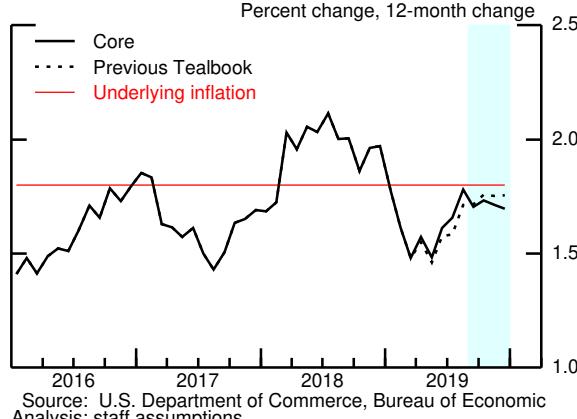


Note: Shaded regions show the distribution of historical revisions to the staff's estimates of the natural rate.

\*Staff estimate including the effect of extended and emergency unemployment insurance benefits.

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.

**Federal Reserve System Nowcasts of 2019:Q3 Real GDP Growth**  
(Percent change at annual rate from previous quarter)

Federal Reserve entity	Type of model	Nowcast as of Oct. 16, 2019
Federal Reserve Bank		
Boston	• Mixed-frequency BVAR	1.7
New York	• Factor-augmented autoregressive model combination • Factor-augmented autoregressive model combination, financial factors only • Dynamic factor model	2.9 3.0 2.0
Cleveland	• Bayesian regressions with stochastic volatility • Tracking model	1.6 1.2
Atlanta	• Tracking model combined with Bayesian vector autoregressions (VARs), dynamic factor models, and factor-augmented autoregressions (known as GDPNow)	1.8
Chicago	• Dynamic factor model • Bayesian VARs	2.2 1.8
St. Louis	• Dynamic factor model • News index model • Let-the-data-decide regressions	1.5 3.2 2.6
Kansas City	• Accounting-based tracking estimate	.7
Board of Governors	• Tealbook estimate (judgmental) • Mixed-frequency dynamic factor model (DFM-SM <sup>1</sup> ) • Mixed-frequency dynamic factor model (DFM-BM)	1.7 2.9 2.6
Memo: Median of Federal Reserve System nowcasts		1.9

<sup>1</sup> We replaced DFM-45 with DFM-SM because of its better out-of-sample forecasting performance. DFM-SM (small model) uses the same infrastructure of DFM-BM, but with a smaller information set chosen using the most popular data releases on Bloomberg terminals and among Federal Reserve Board analysts.

## Summary of the Near-Term Outlook for GDP

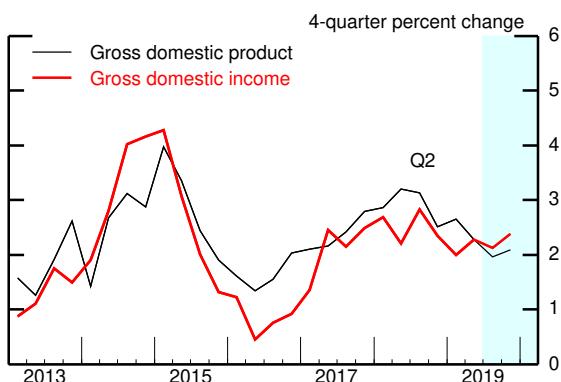
(Percent change at annual rate except as noted)

Measure	2019:H1		2019:Q3		2019:Q4	
	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook
<b>Real GDP</b>	<b>2.5</b>	<b>2.6</b>	<b>1.7</b>	<b>1.7</b>	<b>1.8</b>	<b>1.6</b>
Private domestic final purchases	2.4	2.4	2.2	2.1	2.2	2.1
Personal consumption expenditures	2.9	2.8	3.2	2.8	2.3	2.3
Residential investment	-2.1	-2.0	1.9	4.8	6.3	5.8
Nonres. private fixed investment	1.5	1.7	-3.0	-2.1	.9	-.2
Government purchases	3.7	3.8	1.4	1.3	1.5	.9
<i>Contributions to change in real GDP</i>						
Inventory investment <sup>1</sup>	-.2	-.2	-.1	-.1	-.4	-.2
Net exports <sup>1</sup>	.0	.0	-.3	-.3	.1	-.1

1. Percentage points.

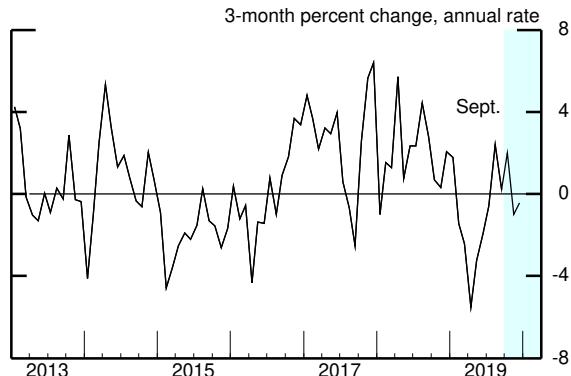
### Recent Nonfinancial Developments (1)

Real GDP and GDI



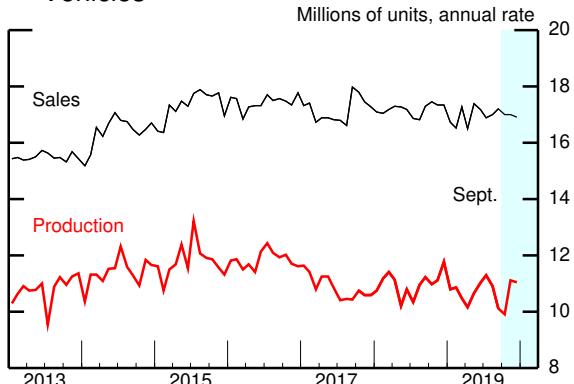
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

Manufacturing IP ex. Motor Vehicles and Parts



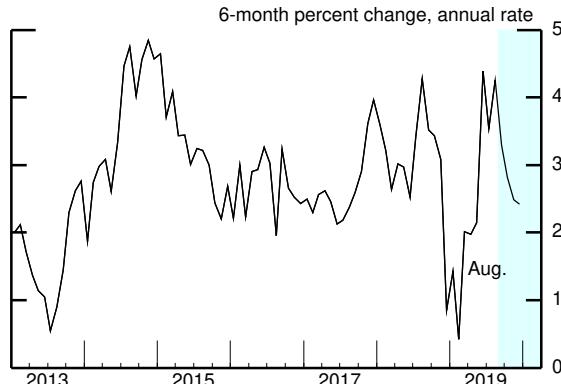
Source: Federal Reserve Board, G.17 Statistical Release, "Industrial Production and Capacity Utilization."

Sales and Production of Light Motor Vehicles



Source: Ward's Communications; Chrysler; General Motors; FRB seasonal adjustments.

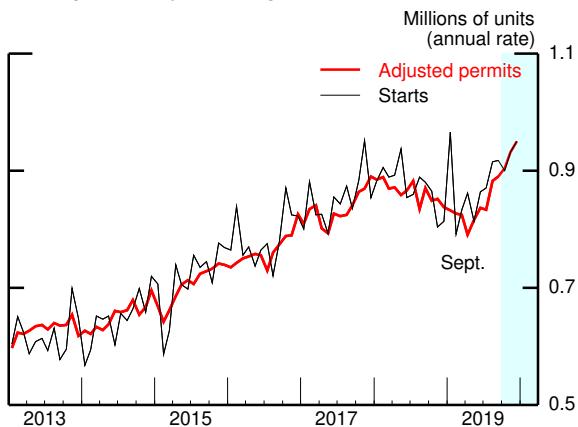
Real PCE Growth



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

## Recent Nonfinancial Developments (2)

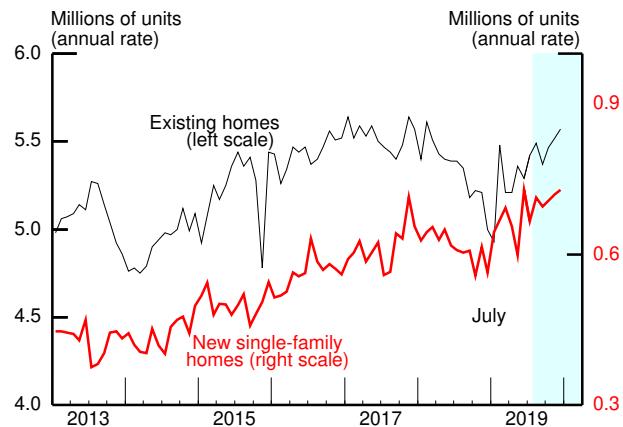
### Single-Family Housing Starts and Permits



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

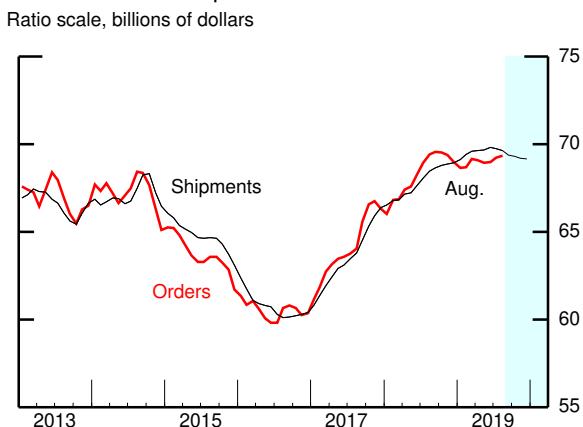
Source: U.S. Census Bureau.

### Home Sales



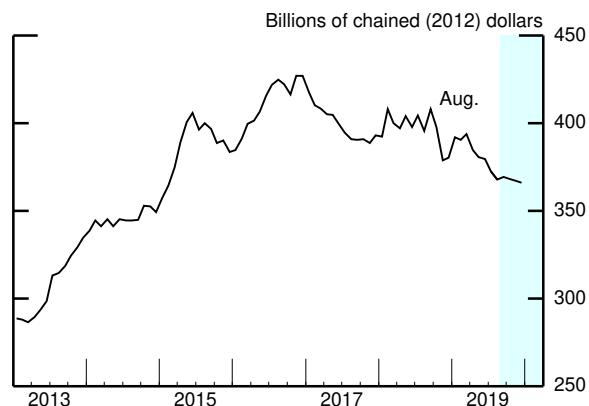
Source: For existing, National Association of Realtors; for new, U.S. Census Bureau.

### Nondefense Capital Goods ex. Aircraft



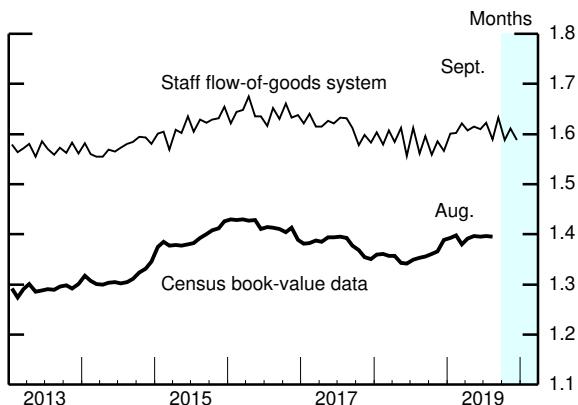
Note: Data are 3-month moving averages.  
Source: U.S. Census Bureau.

### Nonresidential Construction Put in Place



Note: Nominal CPIP deflated by BEA prices through 2019:Q2 and by the staff's estimated deflator thereafter.  
Source: U.S. Census Bureau.

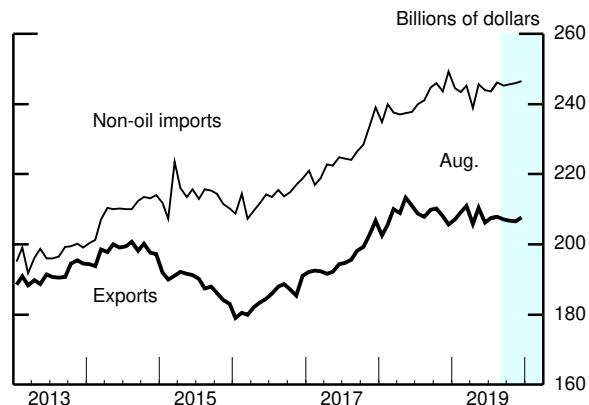
### Inventory Ratios



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

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

### Exports and Non-oil Imports



Note: Forecasts are linear interpolations of quarterly values.  
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis; U.S. Census Bureau.

## An Index of Common Inflation Expectations

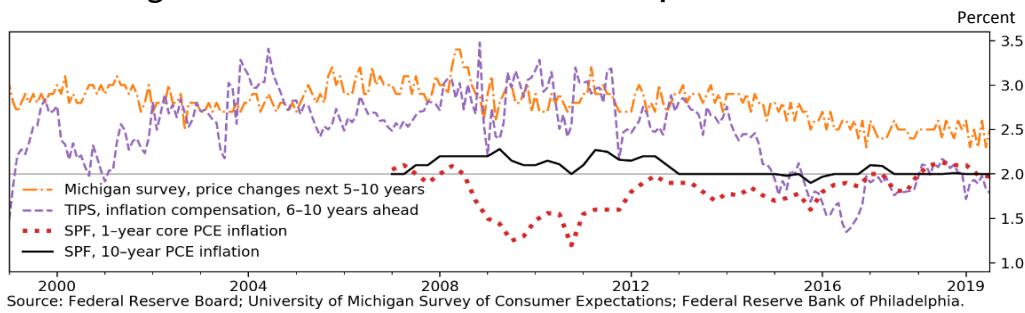
Indicators that measure inflation expectations, based largely on information from surveys and financial instruments, have grown in number in recent years. We closely monitor many of the longer-running measures, but the large number of available indicators and the inherent differences between them make it difficult to evaluate co-movements across the entire set. In this discussion, we present an index of common inflation expectations (CIE) as one way to summarize the information in these measures.

The CIE index is constructed from inflation expectation indicators that represent the views of households, firms, professional forecasters, and financial market participants. The indicators include both “short horizon” and “long horizon” inflation expectations, and while some are denominated in terms of a specific inflation measure, such as the personal consumption expenditures (PCE) price index, others are described only in terms of “prices in general.” Good evidence of interrelationships among many of these indicators exists, but there are also notable differences.

Figure 1 presents four indicators that we closely track and that are representative of the overall trends across many of the other indicators. A broad decline in the three long-horizon indicators over the sample period is evident, and it is this co-movement that the CIE index exploits. However, the short-horizon indicator increases over much of the sample, and the long-horizon indicators exhibit differences in their overall levels and in the timing and dynamics of their declines.

The CIE index, shown in figure 2, is constructed by applying a dynamic factor model to 21 inflation expectation indicators, including those in figure 1.<sup>1</sup> The index suggests that inflation expectations were relatively stable between 1999 and 2012, edged down between 2012 and 2016, and have since fluctuated around that lower level.<sup>2</sup> Because the decline in this measure is small and occurred several years ago, it does not appear to

**Figure 1: Evolution of Selected Inflation Expectation Indicators**



<sup>1</sup> The sample period for the CIE index begins in 1999, as the current regime of anchored inflation expectations is thought to have begun at about that time.

<sup>2</sup> The decline potentially coincides with the announcement of an explicit inflation target by the FOMC in 2012, the perceived deterioration of the global economic outlook (as signaled by the European Central Bank's (ECB) adoption of quantitative easing policies), a sharp drop in oil prices, and the ECB and the Bank of Japan implementing negative policy rates.

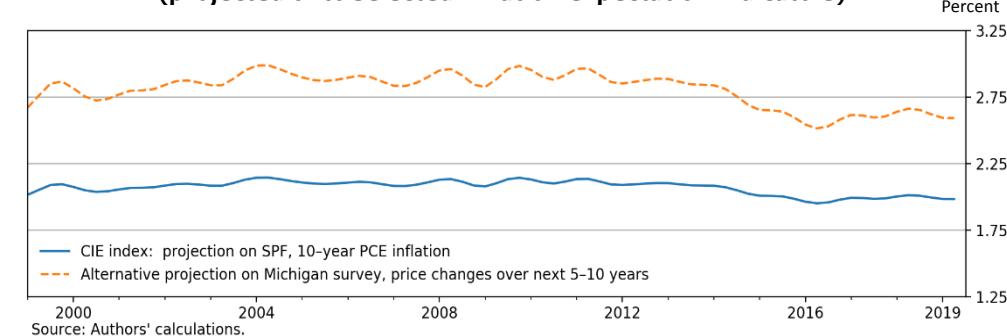
support concerns that expectations may have more recently become unanchored to the downside.

Mechanically, the CIE index can be thought of as a weighted average of the included indicators, where indicators that tend to co-move more with others receive more weight.<sup>3</sup> It is derived from an estimated dynamic factor that has no natural level or scale but that can be interpreted in terms of any of the included indicators. The baseline CIE index, presented as the blue line in figure 2, interprets the factor by “projecting” it onto the 10-year PCE inflation expectations from the Survey of Professional Forecasters (SPF).<sup>4</sup> For comparison, we also present an alternative measure that interprets the factor in terms of expected price changes over the next 5 to 10 years from the Michigan survey (orange line), which has both a higher mean and a higher variance than the SPF. In each case, we interpret the factor using a long-run inflation expectation indicator, as these measures are affected less by transitory factors and may be more appealing in constructing a measure of underlying inflation expectations that may be most interesting to monetary policymakers.

Overall, the CIE index captures the general trajectory of many of the long-horizon inflation expectation indicators well. However, as it is derived from a single factor, it cannot capture all relevant features of the data—even of just the four series illustrated in figure 1. This observation yields several caveats to the interpretation of the index.

First, the level of the index is determined by the mean of the indicator used to interpret the underlying factor; while the baseline CIE index ends the sample slightly below 2 percent, the alternative index ends at 2.6 percent. Second, short-horizon inflation expectation indicators tend to exhibit a different trend over this sample from long-horizon indicators so that including relatively more short-horizon indicators in the exercise could yield an alternative index of inflation expectations with different dynamics. Finally, although many of the various long-horizon indicators decline over the sample period, the differences in timing and dynamics allow the possibility that different economic events triggered each decline, so future co-movement is not guaranteed.

**Figure 2: Estimated Index of Common Inflation Expectations  
(projected onto selected inflation expectation indicators)**

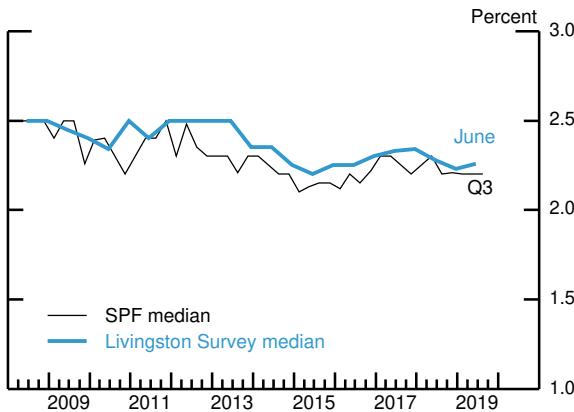


<sup>3</sup> The use of an alternative method, principal components analysis, results in a similar index.

<sup>4</sup> We project the estimated factor onto that indicator by multiplying the factor by the indicator's standard deviation and adding its mean.

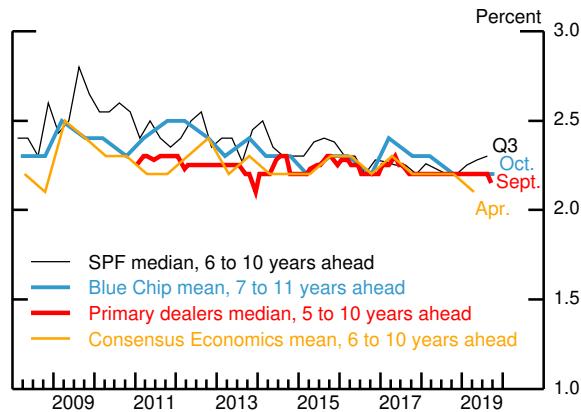
## Survey Measures of Longer-Term Inflation Expectations

CPI Next 10 Years



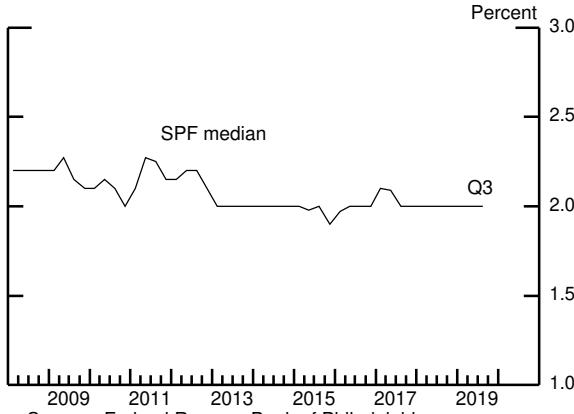
Note: SPF is Survey of Professional Forecasters.  
Source: Federal Reserve Bank of Philadelphia.

CPI Forward Expectations



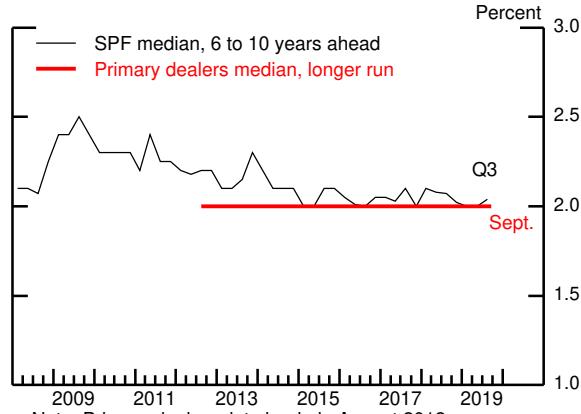
Source: Federal Reserve Bank of Philadelphia; Blue Chip Economic Indicators; Federal Reserve Bank of New York; Consensus Economics.

PCE Next 10 Years



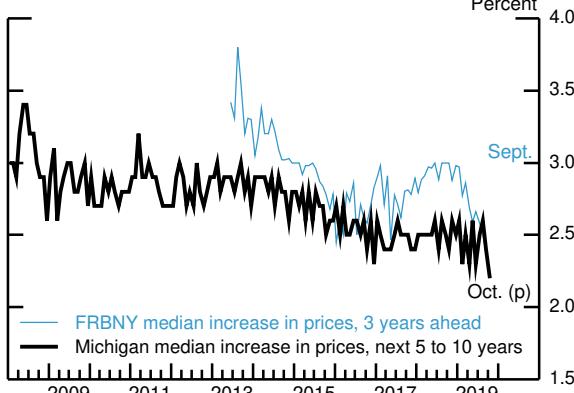
Source: Federal Reserve Bank of Philadelphia.

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

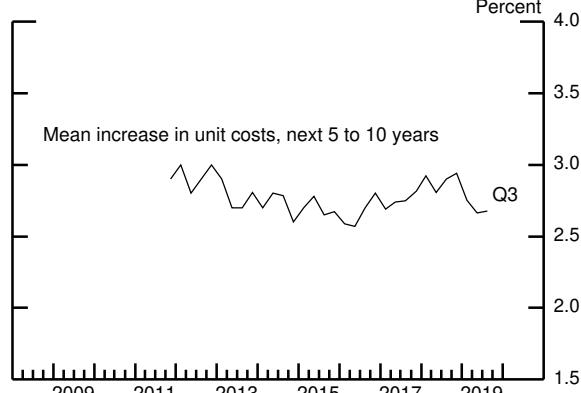


Note: Federal Reserve Bank of New York (FRBNY) Survey of Consumer Expectations reports expected 12-month inflation rate 3 years from the current survey date. FRBNY data begin in June 2013.

(p) Preliminary.

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

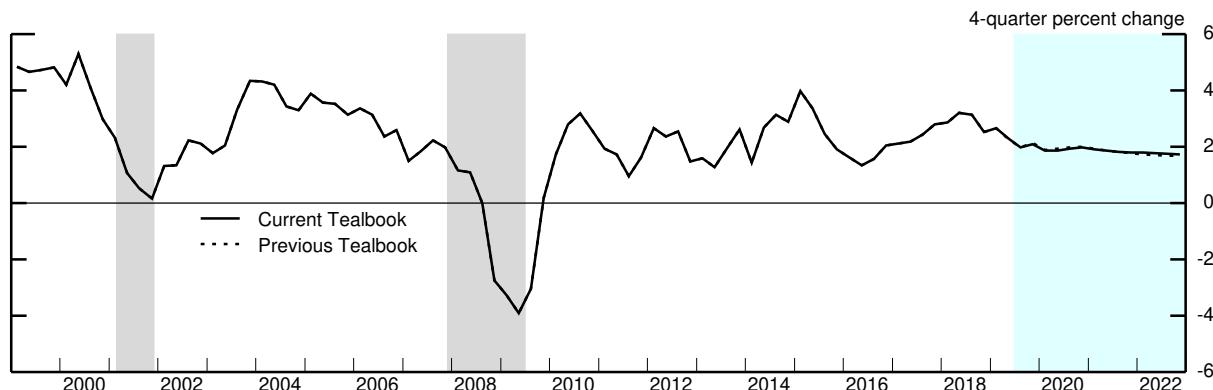
Survey of Business Inflation Expectations



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)

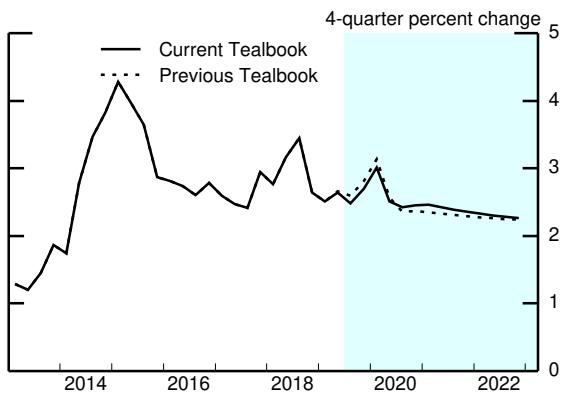
Measure	2018	2019 H1	2019 H2	2019	2020	2021	2022
<b>Real GDP</b>	<b>2.5</b>	<b>2.6</b>	<b>1.6</b>	<b>2.1</b>	<b>2.0</b>	<b>1.8</b>	<b>1.7</b>
<i>Previous Tealbook</i>	2.5	2.5	1.8	2.1	2.0	1.8	1.7
Final sales	2.2	2.8	1.8	2.3	2.2	1.8	1.6
<i>Previous Tealbook</i>	2.2	2.7	2.0	2.4	2.1	1.7	1.6
Personal consumption expenditures	2.6	2.8	2.6	2.7	2.5	2.4	2.3
<i>Previous Tealbook</i>	2.6	2.9	2.7	2.8	2.4	2.3	2.2
Residential investment	-4.4	-2.0	5.3	1.6	4.6	-2.9	-3.8
<i>Previous Tealbook</i>	-4.4	-2.1	4.1	1.0	5.3	-4.0	-4.7
Nonresidential structures	2.6	-3.9	-8.5	-6.2	-2.6	-1.3	-2.1
<i>Previous Tealbook</i>	2.6	-4.6	-1.5	-3.1	-2.2	-1.4	-2.2
Equipment and intangibles	6.8	3.3	1.0	2.1	2.0	3.0	1.7
<i>Previous Tealbook</i>	6.8	3.3	-.9	1.1	2.1	3.1	1.6
Federal purchases	2.7	5.2	2.1	3.6	1.9	.2	.7
<i>Previous Tealbook</i>	2.7	5.1	3.6	4.3	1.2	.2	.7
State and local purchases	.9	3.0	.5	1.8	1.0	1.0	1.1
<i>Previous Tealbook</i>	.9	2.9	.1	1.5	1.1	1.1	1.1
Exports	.4	-.9	-.4	-.6	2.7	3.3	3.6
<i>Previous Tealbook</i>	.4	-.8	.7	-.1	2.2	3.2	3.5
Imports	3.2	-.8	1.1	.2	2.1	3.0	3.2
<i>Previous Tealbook</i>	3.2	-.7	1.2	.3	2.1	3.1	3.2
Contributions to change in real GDP (percentage points)							
Inventory change	.3	-.2	-.1	-.2	-.2	.0	.1
<i>Previous Tealbook</i>	.3	-.2	-.3	-.2	-.1	.0	.1
Net exports	-.4	.0	-.2	-.1	.0	-.1	.0
<i>Previous Tealbook</i>	-.4	.0	-.1	-.1	.0	-.1	-.1

**Real GDP**

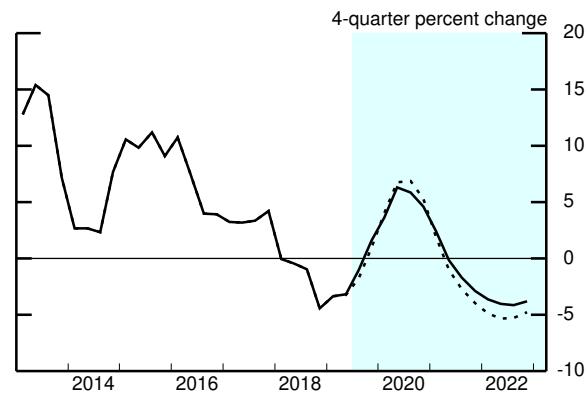
Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.  
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

## Components of Final Demand

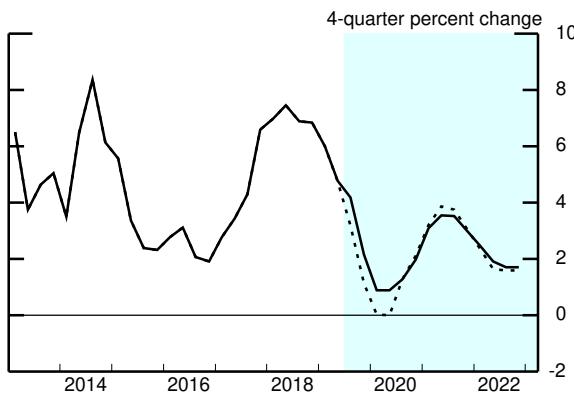
**Personal Consumption Expenditures**



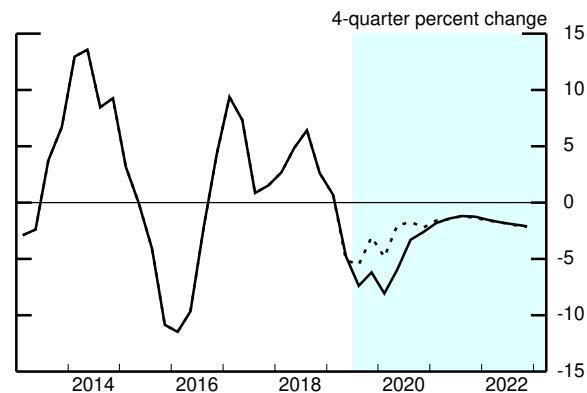
**Residential Investment**



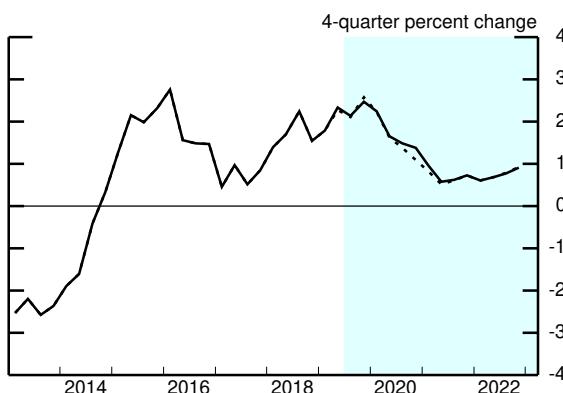
**Equipment and Intangibles**



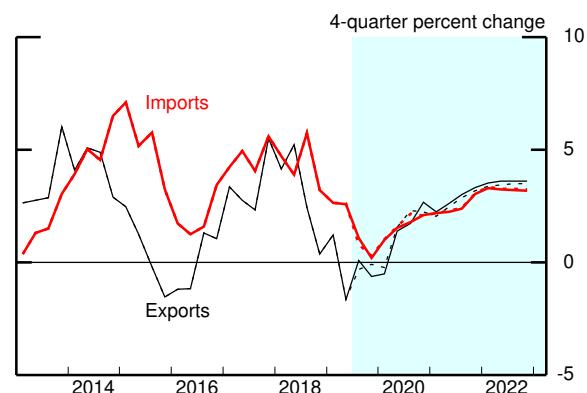
**Nonresidential Structures**



**Government Consumption and Investment**

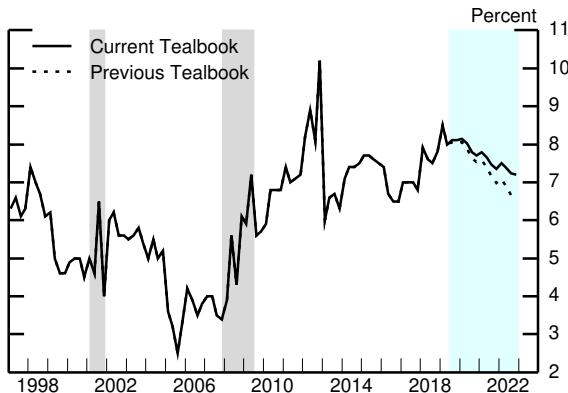


**Exports and Imports**

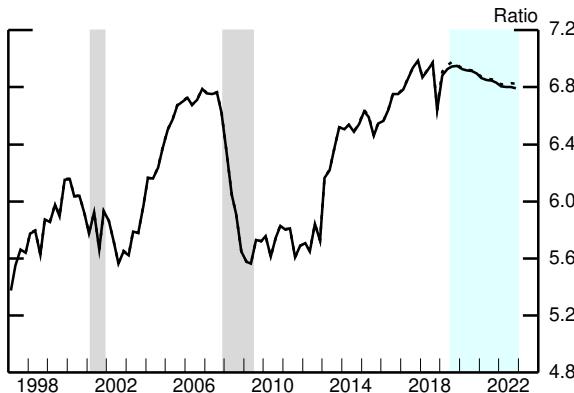


Source: U.S. Department of Commerce, Bureau of Economic Analysis.

## Aspects of the Medium-Term Projection

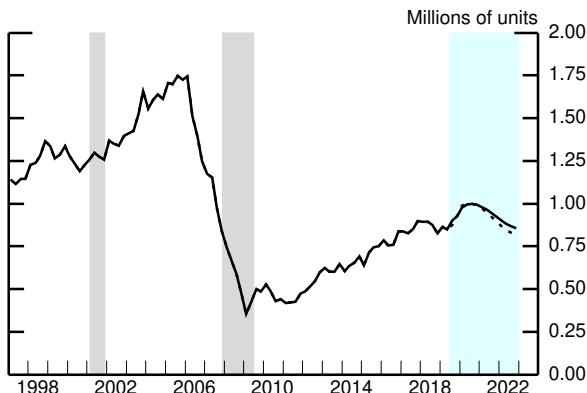
**Personal Saving Rate**

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

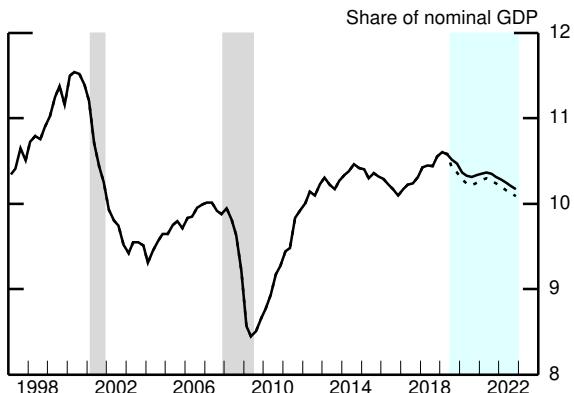
**Wealth-to-Income Ratio**

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

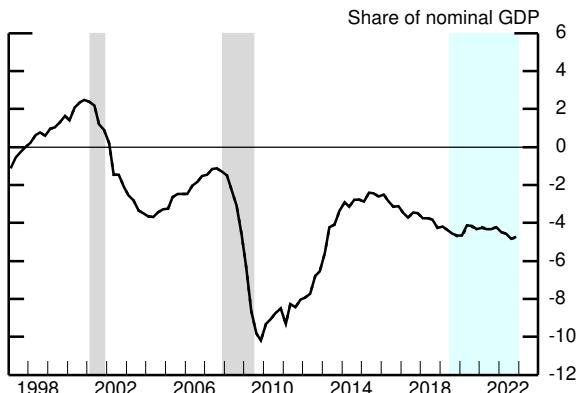
Source: For net worth, Federal Reserve Board, Financial Accounts of the United States; for income, U.S. Dept. of Commerce, Bureau of Economic Analysis.

**Single-Family Housing Starts**

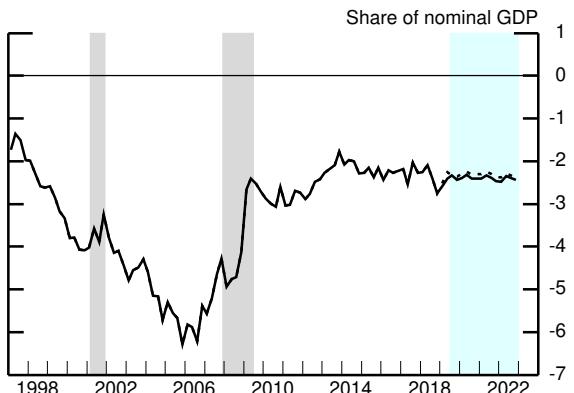
Source: U.S. Census Bureau.

**Equipment and Intangibles Spending**

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

**Federal Surplus/Deficit**

Note: 4-quarter moving average.  
Source: Monthly Treasury Statement.

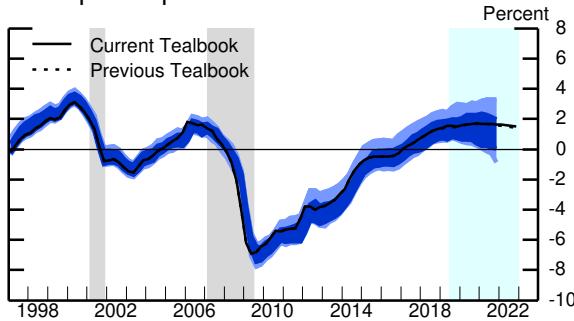
**Current Account Surplus/Deficit**

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

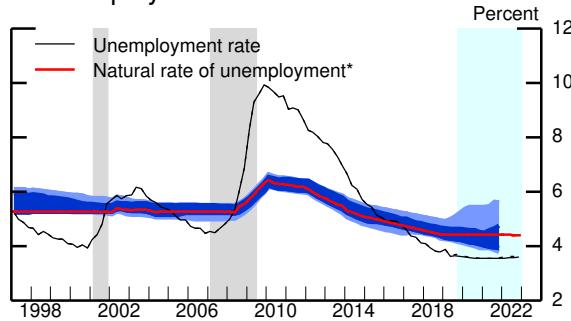
### Output Gap



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

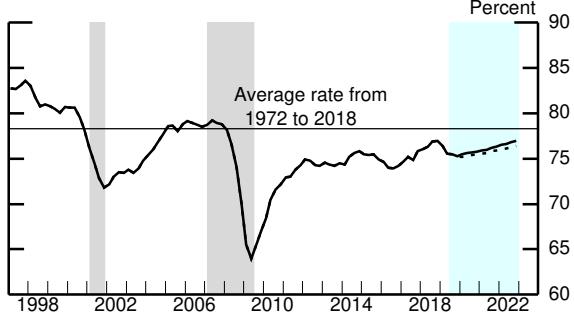


Note: Shaded regions show the 70 percent and 90 percent confidence intervals of the distribution of historical revisions to the staff's estimates of the natural rate.

\*Staff estimate including the effect of extended and emergency unemployment insurance benefits.

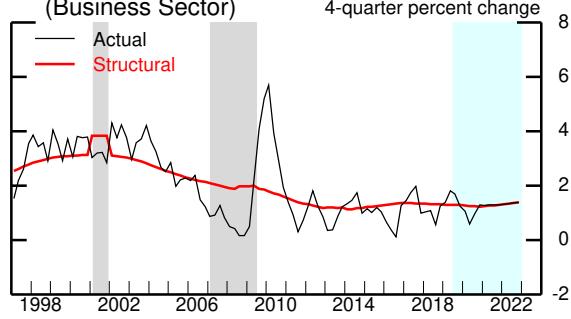
Source: Various macroeconomic data; staff assumptions.

### Manufacturing Capacity Utilization Rate



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

### 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	2011-17	2018	2019	2020	2021	2022
Potential output <i>Previous Tealbook</i>	3.1	3.6	2.7	1.9	1.5	1.8	1.8	1.8	1.9	1.8
<i>Previous Tealbook</i>	3.1	3.6	2.7	1.9	1.5	1.8	1.8	1.8	1.9	1.8
Selected contributions: <sup>1</sup>										
Structural labor productivity <sup>2</sup> <i>Previous Tealbook</i>	1.7	2.9	2.7	1.8	1.3	1.3	1.3	1.2	1.3	1.4
<i>Previous Tealbook</i>	1.7	2.9	2.7	1.8	1.3	1.3	1.3	1.2	1.3	1.4
Capital deepening	.7	1.4	1.0	.5	.8	.7	.7	.5	.5	.5
Multifactor productivity	.8	1.1	1.4	1.1	.2	.4	.4	.5	.6	.7
Structural hours <i>Previous Tealbook</i>	1.5	1.3	.8	.5	.4	.9	.3	.6	.5	.5
<i>Previous Tealbook</i>	1.5	1.3	.8	.5	.4	.9	.3	.6	.5	.5
Labor force participation <i>Previous Tealbook</i>	.4	-.1	-.2	-.4	-.5	-.2	-.2	-.2	-.2	-.3
<i>Previous Tealbook</i>	.4	-.1	-.2	-.4	-.5	-.2	-.2	-.2	-.2	-.3
Memo:										
Output gap <sup>3</sup> <i>Previous Tealbook</i>	-1.2	2.5	.3	-5.4	.6	1.4	1.5	1.7	1.6	1.5
<i>Previous Tealbook</i>	-1.2	2.5	.3	-5.4	.6	1.4	1.5	1.7	1.6	1.4

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

1. Percentage points.

2. Total business sector.

3. Percent difference between actual and potential 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	2018	2019 H1	2019 H2	2019	2020	2021	2022
Nonfarm payroll employment <sup>1</sup> <i>Previous Tealbook</i>	223 223	163 163	141 136	152 149	116 115	89 88	68 65
Private employment <sup>1</sup> <i>Previous Tealbook</i>	215 215	156 156	120 122	138 139	107 106	79 78	58 55
Labor force participation rate <sup>2</sup> <i>Previous Tealbook</i>	63.0 63.0	62.9 62.9	63.1 63.0	63.1 63.0	62.8 62.7	62.6 62.6	62.3 62.3
Civilian unemployment rate <sup>2</sup> <i>Previous Tealbook</i>	3.8 3.8	3.6 3.6	3.6 3.7	3.6 3.7	3.6 3.6	3.6 3.6	3.6 3.6
Employment-to-population ratio <sup>2</sup> <i>Previous Tealbook</i>	60.6 60.6	60.6 60.6	60.8 60.6	60.8 60.6	60.5 60.5	60.3 60.3	60.1 60.1

1. Thousands, average monthly changes.

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

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

**Inflation Projections**

Measure	2018	2019 H1	2019 H2	2019	2020	2021	2022
<i>Percent change at annual rate from final quarter of preceding period</i>							
PCE chain-weighted price index <i>Previous Tealbook</i>	1.9 1.9	1.4 1.3	1.5 1.6	1.4 1.5	1.7 1.8	1.8 1.8	1.8 1.8
Food and beverages <i>Previous Tealbook</i>	.5 .5	1.8 1.8	.4 1.9	1.1 1.8	2.3 2.4	2.3 2.4	2.3 2.4
Energy <i>Previous Tealbook</i>	3.9 3.9	-.7 -.7	-6.5 -9.1	-3.6 -5.0	-2.9 -1.0	.5 .5	1.1 1.0
Excluding food and energy <i>Previous Tealbook</i>	1.9 1.9	1.5 1.4	2.0 2.1	1.7 1.8	1.8 1.8	1.8 1.8	1.8 1.8
Prices of core goods imports <sup>1</sup> <i>Previous Tealbook</i>	.2 .2	-1.1 -1.2	-.3 -1.0	-.7 -1.1	1.0 .7	1.0 1.0	.9 .9
<i>12-month percent change</i>							
	Sept. 2019 <sup>2</sup>	Oct. 2019 <sup>2</sup>	Nov. 2019 <sup>2</sup>	Dec. 2019 <sup>2</sup>	Jan. 2020 <sup>2</sup>	Feb. 2020 <sup>2</sup>	Mar. 2020 <sup>2</sup>
PCE chain-weighted price index <i>Previous Tealbook</i>	1.4 1.4	1.4 1.4	1.5 1.5	1.5 1.6	1.7 ...	1.8 ...	1.7 ...
Excluding food and energy <i>Previous Tealbook</i>	1.7 1.7	1.7 1.8	1.7 1.8	1.7 1.8	1.8 ...	1.9 ...	2.0 ...

... Not applicable.

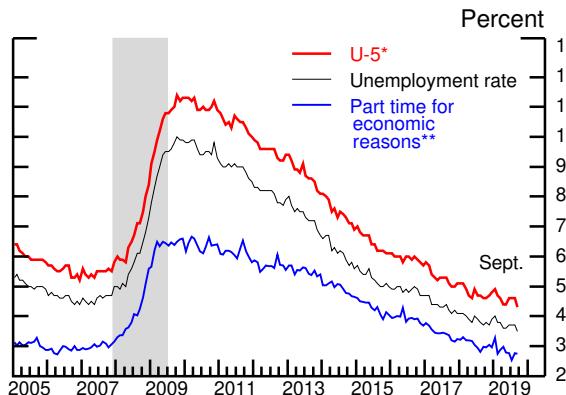
1. Core goods imports exclude computers, semiconductors, oil, and natural gas.

2. Staff Forecast.

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

## Labor Market Developments and Outlook (1)

### Measures of Labor Underutilization

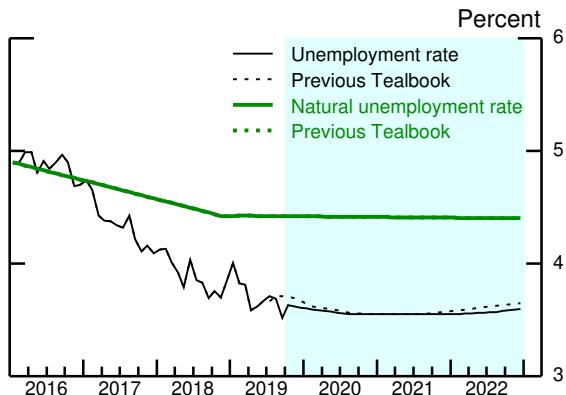


\* U-5 measures total unemployed persons plus all marginally attached to the labor force as a percent of the labor force plus persons marginally attached to the labor force.

\*\* Percent of Current Population Survey employment.

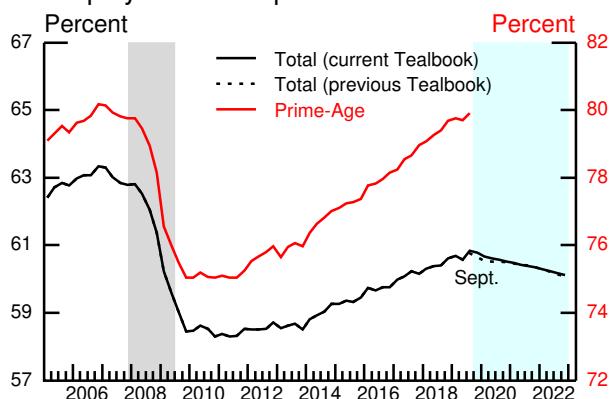
Source: U.S. Department of Labor, Bureau of Labor Statistics.

### Unemployment Rate



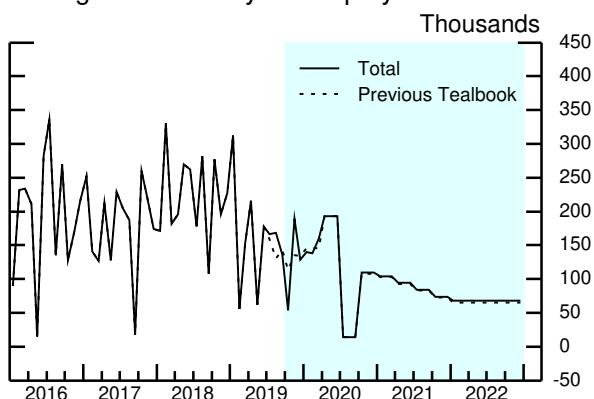
Source: U.S. Department of Labor, Bureau of Labor Statistics.

### Employment-to-Population Ratio



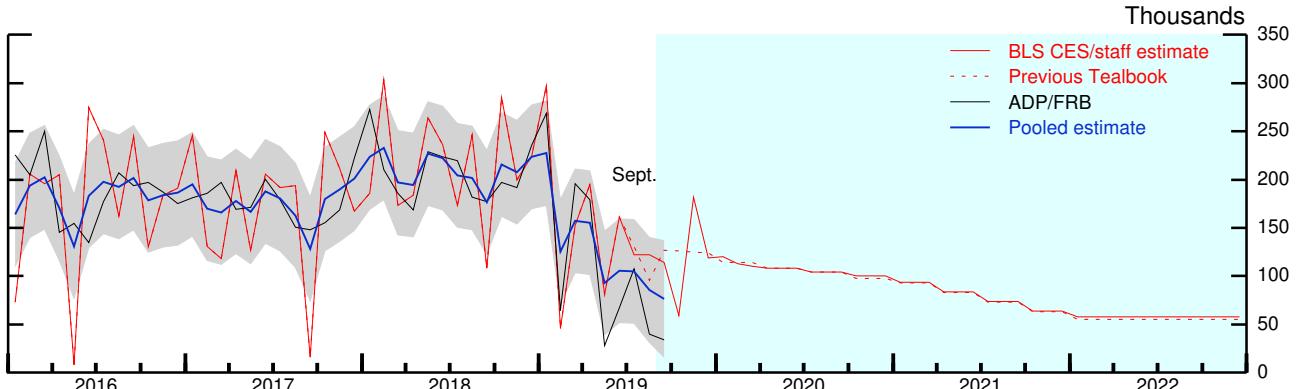
Note: Every curve except the one for the prime-age population corresponds with the left axis.  
Source: U.S. Department of Labor, Bureau of Labor Statistics.

### Change in Total Payroll Employment



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

### Change in Private Payroll Employment

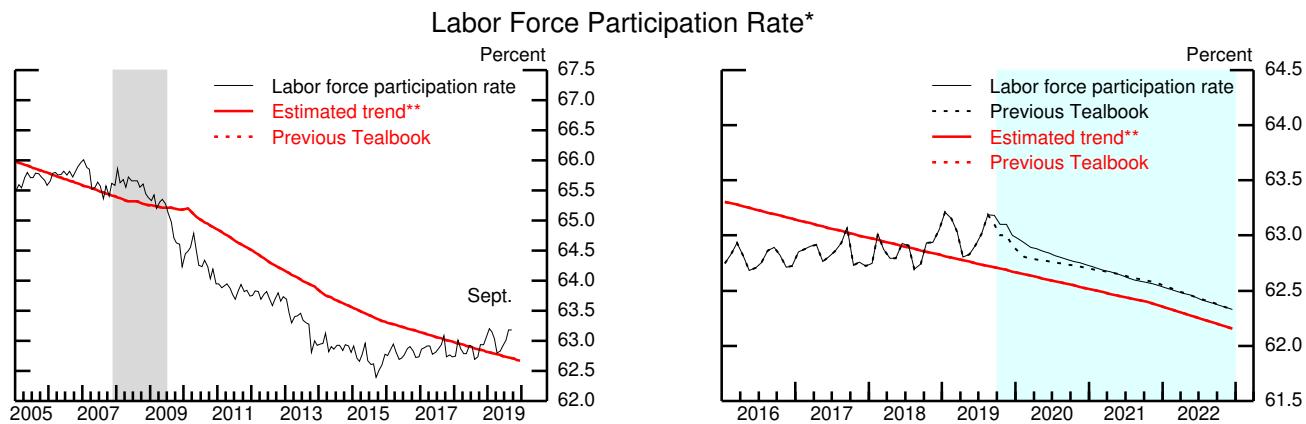


Note: Gray shaded area around blue line is 90 percent confidence interval around pooled estimate.

Source: U.S. Department of Labor, Bureau of Labor Statistics; staff calculations using microdata from ADP.

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

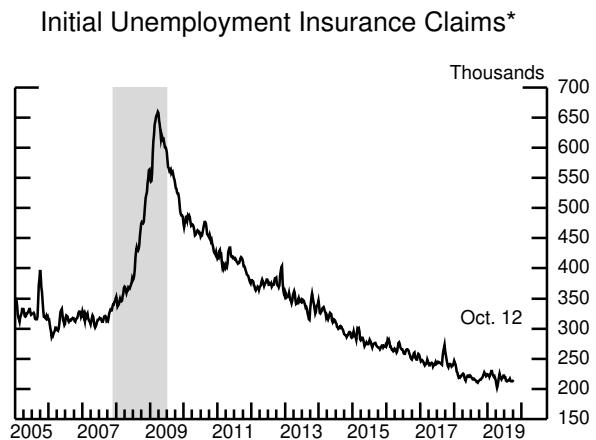
## Labor Market Developments and Outlook (2)



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

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

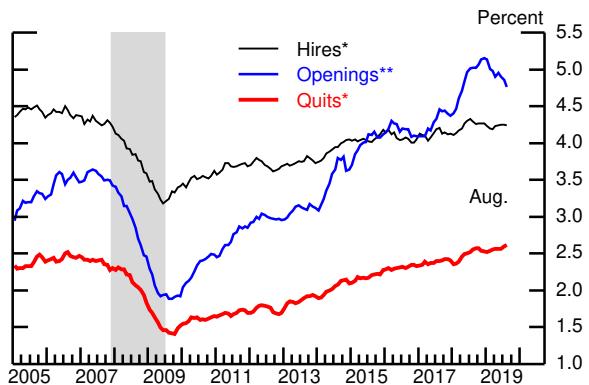
Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.



\* 4-week moving average.

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

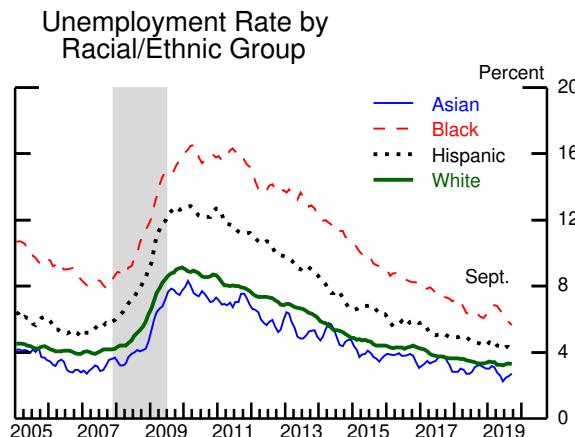
### Hires, Quits, and Job Openings



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

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

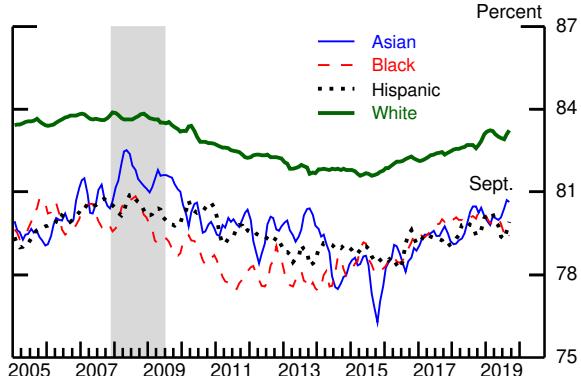
Source: Job Openings and Labor Turnover Survey.



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



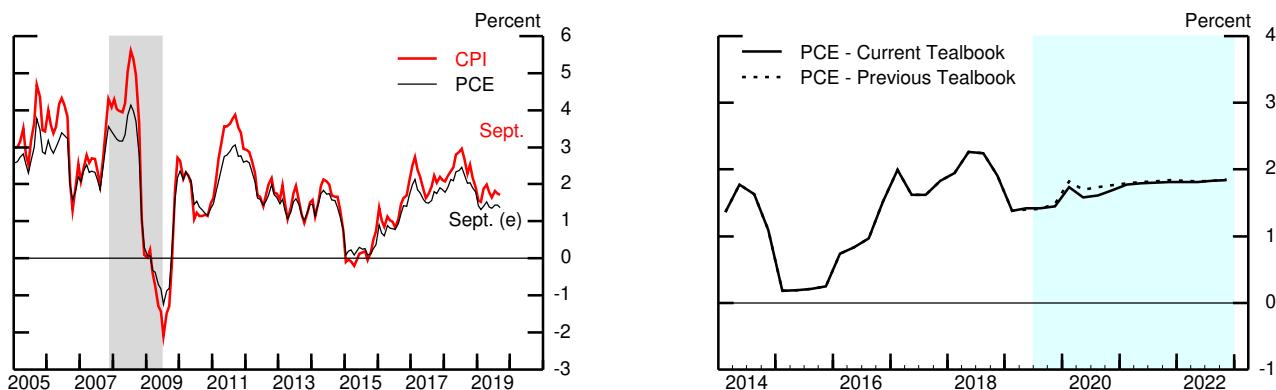
Note: These categories are not mutually exclusive, as the ethnicity Hispanic may include people of any race. The Current Population Survey defines Hispanic ethnicity as those who report their origin is Mexican, Puerto Rican, Cuban, Central American, or South American (and some others). 3-month moving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

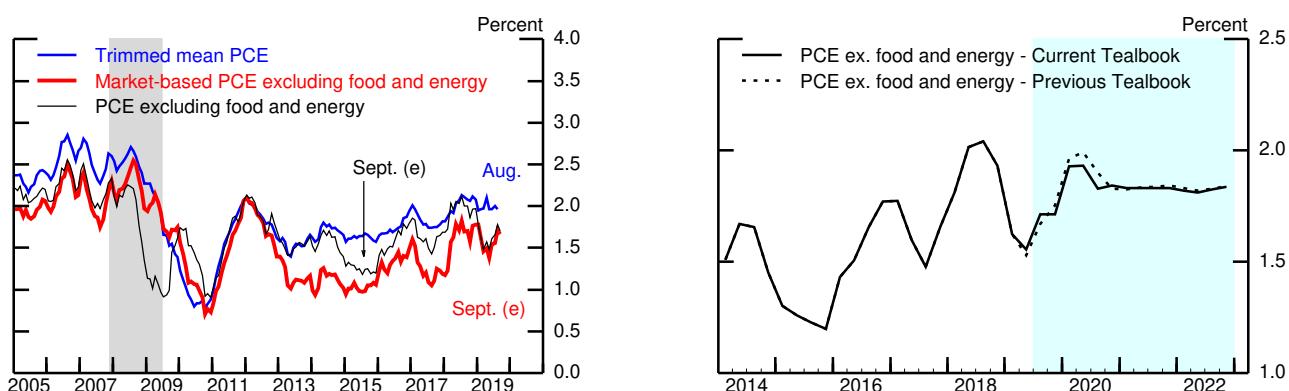
### Headline Consumer Price Inflation



Note: PCE prices from August to September 2019 are staff estimates (e).

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

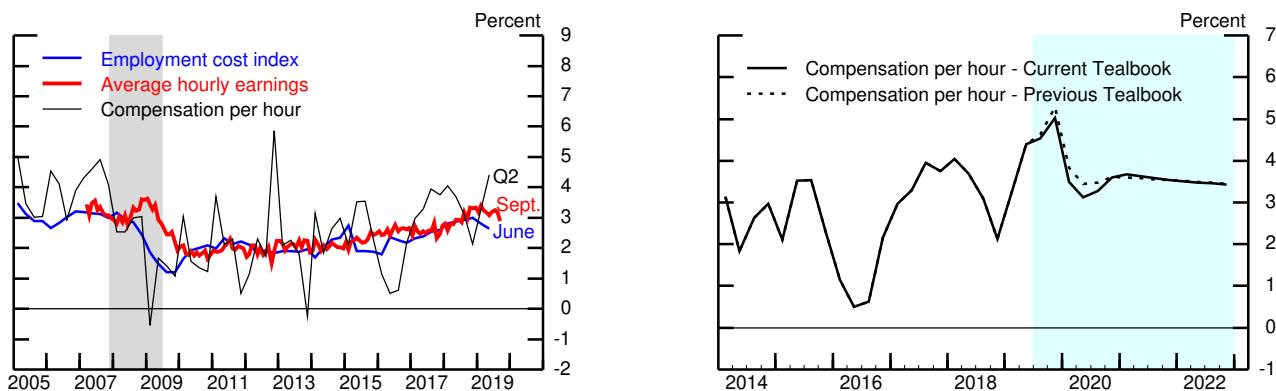
### Measures of Core PCE Price Inflation



Note: Core PCE prices from August to September 2019 are staff estimates (e).

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

### Labor Cost Growth



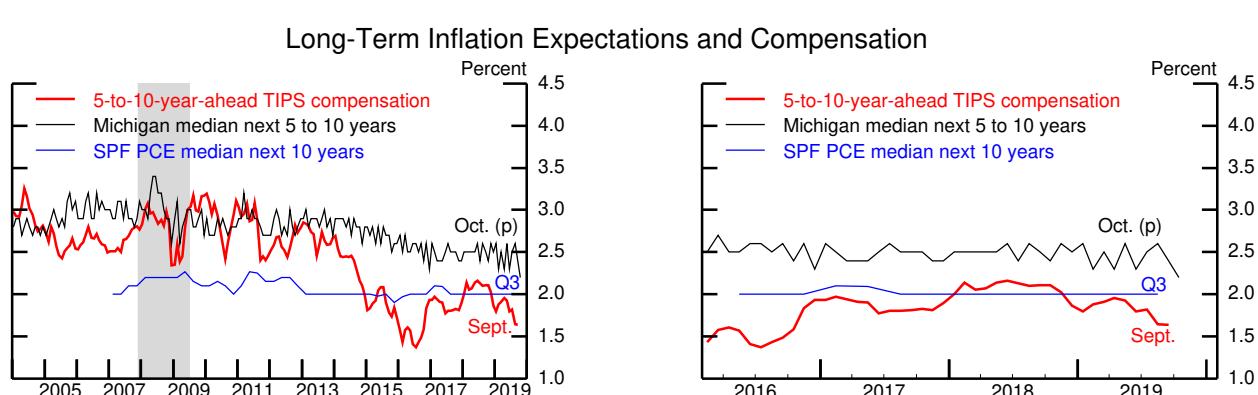
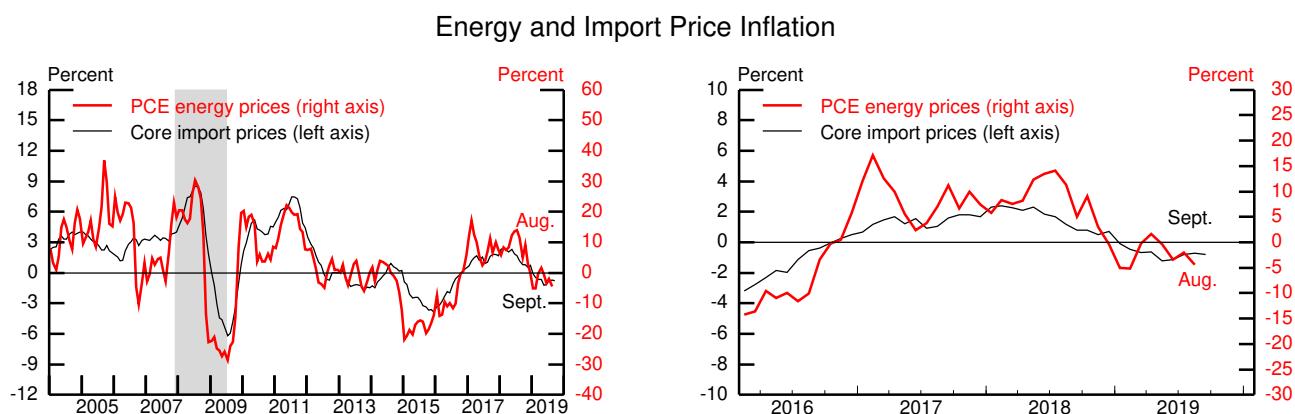
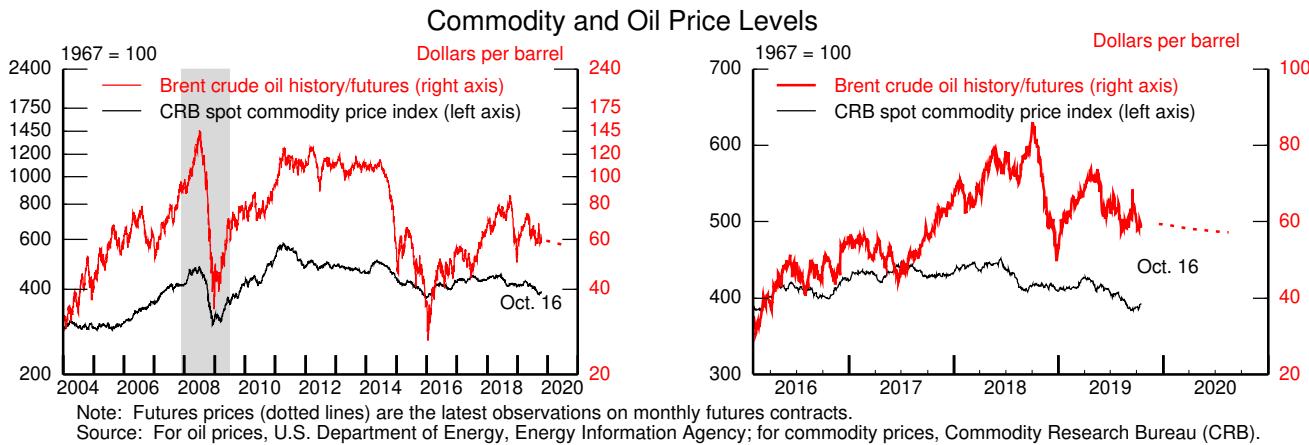
Note: Compensation per hour is for the business sector. Average hourly earnings are for the private nonfarm sector. The employment cost index is for the private sector.

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

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

## Inflation Developments and Outlook (2)

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



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

(p) Preliminary.

SPF Survey of Professional Forecasters.

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

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

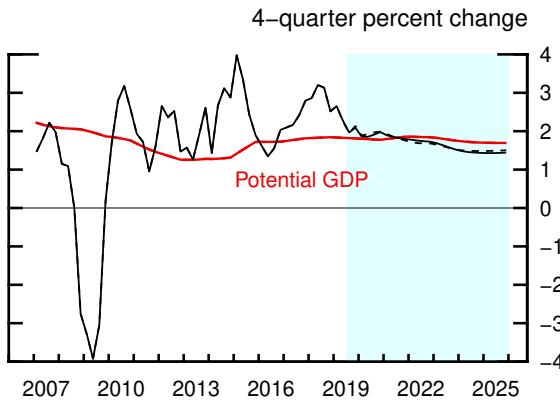
**The Long-Term Outlook**

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

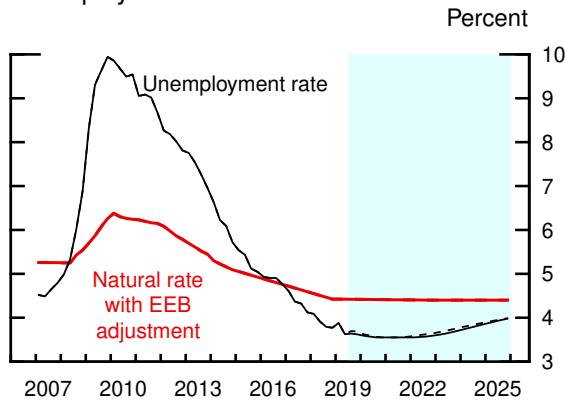
Measure	2019	2020	2021	2022	2023	2024	2025	Longer run
Real GDP Previous Tealbook	2.1	2.0	1.8	1.7	1.5	1.4	1.4	1.7
Civilian unemployment rate <sup>1</sup> Previous Tealbook	3.6	3.6	3.6	3.6	3.7	3.8	4.0	4.4
PCE prices, total Previous Tealbook	1.4	1.7	1.8	1.8	1.9	1.9	1.9	2.0
Core PCE prices Previous Tealbook	1.7	1.8	1.8	1.8	1.9	1.9	1.9	2.0
Federal funds rate <sup>1</sup> Previous Tealbook	1.89	2.19	2.36	2.45	2.50	2.53	2.54	2.50
10-year Treasury yield <sup>1</sup> Previous Tealbook	1.7	2.2	2.6	2.8	2.8	2.9	2.9	3.0

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

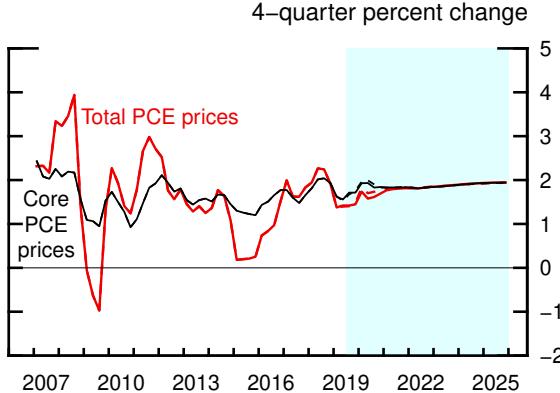
Real GDP



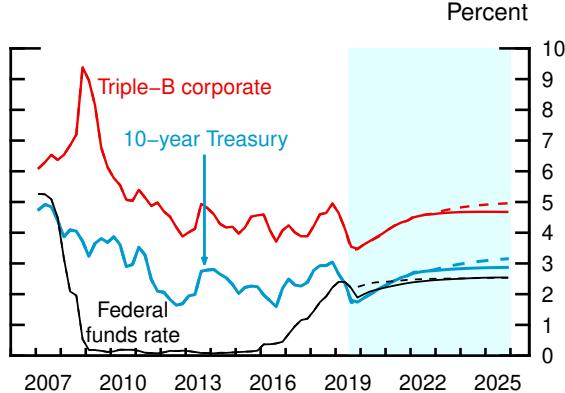
Unemployment Rate



PCE Prices



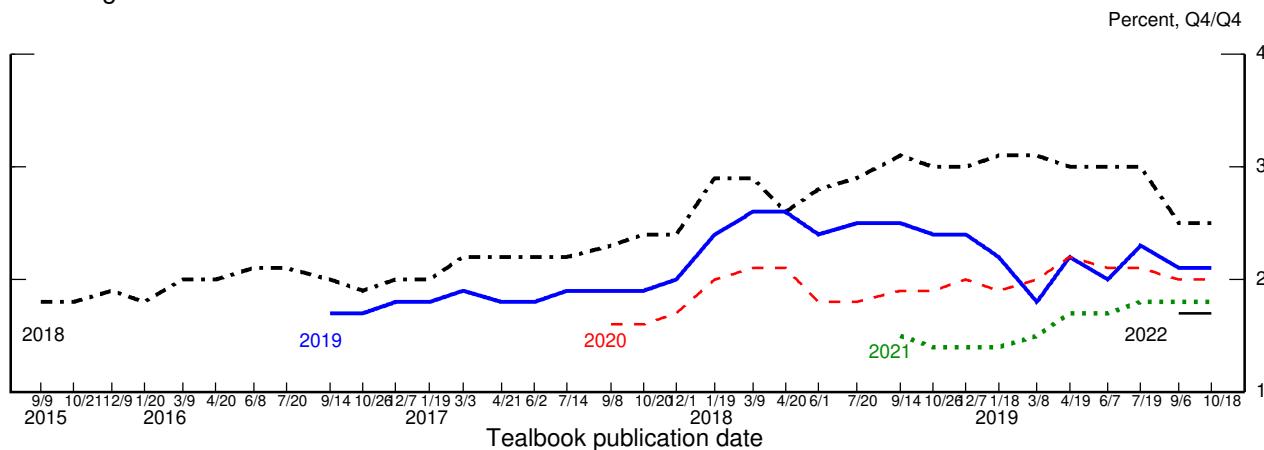
Interest Rates



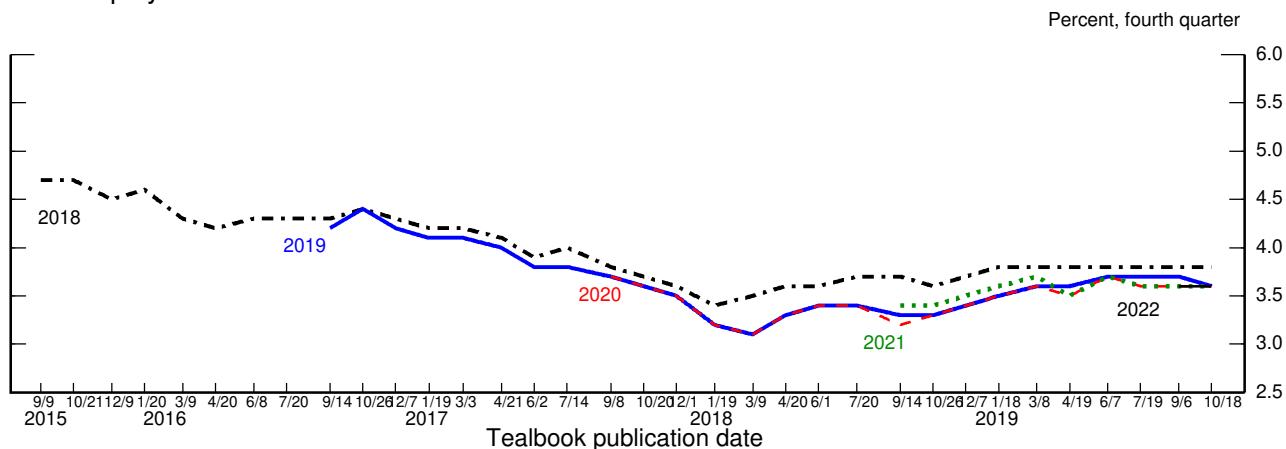
Note: In each panel, shading represents the projection period, and dashed lines are the previous Tealbook.

## Evolution of the Staff Forecast

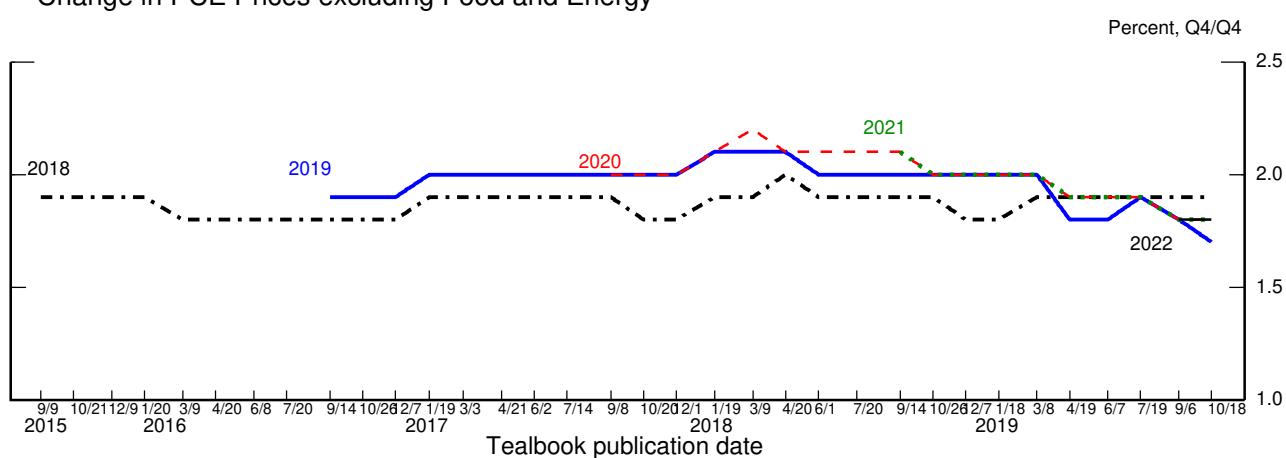
Change in Real GDP



Unemployment Rate



Change in PCE Prices excluding Food and Energy



## The Downturn in the Global Automobile Industry

Global production of motor vehicles, the blue line in figure 1, declined last year for the first time since the Global Financial Crisis and is projected to contract even more sharply this year, contributing to the observed weakness in global manufacturing (the red line). Vehicles account for 9 percent of global manufacturing, which implies that the (expected) decline in motor vehicle production over 2018 and 2019 is directly lowering global manufacturing output by about 0.6 percent. Moreover, declines in motor vehicle production have large, negative spillovers to other manufacturing sectors, including motor vehicle parts, primary metals (for example, steel and aluminum), and fabricated metals. In this discussion, we argue that three key factors appear to be behind the downturn in the global automobile industry: regulatory factors that have limited production in Europe, cyclical factors reflecting the slowing of global GDP, and China-specific credit and tax policies.

In Europe, as reported in past Tealbooks, the production of vehicles has been, in part, depressed by regulatory factors. In September 2018, the European Union (EU) implemented new emissions tests with tougher standards. The large number of models subjected to the new tests led to bottlenecks at testing agencies and caused manufacturers to cut production to avoid unwanted inventory accumulation.

Broader cyclical factors have also likely played a role in the production decline. Given that durable goods, such as motor vehicles, tend to be more cyclical than other expenditure components of GDP, the falloff in vehicle production also reflects the overall slowing in global growth since the beginning of 2018. Indeed, as illustrated in figure 2, global vehicle sales (the black line) declined nearly 5 percent over 2018 and 2019, with China, the world's largest market for automobiles, accounting for the bulk of this contraction (the red portion of bars). Sales have also been declining in Europe (blue portion), in the United States (green portion), and in the rest of the world (gray portion).

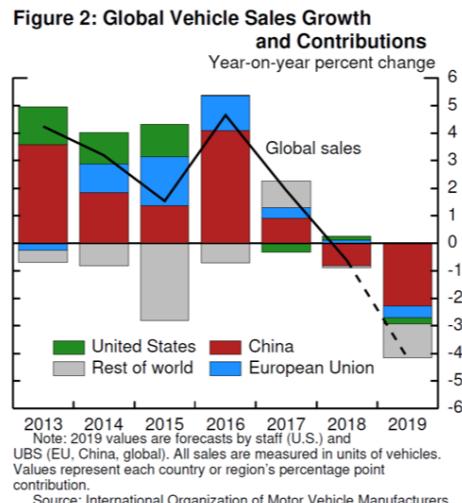
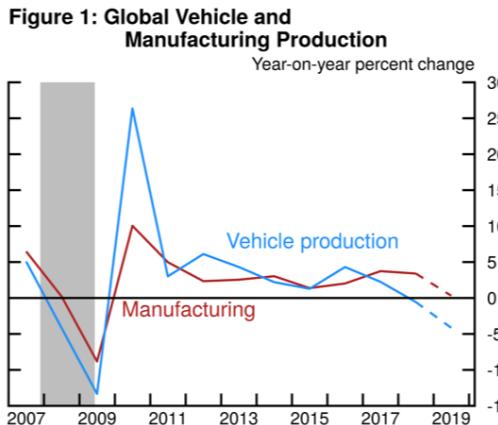
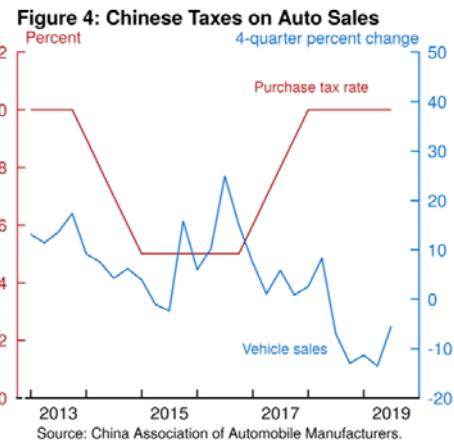
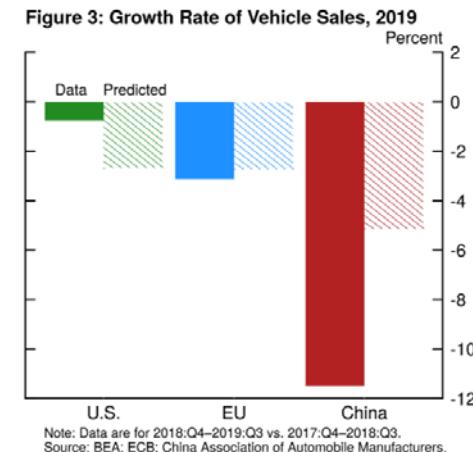


Figure 3 reports, for the United States, the EU, and China, the growth rate of vehicle sales in 2019 (full bars) and the rate predicted by a model that relates sales to real GDP growth (striped bars).<sup>1</sup> For the United States, although sales have edged down a bit, they have held up well relative to the prediction of the model, consistent with the assessment in this and recent Tealbooks that the level of U.S. auto sales has been strong. For the EU, the observed decline in sales is only a touch lower than that predicted by the model, suggesting that the region's economic malaise may well account for the bulk of the weakness in sales. For China, in contrast, the model can explain only half of the plunge in sales, indicating that other factors have been at work.

The exceptional weakness in Chinese sales likely reflects, in part, the authorities' deleveraging campaign, which tightened credit conditions and weighed substantially on household spending for durable goods. In addition, as shown in figure 4, the introduction in late 2015 and subsequent removal in 2017 and 2018 of tax breaks for the purchase of small and medium cars brought sales forward and contributed to a slump in demand when the tax breaks lapsed.<sup>2</sup>

What has been the role of tariffs? Although autos have not yet been directly hit by new tariffs, the automobile industry has likely been depressed by higher tariffs on some inputs as well as by the aggregate negative effects of rising trade policy uncertainty. For example, a recent paper showed that the incidence of Chinese retaliatory tariffs across U.S. counties has been associated with a relative decline in vehicle sales.<sup>3</sup> Moreover, as early as mid-November, the Administration could decide to impose national security tariffs on auto imports, exerting a further drag on the automobile industry. All in all, the downturn in the automobile industry appears to reflect a mix of persistent and temporary headwinds, and, as some of these wane, we expect the auto industry to stabilize, supporting the broader global manufacturing sector.



<sup>1</sup> Specifically, we fit for each country a second-order autoregressive process on the quarterly log of vehicle sales by regressing it on its own lags and contemporaneous real GDP growth. This model fits the data well, and the estimated elasticity of sales relative to growth is larger than one.

<sup>2</sup> The latest International Monetary Fund's World Economic Outlook reports that the temporary tax breaks boosted sales by as much as 7 million units in 2016 and 2017 and then lowered sales by a similar amount in 2018 and 2019.

<sup>3</sup> See Michael E. Waugh (2019), "The Consumption Response to Trade Shocks: Evidence from the U.S.–China Trade War," NBER Working Paper Series 26353 (Cambridge, Mass.: National Bureau of Economic Research, October), <https://www.nber.org/papers/w26353.pdf>.

## The Foreign GDP Outlook

Real GDP\*

Percent change, annual rate\*\*

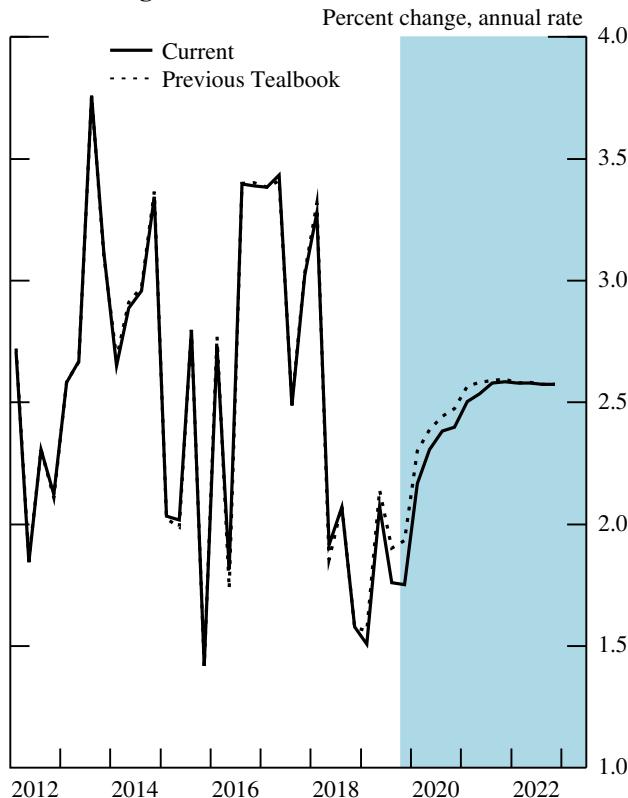
	2018	2019				2020	2021	2022
		Q1	Q2	Q3	Q4			
1. Total Foreign	2.2	1.5	2.1	1.8	1.8	2.3	2.6	2.6
<i>Previous Tealbook</i>	2.2	1.6	2.1	1.9	1.9	2.4	2.6	2.6
2. Advanced Foreign Economies	1.4	1.3	2.0	1.1	.7	1.4	1.7	1.7
<i>Previous Tealbook</i>	1.3	1.4	2.1	1.1	.8	1.4	1.7	1.7
3. Canada	1.6	.5	3.7	1.4	1.4	1.6	1.8	1.8
4. Euro Area	1.2	1.7	.8	.4	.8	1.3	1.8	1.7
5. Japan	.3	2.2	1.3	1.5	-2.8	1.0	.8	.8
6. United Kingdom	1.5	2.3	-.9	1.0	.9	.7	1.4	1.5
7. Emerging Market Economies	3.1	1.7	2.1	2.4	2.7	3.2	3.4	3.4
<i>Previous Tealbook</i>	3.1	1.8	2.2	2.7	3.0	3.3	3.5	3.4
8. China	6.4	7.3	5.5	5.5	5.7	5.6	5.7	5.6
9. Emerging Asia ex. China	3.3	2.3	2.6	2.5	2.9	3.6	3.5	3.4
10. Mexico	1.6	-1.0	.1	1.0	1.2	1.8	2.4	2.5
11. Brazil	1.1	-.3	1.8	1.1	2.3	2.3	2.8	2.8
<i>Memo</i>								
Emerging Market Economies ex. China	2.3	.4	1.3	1.7	2.0	2.6	2.9	2.9

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

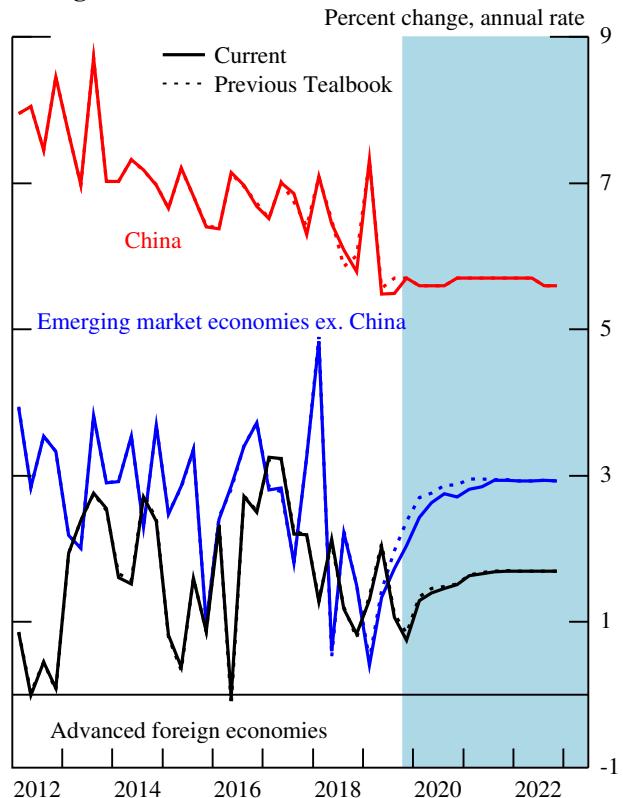
\*\* Annual data are Q4/Q4.

Int'l Econ Devel &amp; Outlook

### Total Foreign GDP



### Foreign GDP



## The Foreign Inflation Outlook

Consumer Prices\*

Percent change, annual rate\*\*

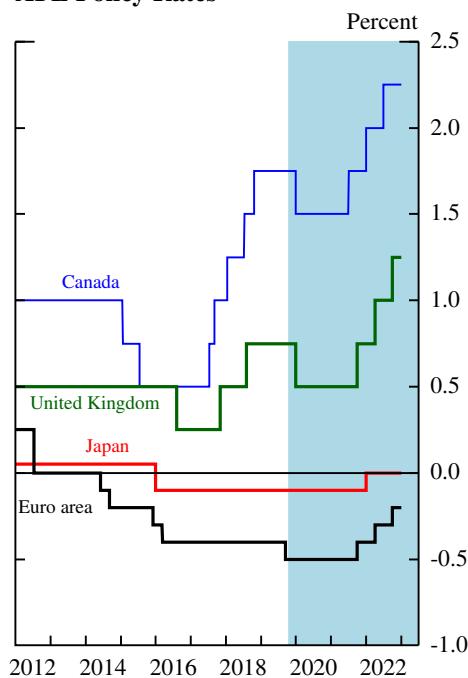
	2018	2019	Q1	Q2	Q3	Q4	2020	2021	2022
1. Total Foreign <i>Previous Tealbook</i>	2.4	.8	3.3	2.3	2.6	2.6	2.3	2.3	2.3
2. Advanced Foreign Economies <i>Previous Tealbook</i>	1.7	.8	2.1	.9	1.5	1.5	1.4	1.5	1.6
3. Canada	2.1	1.6	3.4	1.6	1.9	1.9	1.9	2.0	2.0
4. Euro Area	1.9	.2	2.1	.7	1.0	1.0	1.2	1.4	1.5
5. Japan	.8	.9	.3	.3	2.2	.9	1.0	1.1	
6. United Kingdom	2.3	1.1	2.6	1.8	1.8	1.9	1.9	1.9	
7. Emerging Market Economies <i>Previous Tealbook</i>	2.9	.8	4.1	3.2	3.3	2.9	2.9	2.8	2.8
8. China	2.2	.6	4.3	4.6	4.0	4.0	2.5	2.5	2.5
9. Emerging Asia ex. China	1.9	.2	3.1	1.2	2.5	2.5	2.8	2.7	2.7
10. Mexico	4.8	1.1	4.5	2.8	2.9	2.9	3.2	3.2	3.2
11. Brazil	4.1	2.9	5.2	2.2	2.8	2.8	3.8	3.7	3.5
<i>Memo</i> Emerging Market Economies ex. China	3.5	1.0	3.9	2.1	2.9	3.1	3.0	3.0	

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

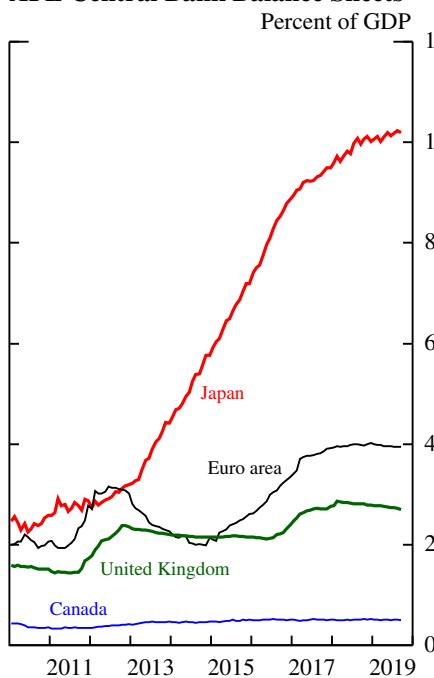
\*\* Annual data are Q4/Q4.

## Foreign Monetary Policy

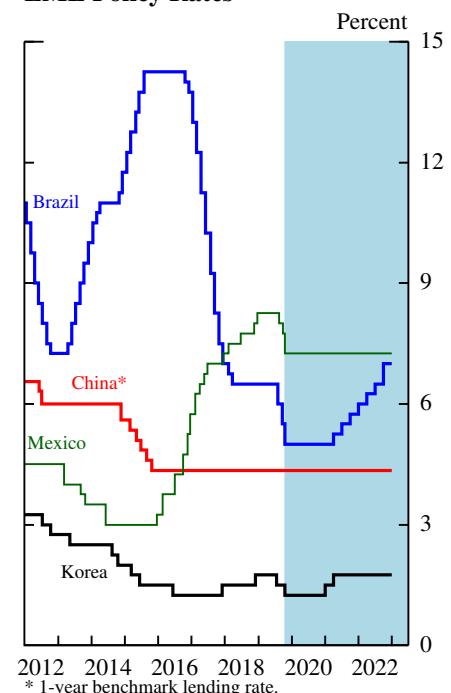
### AFE Policy Rates



### AFE Central Bank Balance Sheets

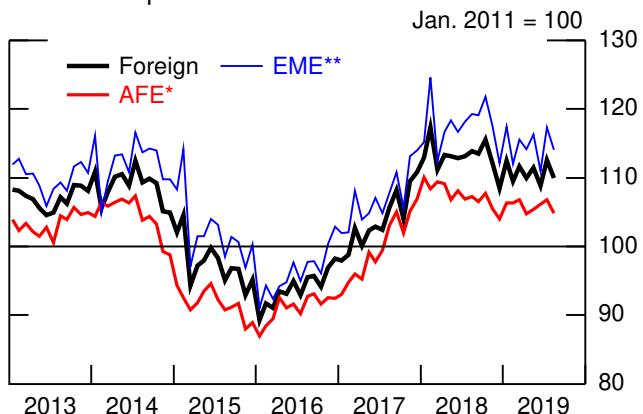


### EME Policy Rates



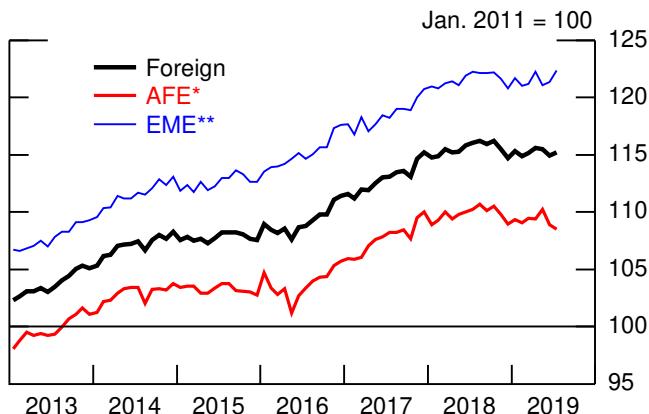
## Recent Foreign Indicators

### Nominal Exports



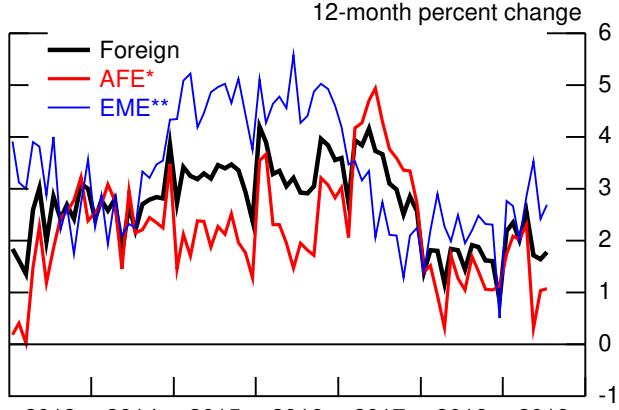
\* Includes Australia, Canada, euro area, Japan, Sweden, Switzerland, U.K.  
\*\* Includes Argentina, Brazil, Chile, China, Colombia, Hong Kong, India, Indonesia, Israel, Korea, Malaysia, Mexico, Singapore, Taiwan, Thailand.

### Industrial Production



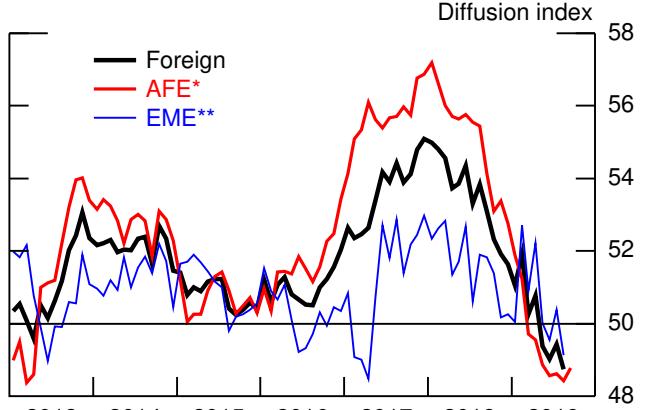
\* Includes Canada, euro area, Japan, Sweden, U.K.  
\*\* Includes Argentina, Brazil, Chile, China, Colombia, India, Indonesia, Israel, Korea, Malaysia, Mexico, Philippines, Russia, Singapore, Taiwan, Thailand.

### Retail Sales



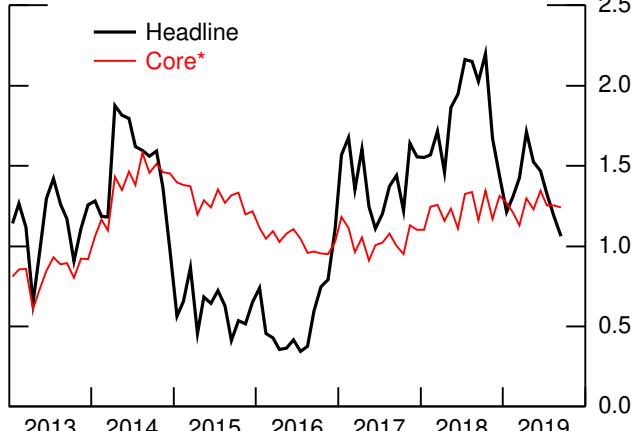
\* Includes Canada, euro area, Japan, Sweden, Switzerland, U.K.  
\*\* Includes Brazil, Chile, China, Korea, Mexico, Singapore, Taiwan.

### Manufacturing PMI



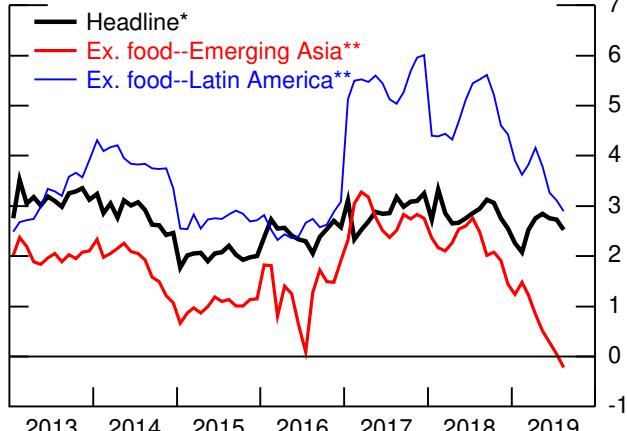
\* Includes Australia, Canada, euro area, Japan, Sweden, Switzerland, U.K.  
\*\* Includes Brazil, China, India, Indonesia, Israel, Korea, Mexico, Russia, Singapore, Taiwan, Turkey.

### Consumer Prices: Advanced Foreign Economies



Note: Includes Canada, euro area, Japan, U.K.  
\* Excludes all food and energy; staff calculation.  
Source: Haver Analytics.

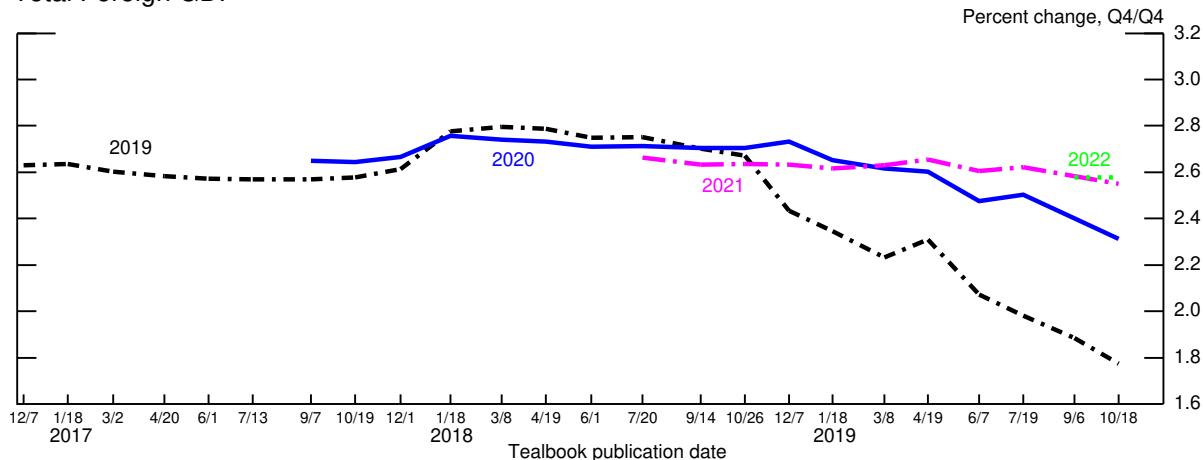
### Consumer Prices: Emerging Market Economies



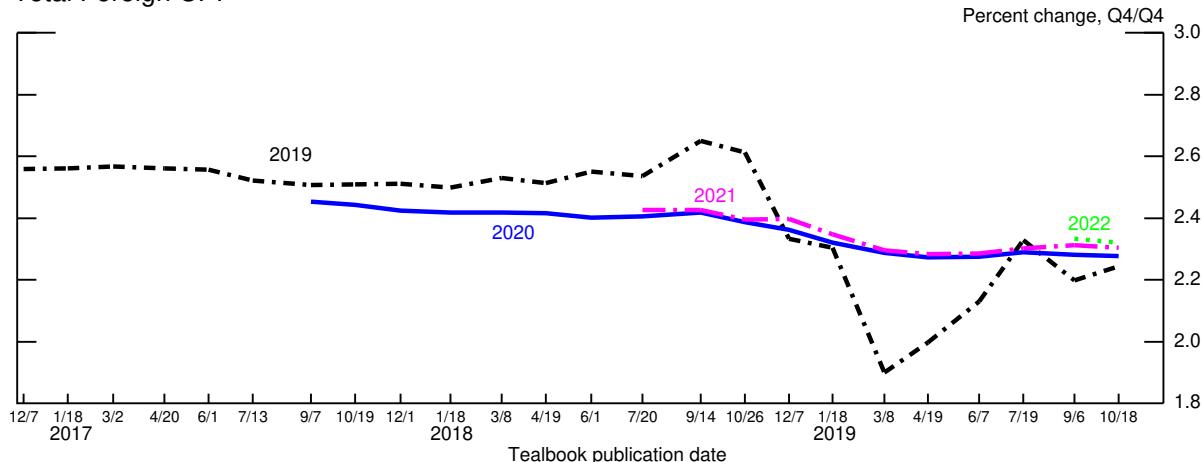
\* Includes Brazil, Chile, China, Colombia, Hong Kong, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Singapore, Taiwan, Thailand.  
\*\* Excludes all food; staff calculation. Latin America excludes Argentina and Venezuela.

## Evolution of Staff's International Forecast

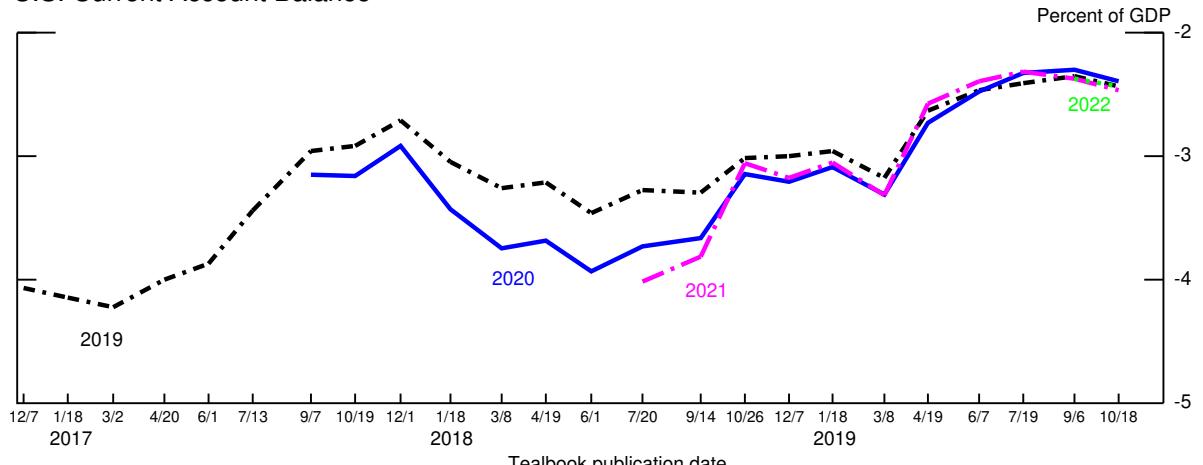
Total Foreign GDP



Total Foreign CPI

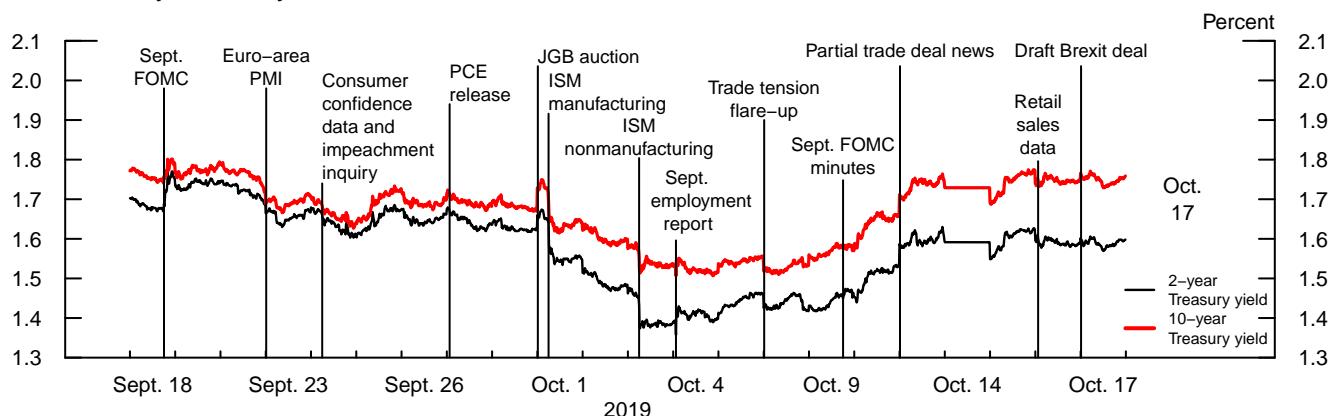


U.S. Current Account Balance



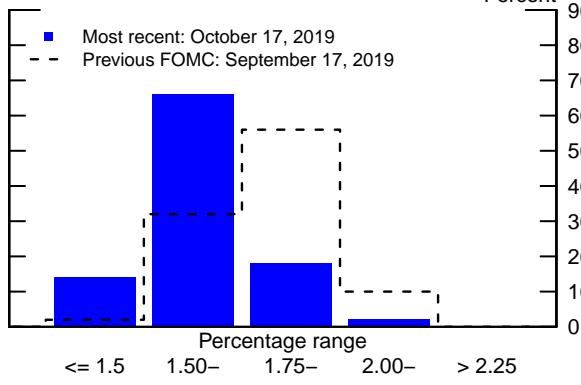
## Policy Expectations and Treasury Yields

### Intraday Treasury Yields



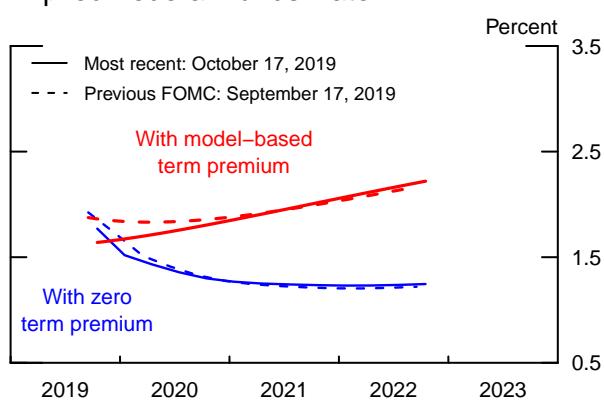
Note: Data are spaced at 5-minute intervals from 8:00 a.m. to 4:00 p.m.  
Source: Bloomberg.

### Market-Implied Probability Distribution of the Federal Funds Rate in Nov. 2019



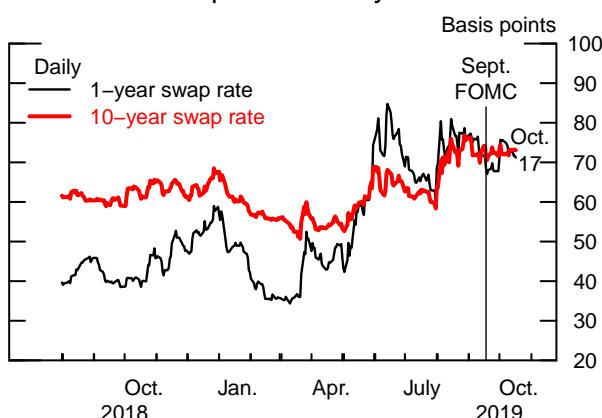
Note: Estimated from federal funds futures options, not adjusted for risk premiums.  
Source: CME Group; Board staff calculations.

### Implied Federal Funds Rate



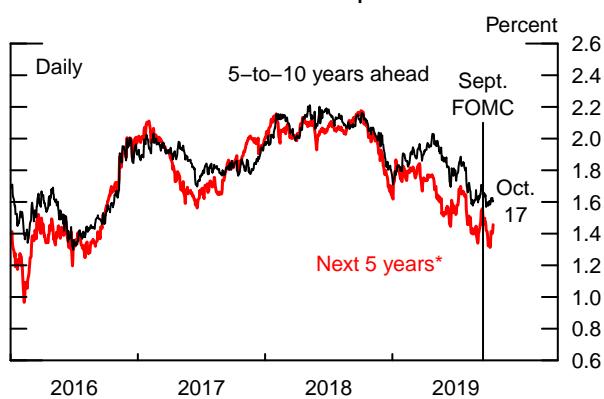
Note: Zero term premium path is estimated using overnight index swap quotes with a spline approach and a term premium of 0 basis points.  
Model-based term premium path is estimated using a term structure model maintained by Board staff and corrects for term premiums.  
Source: Bloomberg; Board staff calculations.

### Measures of Implied Volatility



Note: Implied volatility on the 1-year and 10-year swap rate 6 months ahead is derived from swaptions.  
Source: Barclays.

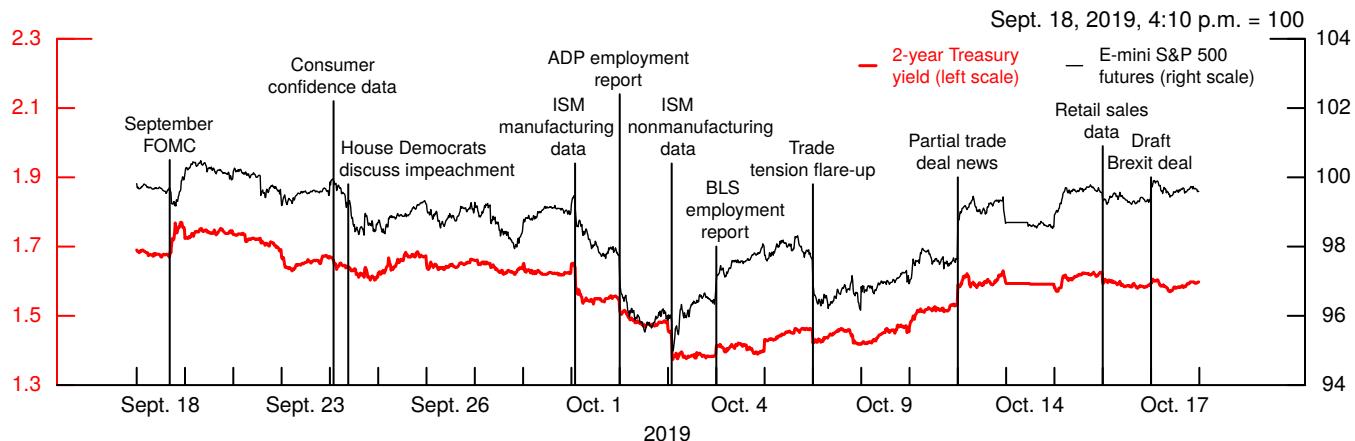
### TIPS-Based Inflation Compensation



Note: Estimates based on smoothed nominal and inflation-indexed Treasury yield curves.  
\* Adjusted for lagged indexation of Treasury Inflation-Protected Securities (TIPS) (carry effect).  
Source: Federal Reserve Bank of New York; Board staff calculations.

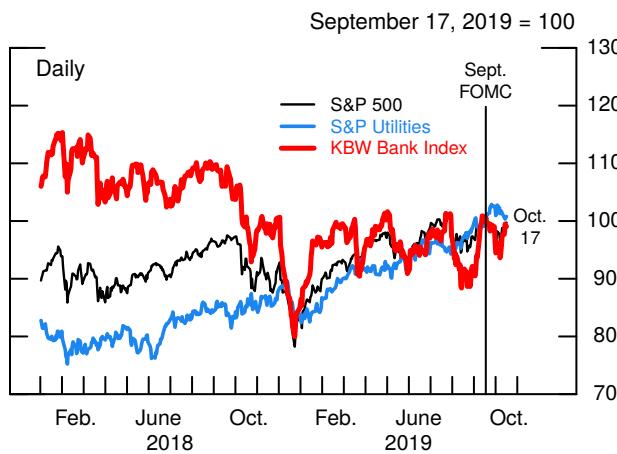
## Corporate Asset Market Developments

### Intraday S&P 500 Futures and 2-Year Treasury Yield



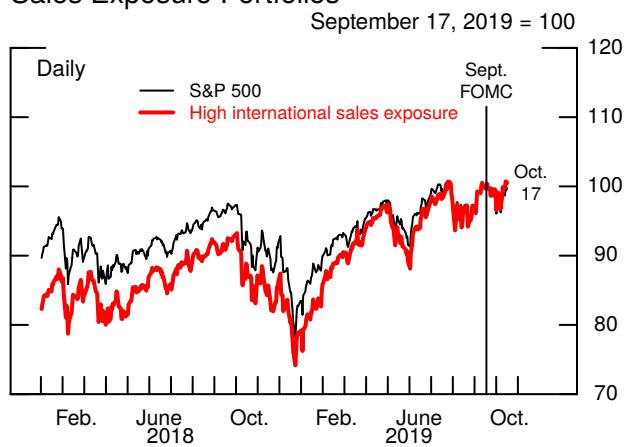
Note: Data are spaced at 5-minute intervals from 9:30 a.m. to 4:10 p.m.  
Source: Bloomberg.

### Selected S&P 500 Stock Price Indexes



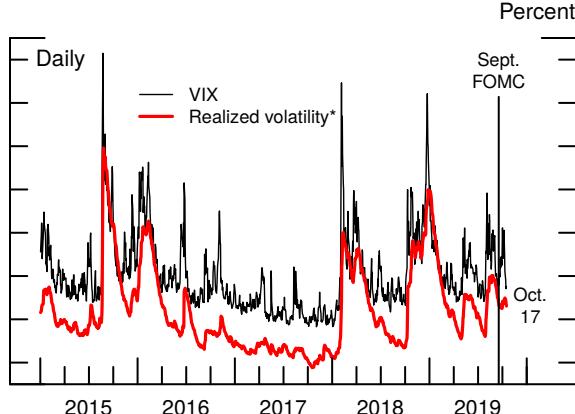
Source: Bloomberg.

### S&P 500 Index and International Sales Exposure Portfolios



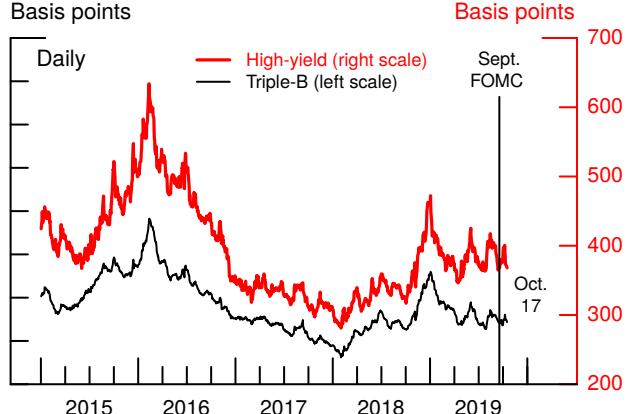
Note: China exposure is measured based on Board staff calculations of stock price sensitivity to the ASHR China A-Shares exchange-traded fund.  
Source: Bloomberg; Compustat; Yahoo Finance.

### S&P 500 Volatility



\* 5-minute returns used in exponentially weighted moving average with 75 percent of weight distributed over the most recent 20 days.  
Source: Bloomberg.

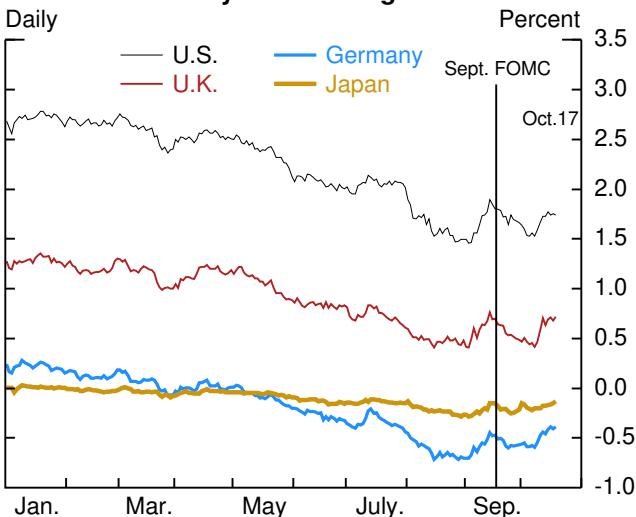
### 10-Year Corporate Bond Spreads



Note: Spreads over 10-year Treasury yield.  
Source: Merrill Lynch; Federal Reserve Bank of New York; Board staff calculations.

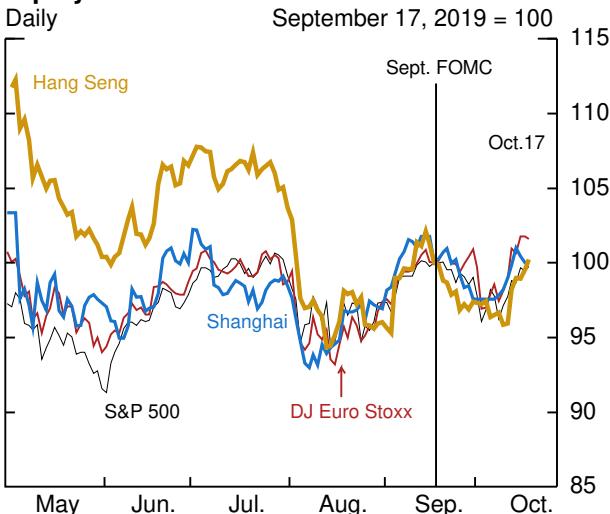
## Foreign Developments

### U.S. and AFE 10-year Sovereign Yields



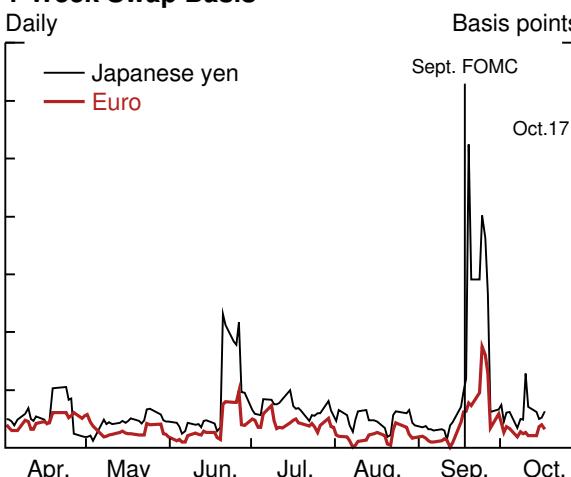
Source: Bloomberg.

### Equity Indexes



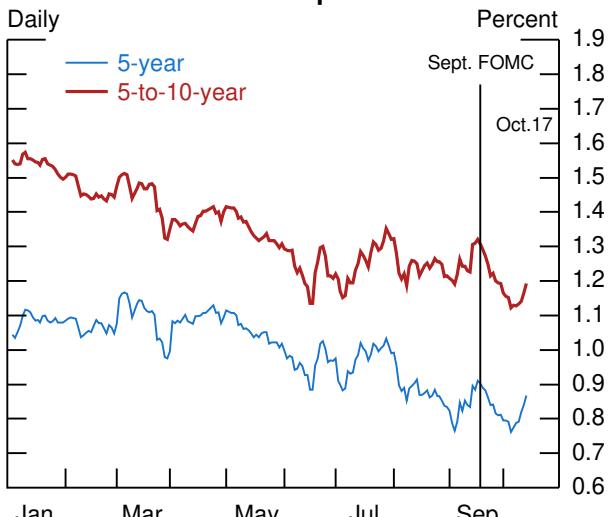
Note: Indexes denominated in local currency.  
Source: Bloomberg.

### 1-Week Swap Basis



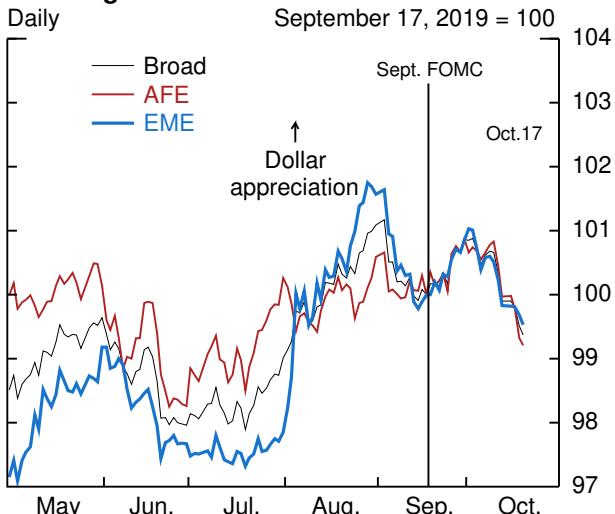
Note: The FX swap basis is the implied dollar borrowing rate less the dollar borrowing rate in the cash market.

### Euro-Area Inflation Compensation



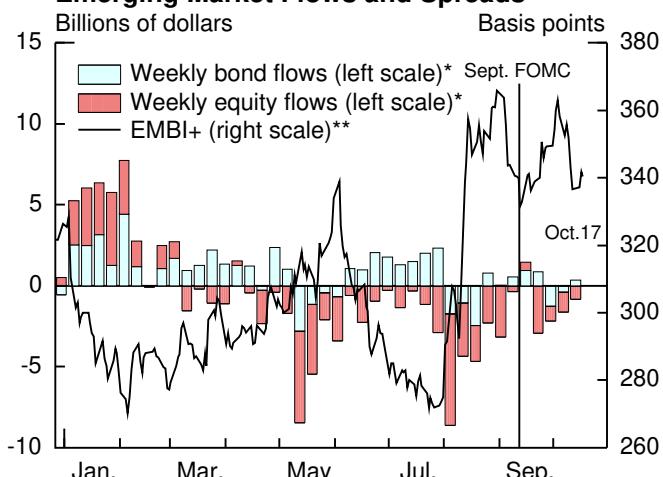
Source: Zero-coupon inflation swaps.

### Exchange Rates



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

### Emerging Market Flows and Spreads



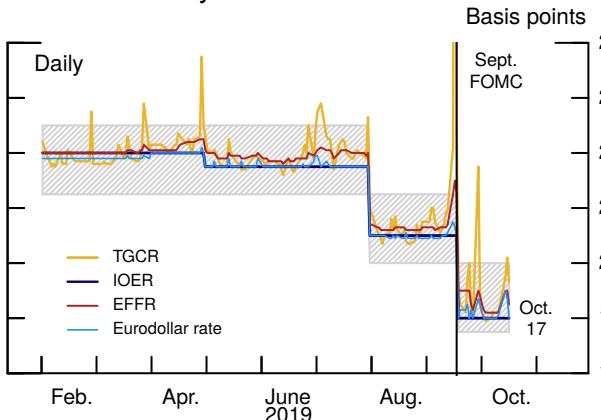
Note: EMBI+ refers to emerging market bond spreads to Treasury securities.  
\* Average weekly flow by month.

\*\* Excluding Venezuela.

Source: Emerging Portfolio Fund Research. Excludes intra-China flows.

## Short-Term Funding Markets

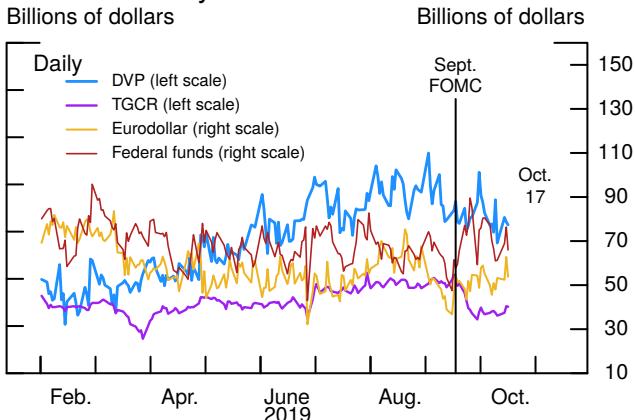
### Selected Money Market Rates



Note: These data points are not shown: TGCR: Sept. 17 = 525 basis points. Shaded area is the target range for the federal funds rate. IOER is interest on excess reserves; TGCR is triparty general collateral rate.

Source: Federal Reserve Board, Form FR 2420, Report of Selected Money Market Rates.

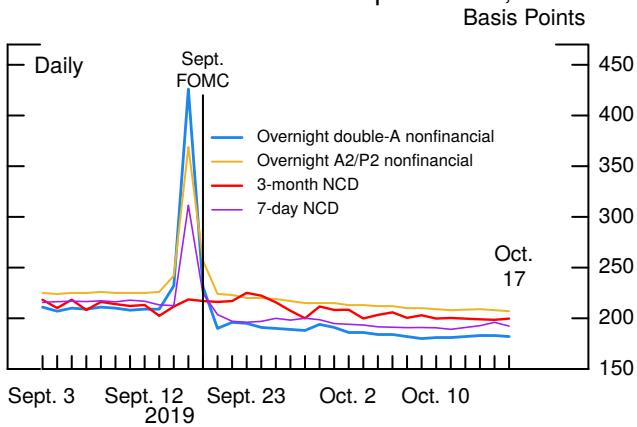
### Selected Money Market Volumes



Note: DVP is delivery-versus-payment repo; TGCR is triparty general collateral rate.

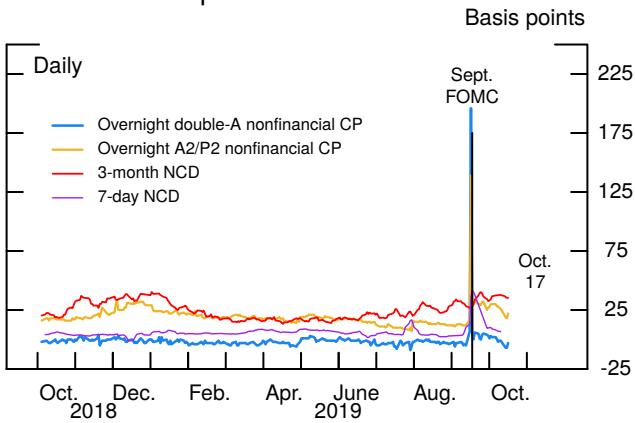
Source: Federal Reserve Bank of New York; Federal Reserve Board.

### CP and NCD Rates since September 1, 2019



Note: CP is commercial paper; NCD is negotiable certificate of deposit.  
Source: Depository Trust & Clearing Corporation.

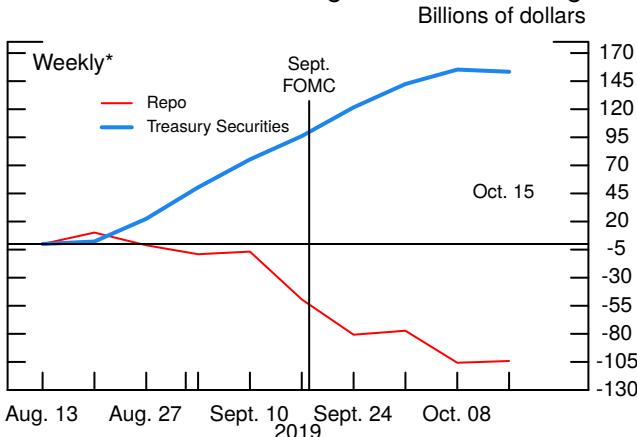
### CP and NCD Spreads



Note: CP is commercial paper; NCD is negotiable certificate of deposit. Overnight CP spreads are to the effective federal funds rate and NCD spreads to overnight index swap. NCD spreads are 5-day moving averages.

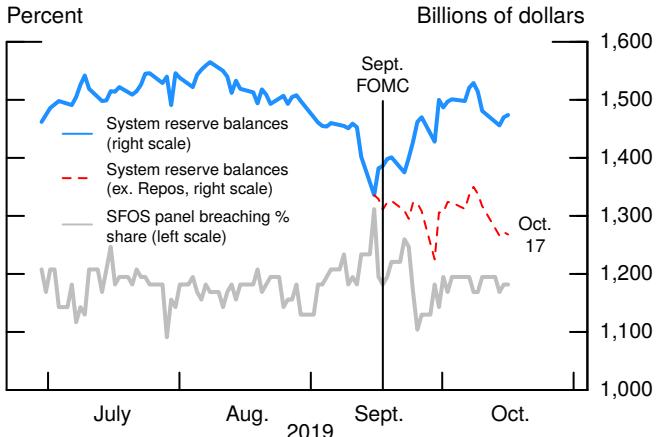
Source: Depository Trust & Clearing Corporation.

### Recent Cumulative Changes in MMF Holdings

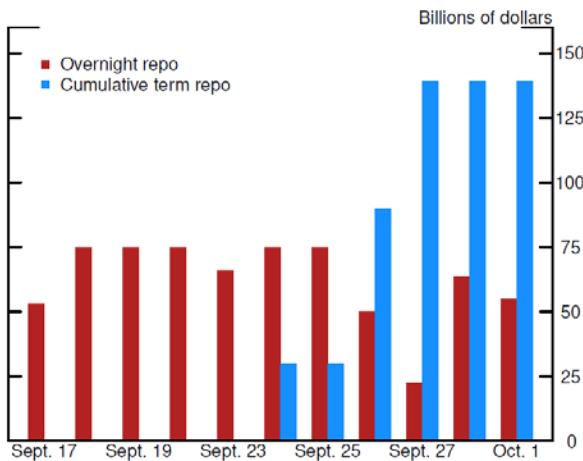


\* Data are for holdings as of Tuesday of each week.  
Source: iMoneyNet.

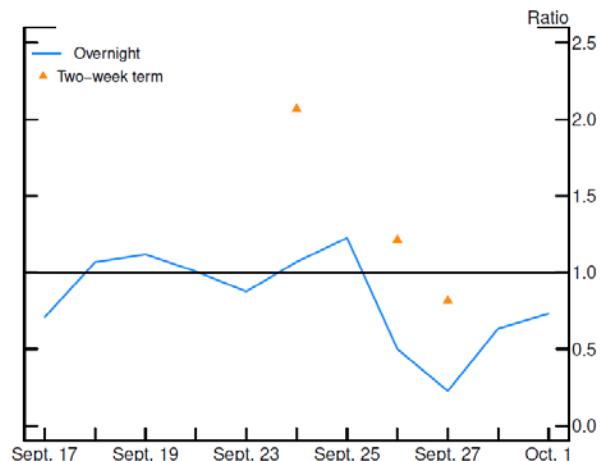
### Reserve Balances and SFOS LCLoR Breaches



Note: SFOS is senior financial officer survey; LCLoR is lowest comfortable level of reserves; repos are repurchase agreements.  
Source: Reserve balances data are from NRBL; LCLoR data are from SFOS.

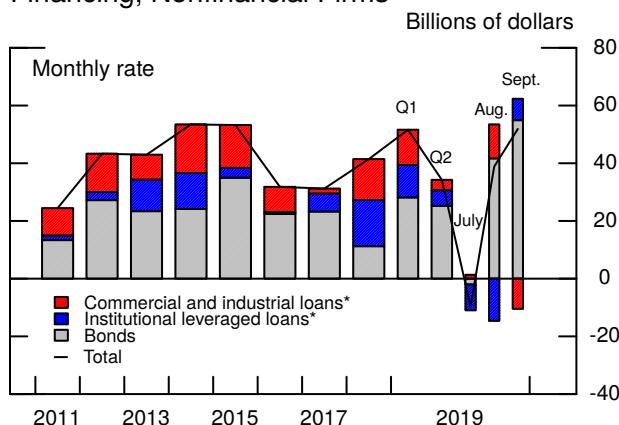
**Figure 1: Repo Operations by Maturity and Bid-to-Cover Ratios**

Note: Shows all collateral types, which includes Treasury securities, agency MBS, and agency debt.  
Source: FRBNY public release.

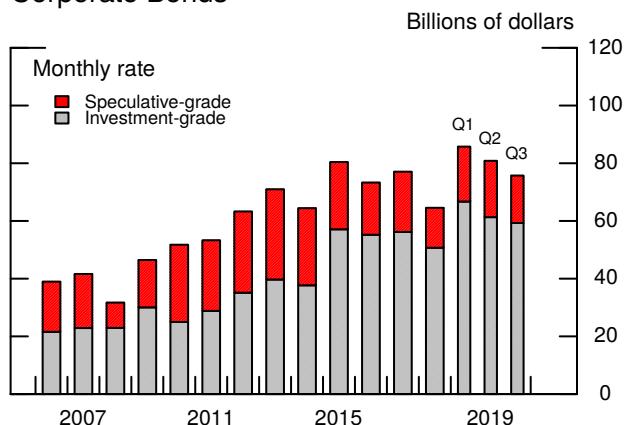


Note: The bid-to-cover ratio is defined as the total amount submitted to the Desk's repo operation divided by the total amount made available to the Desk.  
Source: FRBNY public release.

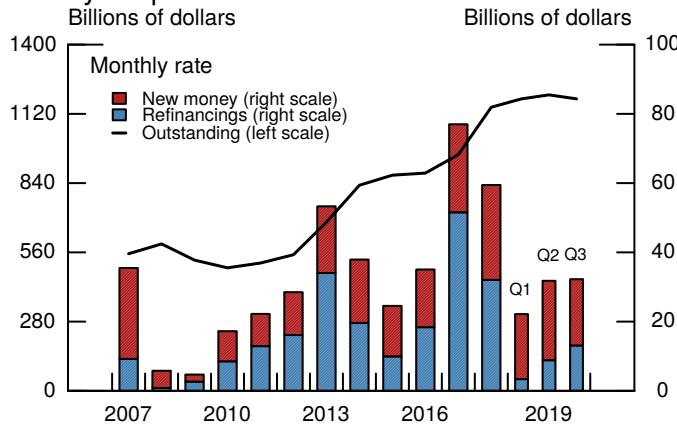
On September 17, the Desk announced and conducted its first repo operation after most repo trading had ended in the triparty market. While the operation reportedly improved market conditions, some funding pressures persisted. Subsequent operations were conducted earlier in the day. Primary dealers that participated in the September 17 Fed operation paid, on average, 5.16 percent for funding in the triparty repo market, 14 basis points less than nonprimary dealers. On September 18, primary dealers still paid an average of 7 basis points less for funding in triparty repo than did nonprimary dealers, in comparison with an average difference of 1 basis point over the previous six months. By September 19 and all dates after, the repo operation rate and the triparty repo market rate were essentially equal.

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

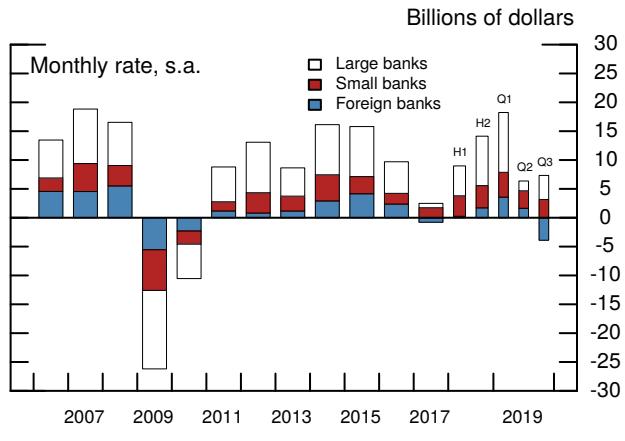
\* Period-end basis.  
Source: Mergent Fixed Income Securities Database; Thomson Reuters LPC; Federal Reserve Board.

**Gross Issuance of Nonfinancial Corporate Bonds**

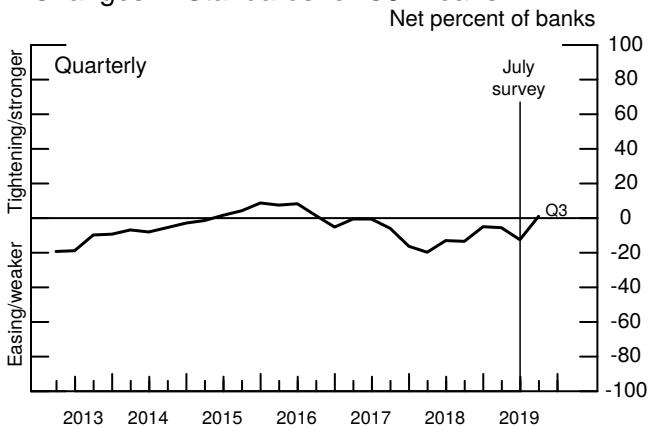
Note: Bonds are categorized by Moody's, Standard & Poor's, and Fitch.  
Source: Mergent Fixed Income Securities Database.

**Institutional Leveraged Loan Issuance, by Purpose**

Source: Thomson Reuters LPC LoanConnector.

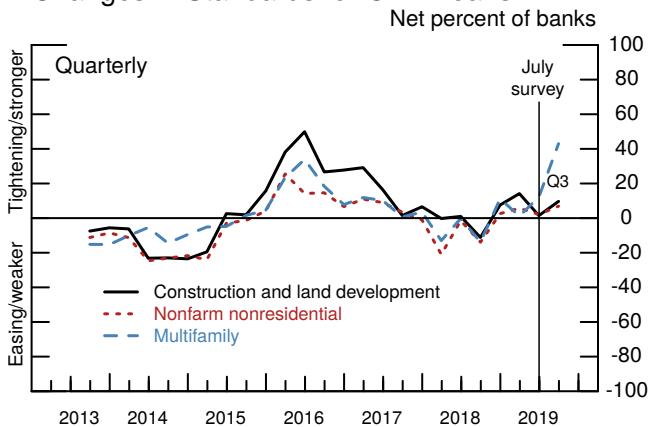
**Commercial and Industrial Loans**

Source: Federal Reserve Board 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.

**Changes in Standards for C&I Loans**

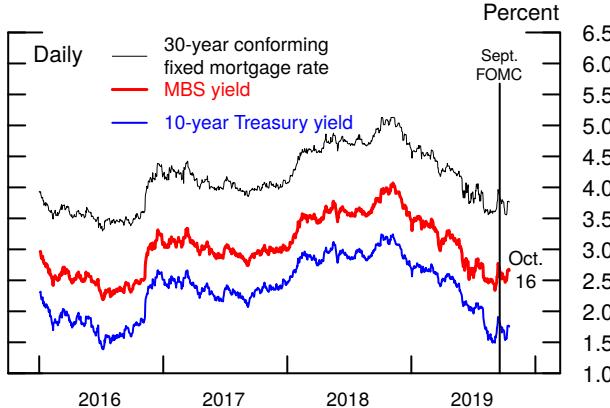
Note: Individual bank responses have been weighted by the outstanding amount of the relevant loan category on its balance sheet at the end of the previous quarter. C&I is commercial and industrial.

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

**Changes in Standards for CRE Loans**

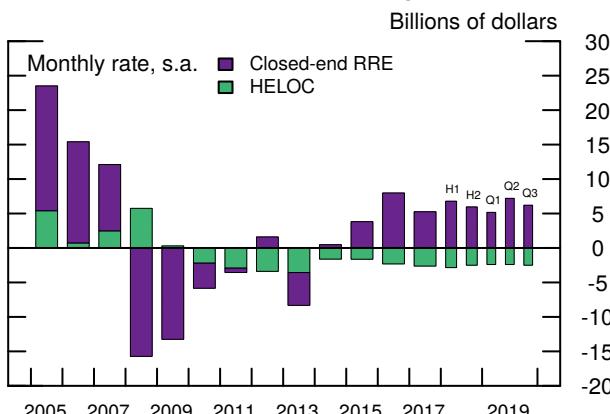
Note: Individual bank responses have been weighted by the outstanding amount of the relevant loan category on its balance sheet at the end of the previous quarter. CRE is commercial real estate.

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

**Mortgage Rate and MBS Yield**

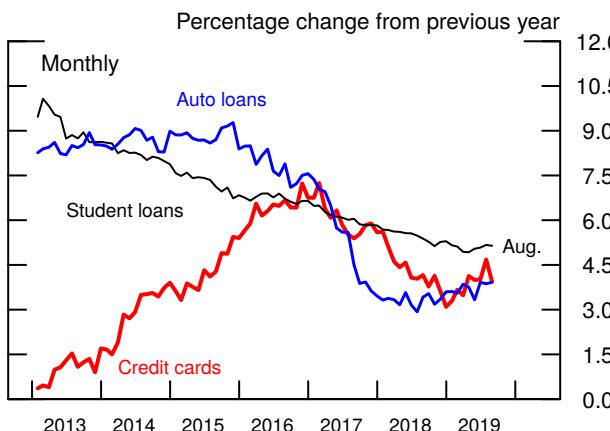
Note: Through May 31, 2019, the mortgage-backed securities (MBS) yield is the Fannie Mae 30-year current-coupon rate. From June 3, 2019, forward, the MBS yield is the uniform MBS 30-year current-coupon rate.

Source: For MBS yield, Barclays; for mortgage rate, Loansifter; for Treasury yield, Federal Reserve Bank of New York and Federal Reserve Board staff calculations.

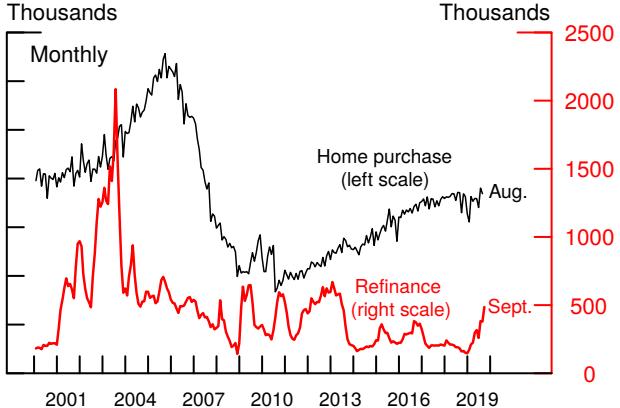
**Residential Real Estate Lending**

Note: RRE is residential real estate; HELOC is home equity lines of credit.

Source: Federal Reserve Board 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.

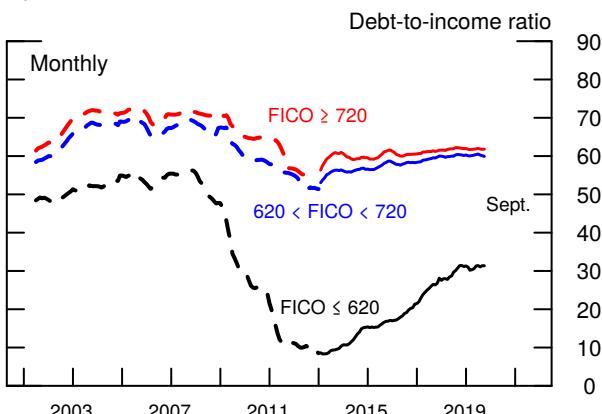
**Consumer Credit**

Source: Federal Reserve Board, Statistical Release G.19, "Consumer Credit."

**Household Finance****Purchase and Refinance Originations**

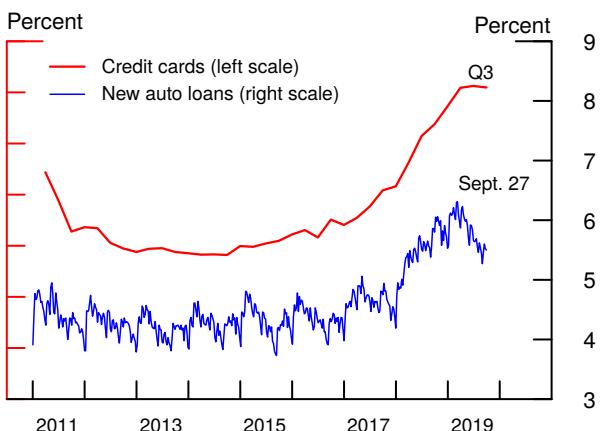
Note: The data are seasonally adjusted by Federal Reserve Board staff.

Source: For MBS yield, Barclays; for mortgage rate, Loansifter; for Treasury yield, Federal Reserve Bank of New York and Federal Reserve Board staff calculations.

**Maximum Debt-to-Income Ratio, by Credit Score**

Note: Weighted average of maximums by borrower and loan type, where types are defined by loan-to-value ratio, property location, and credit score.

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

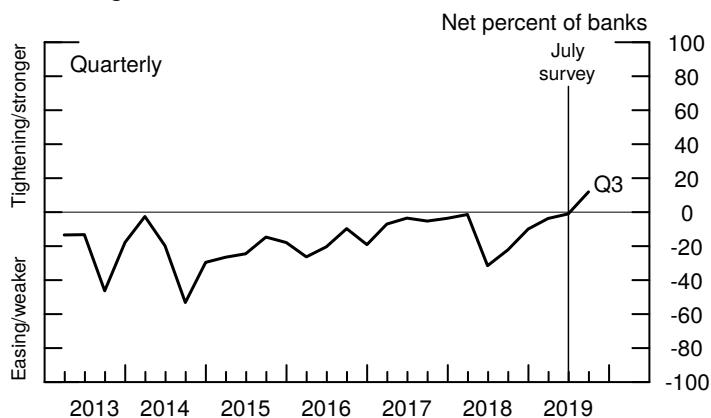
**Consumer Interest Rates**

Note: Credit card data reflect rates at commercial banks on all credit card plans; data are reported quarterly and not seasonally adjusted. Auto loans data are reported weekly and not seasonally adjusted.

Source: For credit cards, Federal Reserve Board; for auto loans, J.D. Power.

## Household Lending Standards

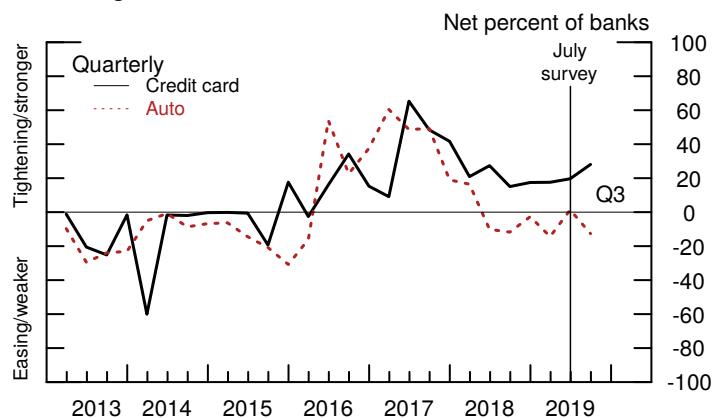
### Changes in Standards for RRE Loans



Note: Individual bank responses have been weighted by the outstanding amount of the relevant loan category on its balance sheet at the end of the previous quarter.  
RRE is residential real estate.

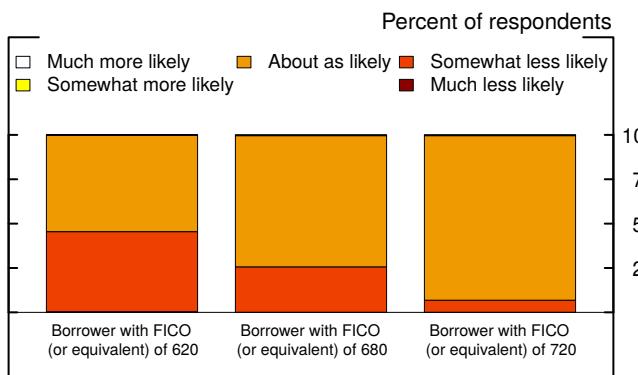
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices; Federal Reserve Board staff calculations.

### Changes in Standards for Consumer Loans



Note: Individual bank responses have been weighted by the outstanding amount of the relevant loan category on its balance sheet at the end of the previous quarter.  
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices.

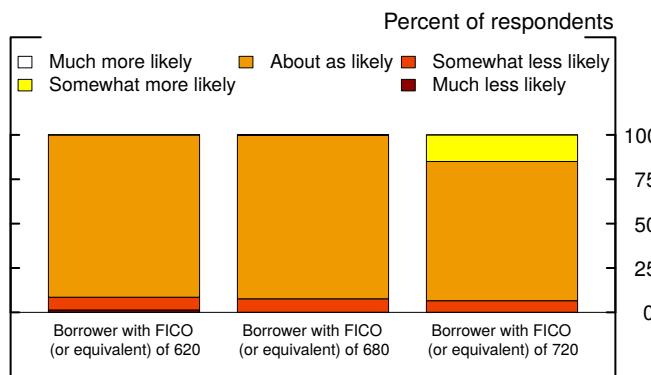
### Likelihood of Approving Credit Card Applications



Note: Likelihoods compared to beginning of year; bank responses have been weighted.

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

### Likelihood of Approving Auto Loan Applications



Note: Likelihoods compared to beginning of year; bank responses have been weighted.

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

## Appendix

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### Technical Note on Financial Conditions Indexes

The table “Overview of Selected FCIs” provides a summary of various financial conditions indexes (FCIs) that have been developed at the Federal Reserve Board and elsewhere. The historical evolution of these indexes is reported in the exhibit “Selected Financial Conditions Indexes.”

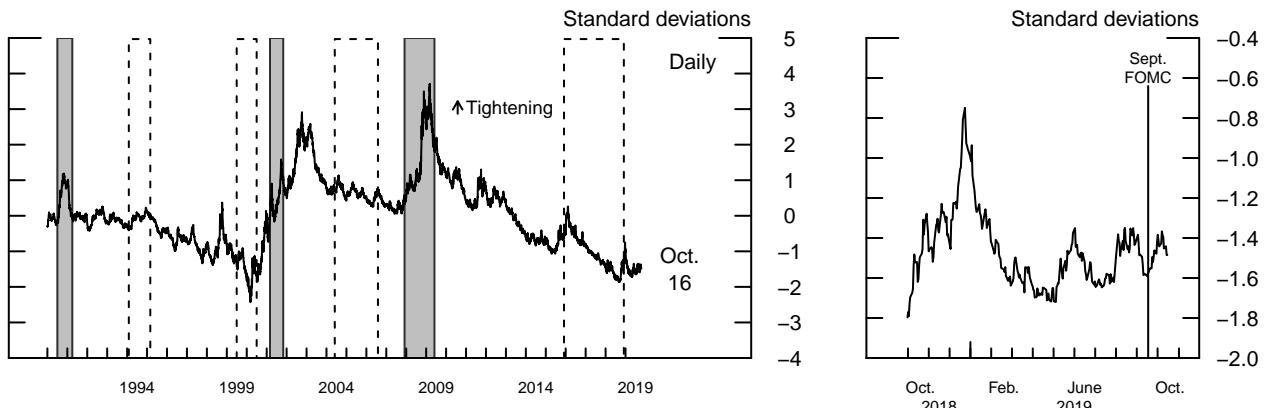
#### Overview of Selected FCIs

Index	Frequency	Sample start	Methodology	Components
Staff FCI for nonfinancial corporations	Daily	1973	Difference in equity returns between two portfolios of firms with credit ratings above and just below investment grade	Nonfinancial firms' stock returns and credit ratings; five Fama-French factors, plus momentum and quality minus junk factors
SLOOS Bank Lending Standards Index	Quarterly	1991	Weighted average of the net percentage of domestic banks tightening standards for 11 loan categories, with weights given by the size of each loan category on banks' balance sheets	Lending standards for 11 loan categories
Goldman Sachs Financial Conditions Index	Daily	1990	Weighted average of financial variables with weights pinned down by the contribution of each financial variable on real GDP growth over the following year using a VAR model	5 financial variables: the federal funds rate, the 10-year Treasury yield, the triple-B yield spreads to Treasury, the S&P price-to-earnings ratio, and the broad value of the U.S. dollar
Chicago Fed National Financial Conditions Index	Weekly	1971	Dynamic factor model	100 financial variables related to money markets (28 indicators), debt and equity markets (27 indicators), and the banking system (45 indicators)
St. Louis Fed Financial Stress Index	Weekly	1993	Principal component analysis	18 variables, including short- and long-term Treasury yields, corporate yields, money market and corporate bond spreads, bond and stock market volatility indicators, break-even inflation rate, and the S&P 500 index
Kansas City Fed Financial Stress Index	Monthly	1990	Principal component analysis	11 financial variables, including short- and long-term interest rates, corporate and consumer yield spreads, the VIX, and the volatility of bank stock prices

Source: CRSP; Yahoo Finance; Moody's Bond Ratings; Ken French website; AQR Capital Management website; Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices; Bloomberg; Federal Reserve Banks of Chicago, St. Louis, and Kansas City.

## Selected Financial Conditions Indexes

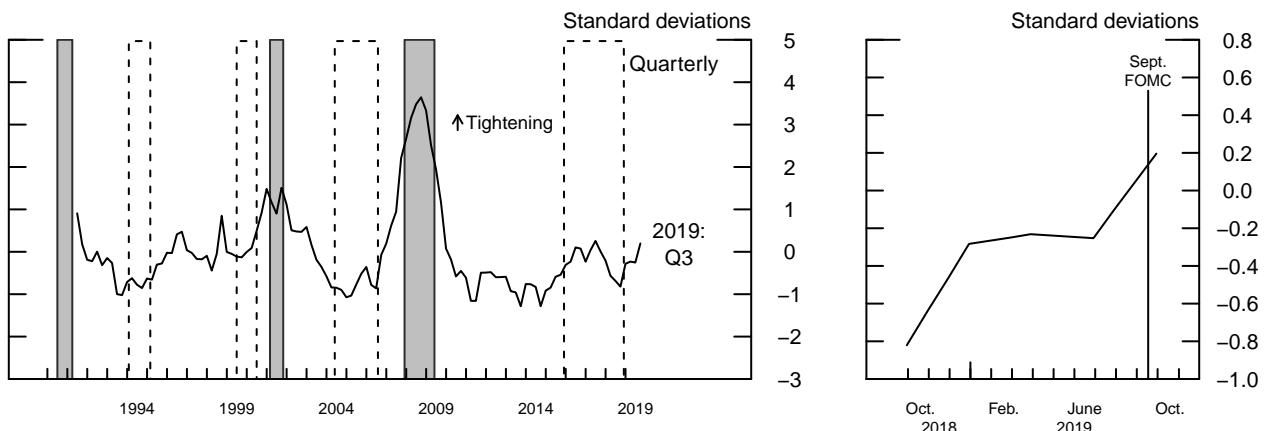
### Staff FCI for Nonfinancial Corporations



Note: The financial conditions index (FCI) is the deviation from the long-run relation between the systematic components of the cumulative log returns of 2 portfolios of firms with credit ratings above and just below investment grade. The systematic components are derived from the 5-factor Fama–French asset pricing model, augmented with the momentum and quality minus junk factors.

Source: CRSP; Yahoo Finance; Moody's Bond Ratings; Ken French website; AQR Capital Management website.

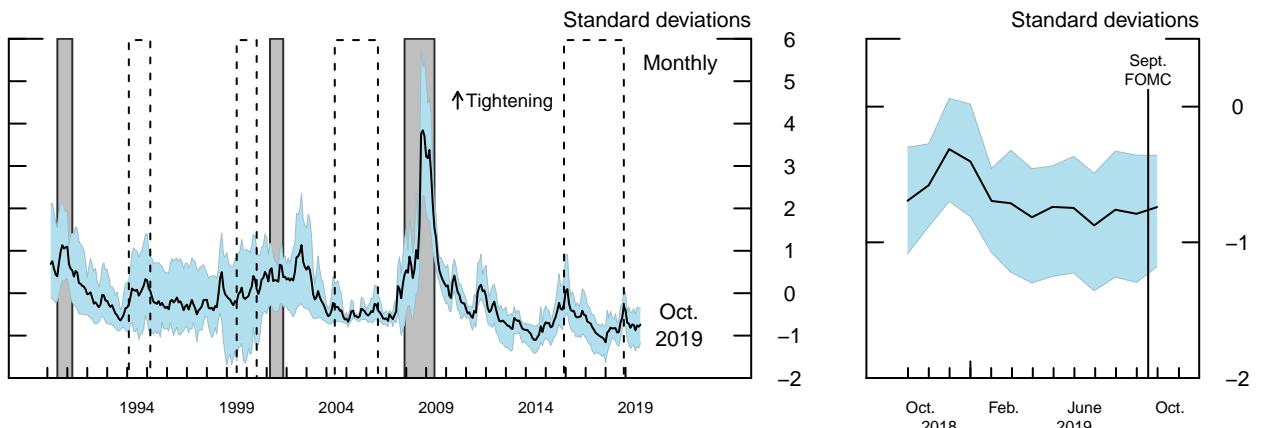
### SLOOS Bank Lending Standards Index



Note: The index is a weighted average of the net percentage of domestic banks tightening standards for 11 loan categories, with weights given by the size of each loan category on banks' balance sheets.

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

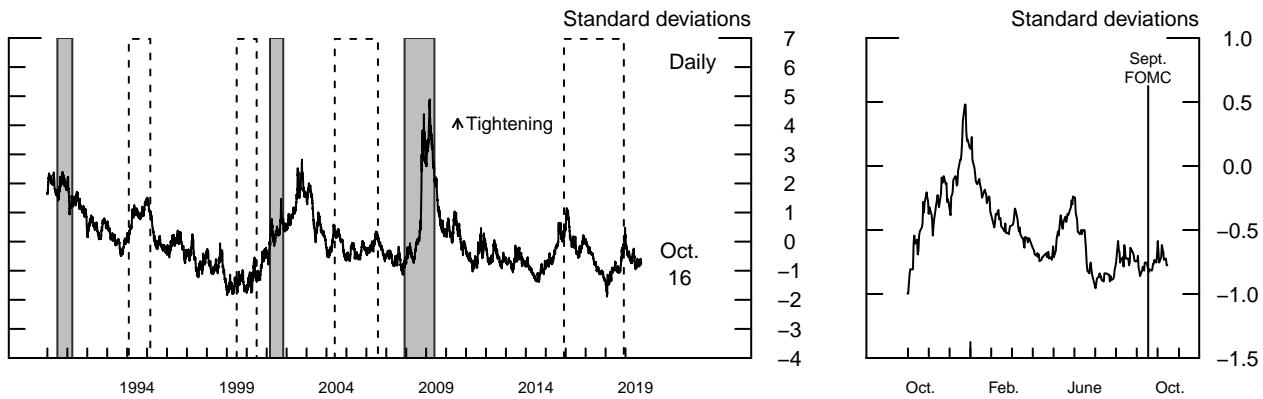
### Mean and Range of External FCIs



Note: Mean FCI represents the mean of FCIs developed by Goldman Sachs and the Federal Reserve Banks of Chicago, St. Louis, and Kansas City. The blue shaded region represents the range of these 4 standardized FCIs.

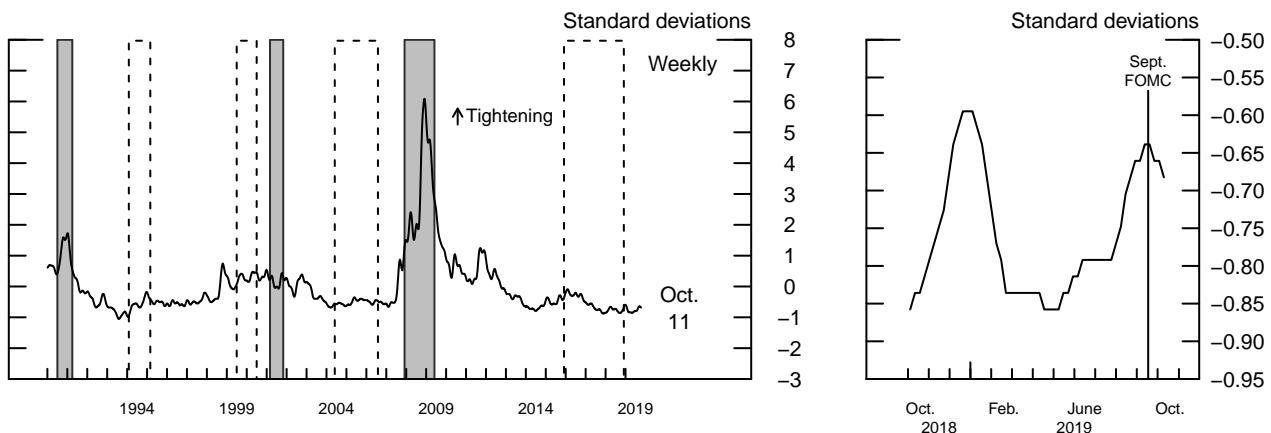
Source: Bloomberg; Federal Reserve Banks of Chicago, St. Louis, and Kansas City.

**For all panels: Indexes are standardized. Values above (below) zero represent tighter (easier) than average financial conditions. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research. The dashed boxes denote monetary policy tightening cycles.**

**Selected Financial Conditions Indexes (continued)****Goldman Sachs FCI**

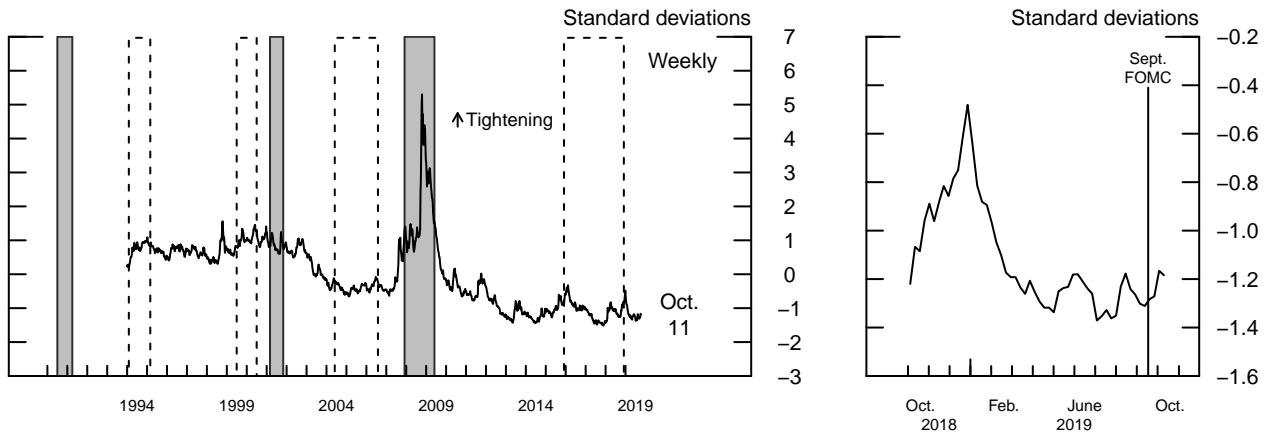
Note: The index is a weighted average of 5 financial variables: the federal funds rate, the 10-year Treasury yield, the triple-B yield spreads to Treasury, the S&P price-to-earnings ratio, and the broad value of the U.S. dollar. Weights are pinned down by the contribution of each financial variable on real gross domestic product growth over the following year using a vector autoregression model.

Source: Bloomberg.

**Chicago Fed NFCI**

Note: The index is based on 100 financial variables related to money markets (28 indicators), debt and equity markets (27 indicators), and the banking system (45 indicators). The index is weekly and is derived using a dynamic factor model.

Source: Federal Reserve Bank of Chicago.

**St. Louis Fed Financial Stress Index**

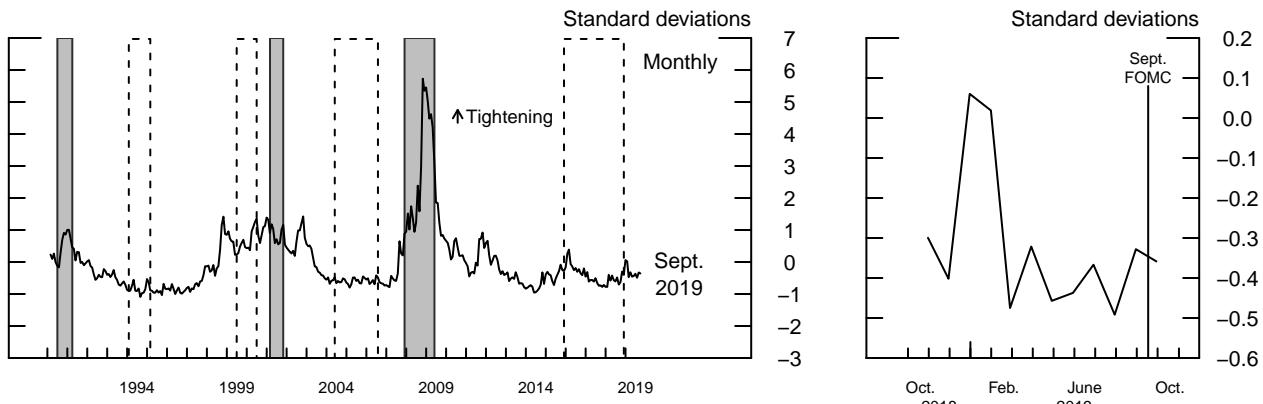
Note: The index is the principal component of 18 variables, including short- and long-term Treasury yields, corporate yields, money market and corporate bond spreads, bond and stock market volatility indicators, breakeven inflation rate, and the S&P 500 index.

Source: Federal Reserve Bank of St. Louis.

**For all panels: Indexes are standardized. Values above (below) zero represent tighter (easier) than average financial conditions. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research. The dashed boxes denote monetary policy tightening cycles.**

## Selected Financial Conditions Indexes (continued)

Kansas City Fed Financial Stress Index



Note: The index is the principal component of 11 financial variables, including short- and long-term interest rates, corporate and consumer yield spreads, the VIX, and the volatility of bank stock prices.

Source: Federal Reserve Bank of Kansas City.

**For all panels: Indexes are standardized. Values above (below) zero represent tighter (easier) than average financial conditions. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research. The dashed boxes denote monetary policy tightening cycles.**

## 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	.05	.09	.05	.09
Previous Tealbook	.04	.05	.05	.08
<i>Between 1 3/4 and 2 1/4 percent</i>				
Current Tealbook	.20	.23	.36	.24
Previous Tealbook	.24	.27	.38	.25
<i>Less than 1 percent</i>				
Current Tealbook	.25	.16	.00	.14
Previous Tealbook	.17	.13	.00	.14

### Probability of Unemployment Events

(4 quarters ahead)

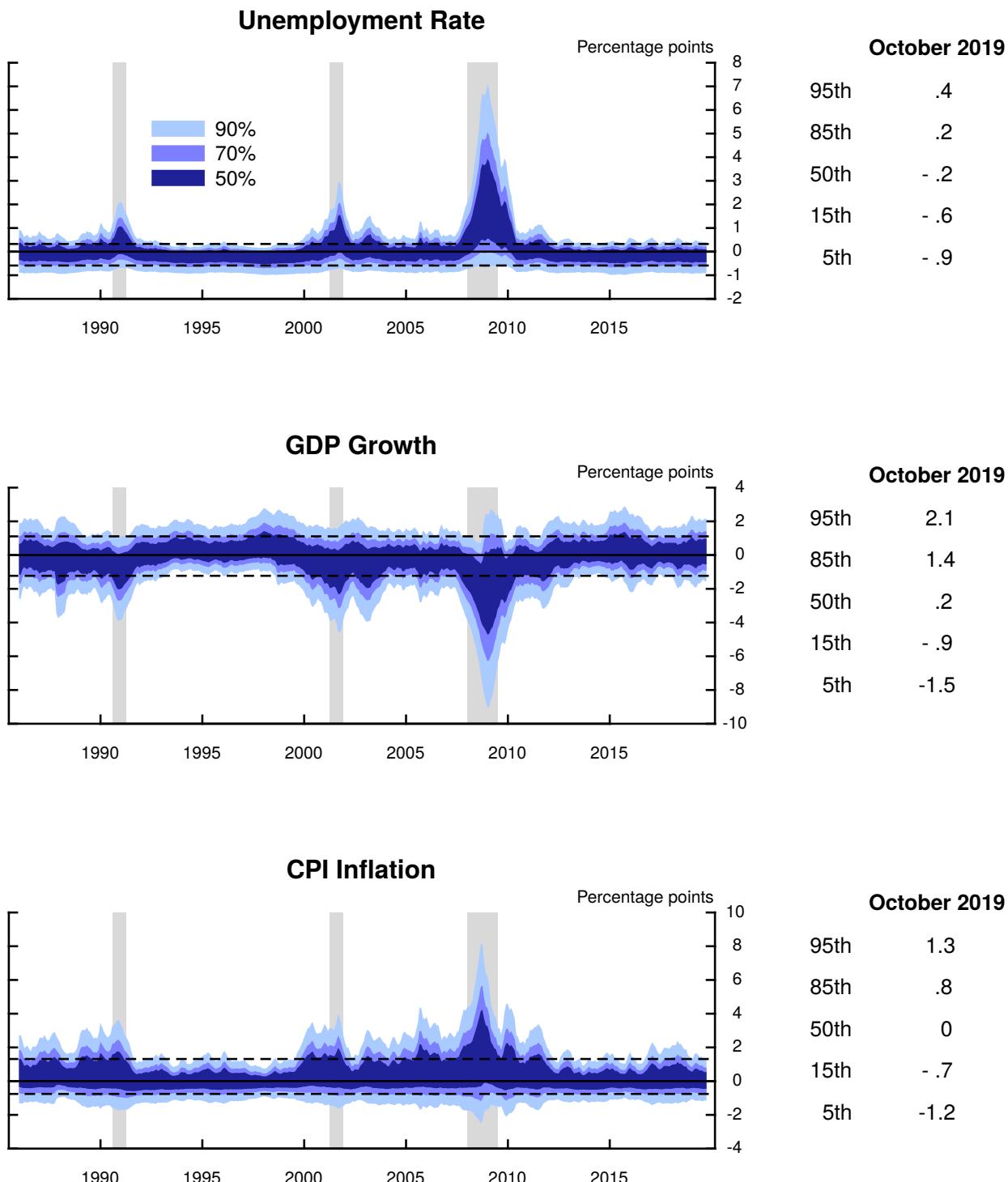
Probability that the unemployment rate will . . .	Staff	FRB/US	EDO	BVAR
<i>Increase by 1 percentage point</i>				
Current Tealbook	.04	.09	.23	.02
Previous Tealbook	.02	.05	.23	.02
<i>Decrease by 1 percentage point</i>				
Current Tealbook	.08	.03	.00	.14
Previous Tealbook	.04	.01	.00	.15

### Probability of Recession Over Next 4 Quarters

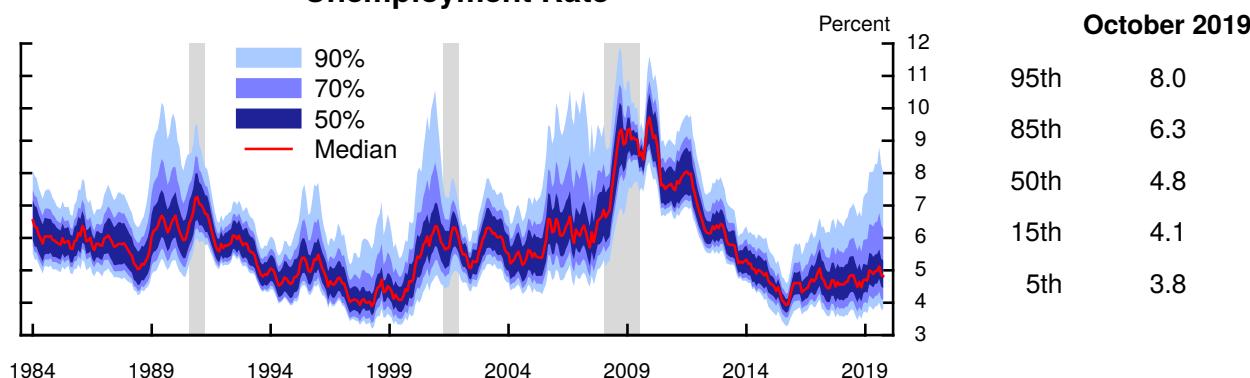
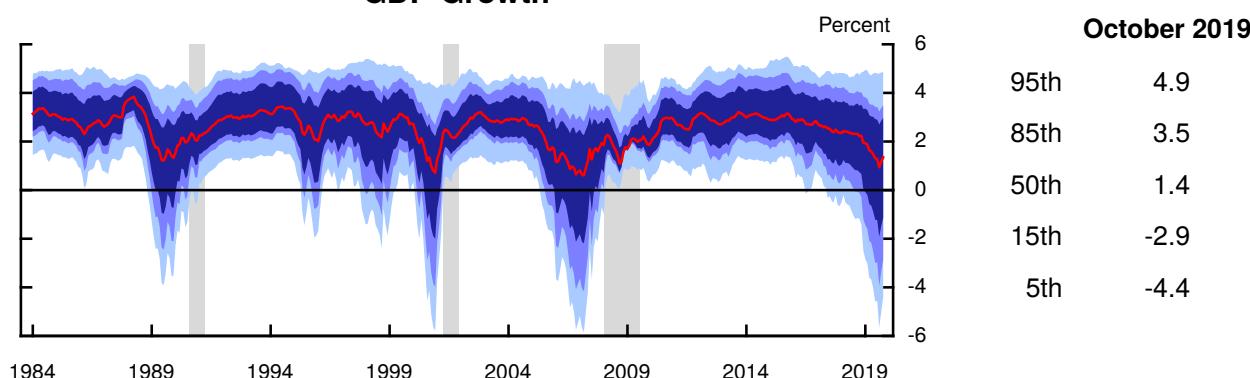
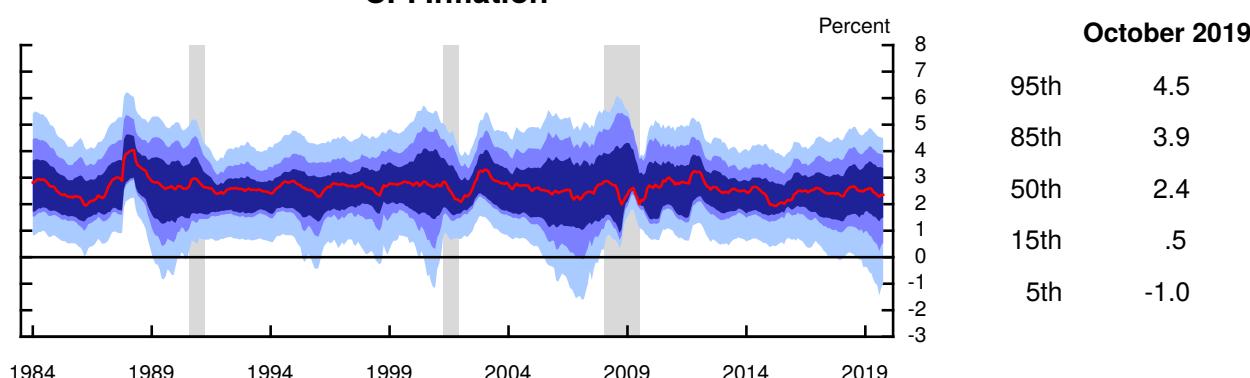
Probability of transitioning into or remaining in a recession	Staff	FRB/US	MAF	Term Spread	Unconditional
Current Tealbook	.09	.10	.22	.57	.23
Previous Tealbook	.07	.08	.45	.66	.23

Note: “Staff” represents stochastic simulations in FRB/US around the staff judgmental baseline; baselines for FRB/US, EDO, and BVAR are generated by those models. The “MAF” estimate uses a model averaging framework to infer the probability from a selection of real and financial variables. “Term Spread” shows the probability implied by the spread between the current month’s 10-year and 3-month Treasury yields. “Unconditional” is calculated using NBER recession dating from 1973:Q1 to the most recent quarter with a BEA estimate of GDP.

## Time-Varying Macroeconomic Risk 1 Year Ahead



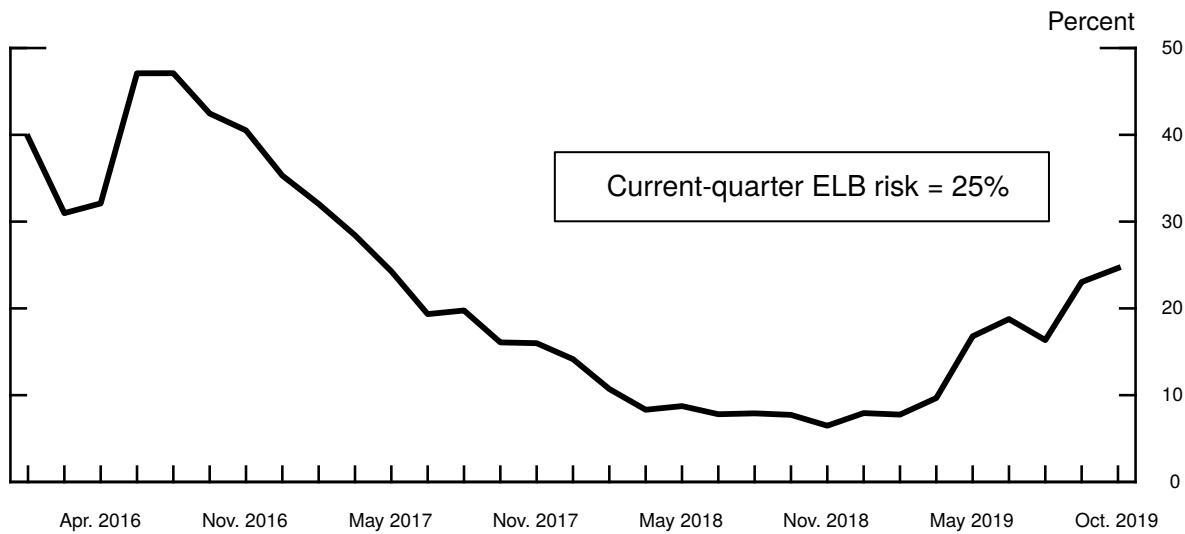
Note: The exhibit shows estimates of quantiles of the distribution of errors for 4-quarter-ahead staff forecasts. The estimates are conditioned on indicators of real activity, inflation, financial market strain, and the volatility of high-frequency macroeconomic indicators. The tables show selected quantiles of the predictive distributions for the respective variables as of the current Tealbook. Dashed lines denote the median 15th and 85th percentiles. Gray shaded bars indicate recession periods as defined by the National Bureau of Economic Research.

**Conditional Distributions of Macroeconomic Variables 2 Years Ahead****Unemployment Rate****GDP Growth****CPI Inflation**

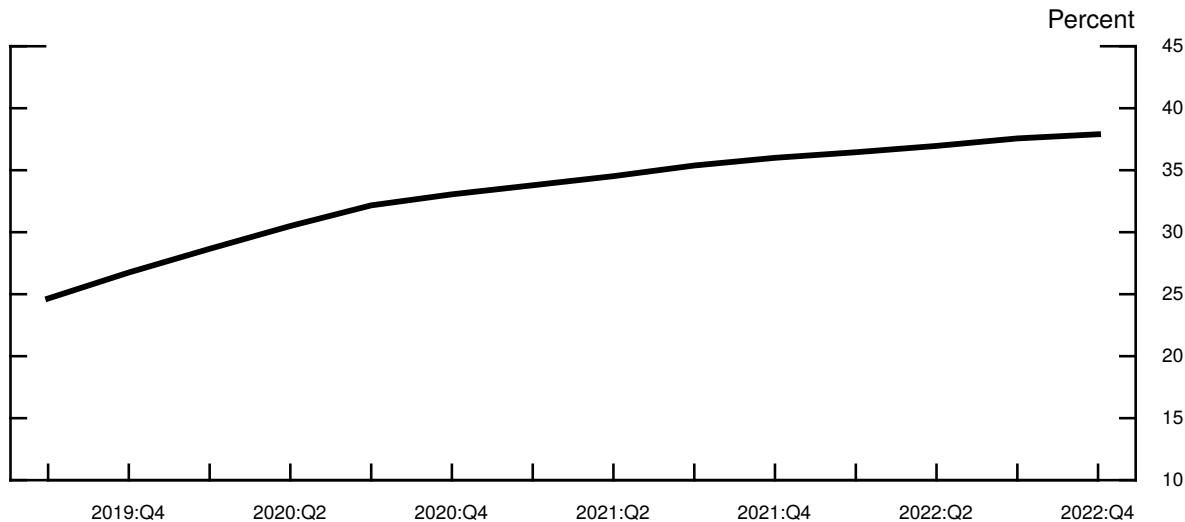
Note: The exhibit shows estimates of quantiles of the conditional distribution of the respective macro variables 2 years ahead. The estimates are conditioned on indicators of real activity, inflation, financial market strain, the volatility of high-frequency macroeconomic indicators, and a term-spread-based recession probability. The tables show selected quantiles of the predictive distributions for the respective variables as of the current Tealbook. 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	2019	2020	2021	2022	2023	2024-25
	H2					
<i>Real GDP</i>						
Tealbook baseline and extension	1.6	2.0	1.8	1.7	1.5	1.4
Global slowdown	1.2	.4	1.5	2.0	1.9	1.6
No-deal Brexit	1.6	1.6	1.7	1.7	1.6	1.5
Recession	1.2	.1	-1.0	2.5	3.2	2.2
Recession - low interest sensitivity	.5	-1.0	-1.4	2.9	3.9	2.6
Lower long-run equilibrium FF rate	1.8	1.7	1.7	1.5	1.1	1.0
Stronger aggregate demand	2.4	3.2	2.5	2.2	1.8	1.6
Steeper Phillips curve	1.6	1.9	1.7	1.5	1.3	1.3
<i>Unemployment rate<sup>1</sup></i>						
Tealbook baseline and extension	3.6	3.6	3.6	3.6	3.7	4.0
Global slowdown	3.6	4.0	4.2	4.1	4.1	4.2
No-deal Brexit	3.6	3.7	3.8	3.8	3.9	4.1
Recession	3.7	4.6	6.1	5.8	5.0	4.5
Recession - low interest sensitivity	3.9	5.4	7.2	6.6	5.4	4.5
Lower long-run equilibrium FF rate	3.5	3.5	3.4	3.4	3.5	3.8
Stronger aggregate demand	3.6	3.1	2.9	2.8	2.9	3.4
Steeper Phillips curve	3.6	3.6	3.6	3.8	4.0	4.4
<i>Total PCE prices</i>						
Tealbook baseline and extension	1.5	1.7	1.8	1.8	1.9	1.9
Global slowdown	1.4	1.1	1.4	1.6	1.7	1.8
No-deal Brexit	1.4	1.5	1.7	1.8	1.8	1.9
Recession	1.3	1.3	1.5	1.6	1.7	1.8
Recession - low interest sensitivity	1.3	1.1	1.3	1.4	1.6	1.7
Lower long-run equilibrium FF rate	1.6	1.8	1.9	1.9	2.0	2.0
Stronger aggregate demand	1.5	1.7	1.8	1.9	2.0	2.1
Steeper Phillips curve	1.6	2.1	2.6	2.9	3.1	3.1
<i>Core PCE prices</i>						
Tealbook baseline and extension	2.0	1.8	1.8	1.8	1.9	1.9
Global slowdown	1.9	1.4	1.4	1.5	1.7	1.8
No-deal Brexit	1.9	1.7	1.7	1.8	1.8	1.9
Recession	1.8	1.4	1.5	1.6	1.7	1.8
Recession - low interest sensitivity	1.7	1.3	1.3	1.4	1.6	1.7
Lower long-run equilibrium FF rate	2.0	2.0	1.9	1.9	2.0	2.0
Stronger aggregate demand	2.0	1.9	1.9	1.9	2.0	2.1
Steeper Phillips curve	2.0	2.3	2.6	2.9	3.0	3.1
<i>Federal funds rate<sup>1</sup></i>						
Tealbook baseline and extension	1.9	2.2	2.4	2.5	2.5	2.5
Global slowdown	1.8	1.7	1.3	1.3	1.6	2.0
No-deal Brexit	1.9	2.1	2.1	2.1	2.2	2.4
Recession	1.8	.1	.1	.1	.1	.8
Recession - low interest sensitivity	1.4	.1	.1	.1	.1	.6
Lower long-run equilibrium FF rate	1.8	2.0	2.1	2.2	2.3	2.3
Stronger aggregate demand	1.9	2.3	2.6	2.8	2.9	3.1
Steeper Phillips curve	1.9	2.4	2.9	3.3	3.5	3.5

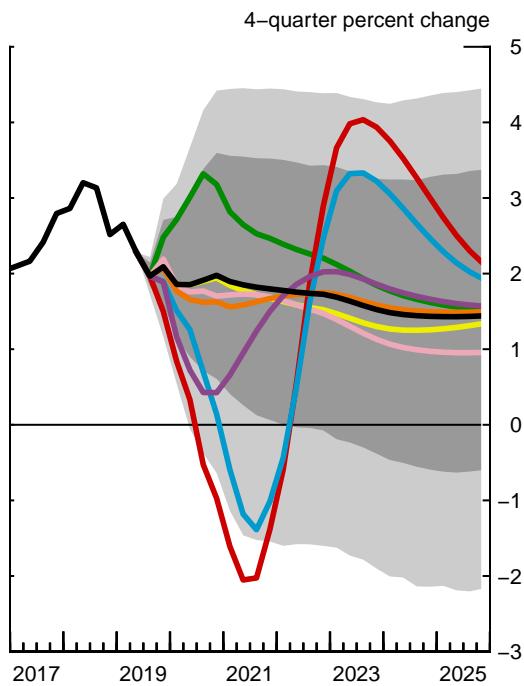
1. Percent, average for the final quarter of the period.

## Forecast Confidence Intervals and Alternative Scenarios

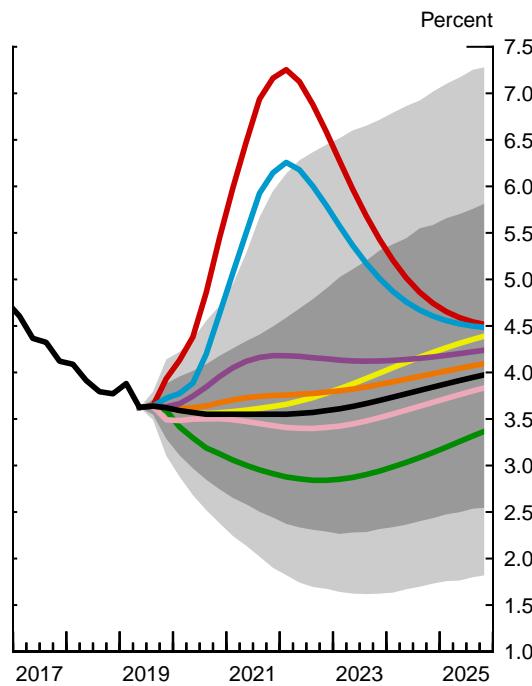
Confidence Intervals Based on FRB/US Stochastic Simulations\*

- Tealbook baseline and extension
- Recession
- Stronger aggregate demand
- Global slowdown
- Recession – low interest sensitivity
- Steeper Phillips curve
- No-deal Brexit
- Lower long-run equilibrium FF rate

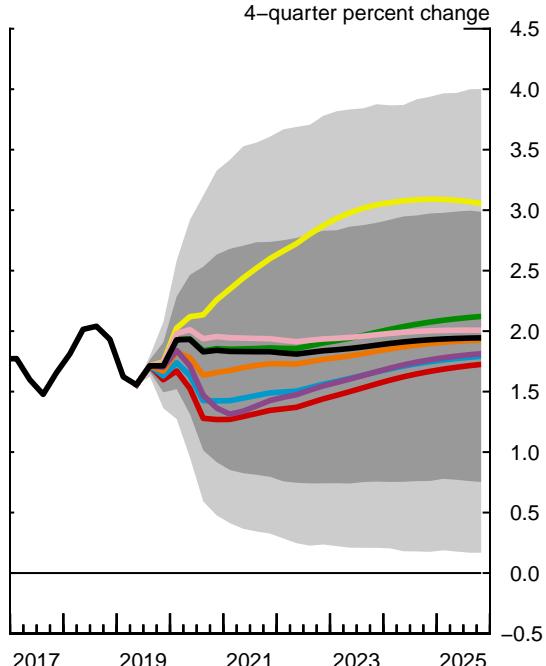
Real GDP



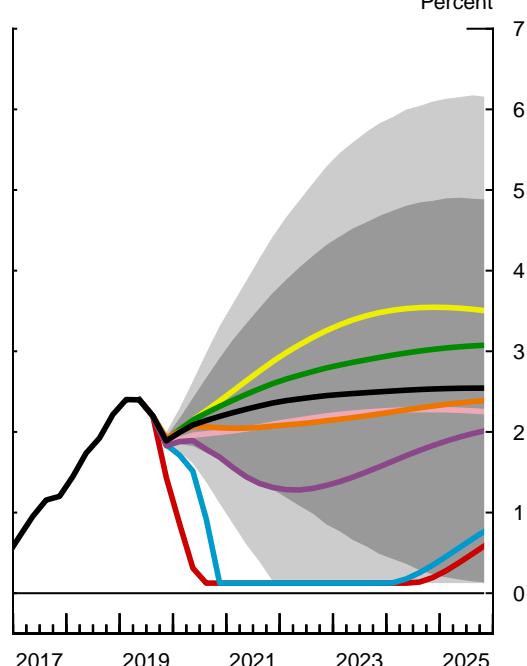
Unemployment Rate



PCE Prices excluding Food and Energy



Federal Funds Rate



\* The dark gray shaded area is the 70 percent interval, and the light gray shaded area is the 90 percent interval from stochastic simulations around the Tealbook baseline.

## Alternative Model Forecasts

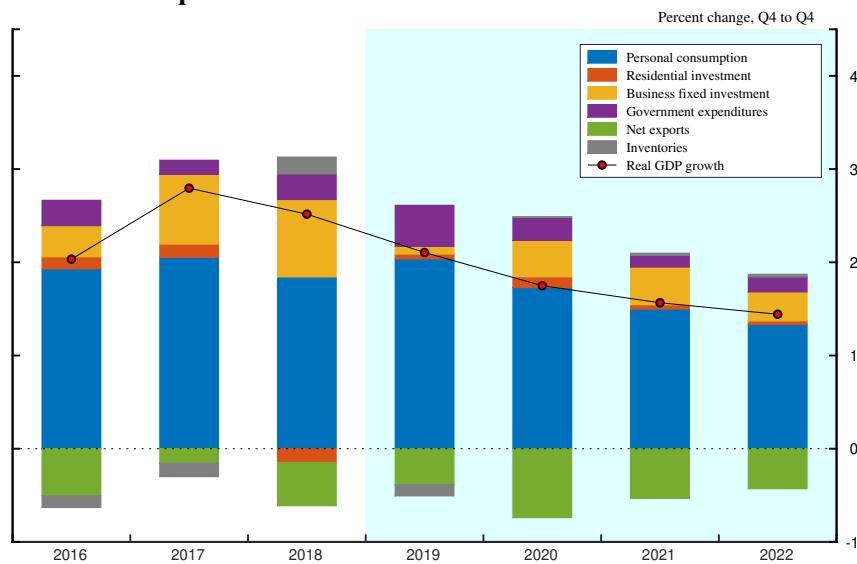
(Percent change, Q4 to Q4, except as noted)

Measure and projection	2019		2020		2021		2022	
	Previous Tealbook	Current Tealbook						
<i>Real GDP</i>								
Staff	2.1	2.1	2.0	2.0	1.8	1.8	1.7	1.7
FRB/US	2.1	2.1	1.6	1.7	1.5	1.6	1.4	1.4
EDO <sup>1</sup>	2.3	2.3	1.6	1.7	1.8	1.9	2.4	2.4
<i>Unemployment rate<sup>2</sup></i>								
Staff	3.7	3.6	3.6	3.6	3.6	3.6	3.6	3.6
FRB/US	3.7	3.6	4.0	3.9	4.3	4.2	4.5	4.4
EDO <sup>1</sup>	3.9	3.9	4.4	4.4	4.8	4.8	5.1	5.0
<i>Total PCE prices</i>								
Staff	1.5	1.4	1.8	1.7	1.8	1.8	1.8	1.8
FRB/US	1.5	1.5	2.0	1.9	2.0	2.0	2.0	2.0
EDO <sup>1</sup>	1.6	1.7	2.5	2.6	2.5	2.5	2.3	2.3
<i>Core PCE prices</i>								
Staff	1.8	1.7	1.8	1.8	1.8	1.8	1.8	1.8
FRB/US	1.8	1.8	2.1	2.1	2.1	2.1	2.0	2.0
EDO <sup>1</sup>	1.8	1.9	2.5	2.6	2.5	2.5	2.4	2.3
<i>Federal funds rate<sup>2</sup></i>								
Staff	2.2	1.9	2.4	2.2	2.5	2.4	2.5	2.5
FRB/US	2.4	2.4	2.6	2.6	2.6	2.7	2.6	2.6
EDO <sup>1</sup>	2.7	2.7	3.6	3.7	4.0	4.0	4.1	4.1

1. The EDO projections labeled "Previous Tealbook" and "Current Tealbook" integrate over the posterior distribution of model parameters.

2. Percent, average for Q4.

### Decomposition of FRB/US Real GDP Growth Forecast



Note: Shading represents the projection period.

Source: Staff calculations.

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

Risks &amp; Uncertainty

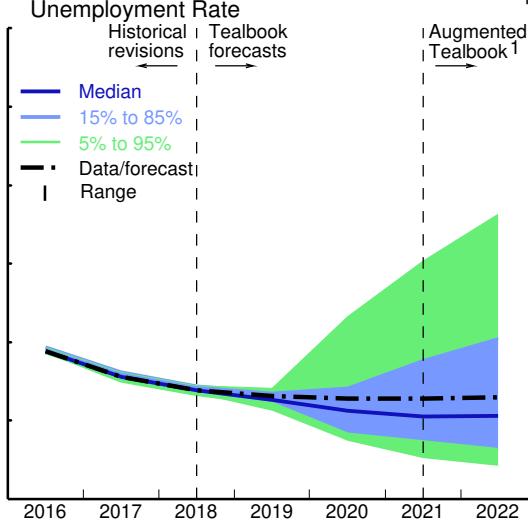
Measure	2019	2020	2021	2022	2023	2024	2025
<i>Real GDP</i> (percent change, Q4 to Q4)							
Projection	2.1	2.0	1.8	1.7	1.5	1.4	1.4
Confidence interval							
Tealbook forecast errors	1.6–3.3	.9–3.6	-.2–3.6	-.6–3.4	...	...	...
FRB/US stochastic simulations	1.6–2.7	.6–3.6	.1–3.5	-.1–3.4	-.4–3.3	-.6–3.3	-.6–3.4
<i>Civilian unemployment rate</i> (percent, Q4)							
Projection	3.6	3.6	3.6	3.6	3.7	3.8	4.0
Confidence interval							
Tealbook forecast errors	3.4–3.7	2.7–3.9	2.5–4.6	2.2–5.1	...	...	...
FRB/US stochastic simulations	3.3–3.9	2.7–4.2	2.4–4.5	2.3–4.9	2.3–5.3	2.4–5.6	2.5–5.8
<i>PCE prices, total</i> (percent change, Q4 to Q4)							
Projection	1.4	1.7	1.8	1.8	1.9	1.9	1.9
Confidence interval							
Tealbook forecast errors	1.3–1.8	1.1–3.0	1.2–3.5	1.3–3.3	...	...	...
FRB/US stochastic simulations	1.2–1.7	.7–2.6	.7–2.8	.7–2.9	.7–3.0	.7–3.1	.7–3.1
<i>PCE prices excluding</i> <i>food and energy</i> (percent change, Q4 to Q4)							
Projection	1.7	1.8	1.8	1.8	1.9	1.9	1.9
Confidence interval							
Tealbook forecast errors	1.5–2.0	1.4–2.4	1.3–2.7	...	...	...	...
FRB/US stochastic simulations	1.5–1.9	.9–2.6	.8–2.7	.7–2.8	.8–2.9	.8–3.0	.8–3.0
<i>Federal funds rate</i> (percent, Q4)							
Projection	1.9	2.2	2.4	2.5	2.5	2.5	2.5
Confidence interval							
FRB/US stochastic simulations	1.8–1.9	1.7–2.9	1.3–3.7	.9–4.3	.5–4.7	.2–4.9	.1–4.9

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 2022 using information from the Blue Chip survey and forecasts from the CBO and CEA.

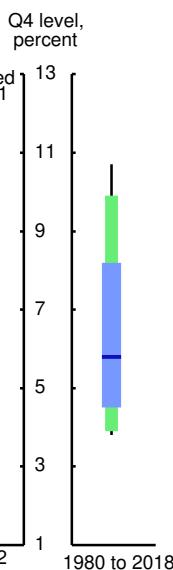
... Not applicable.

## Prediction Intervals Derived from Historical Tealbook Forecast Errors

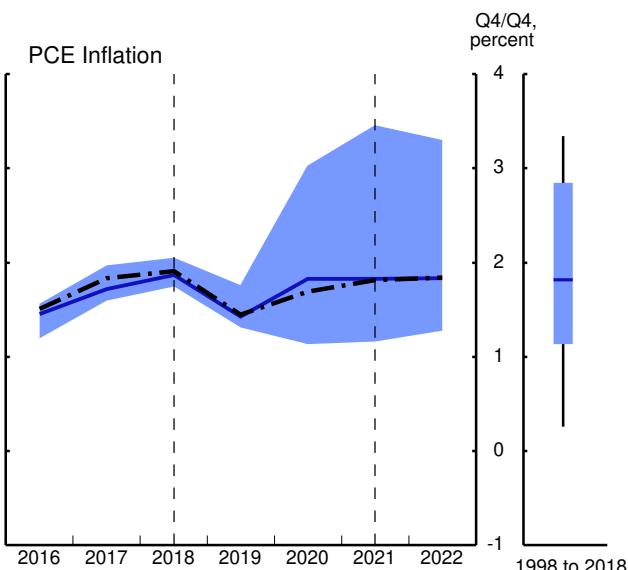
### Forecast Error Percentiles



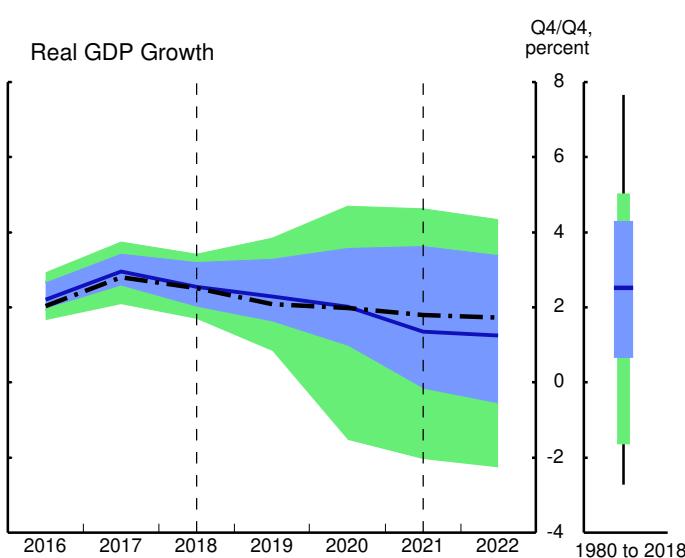
### Historical Distributions



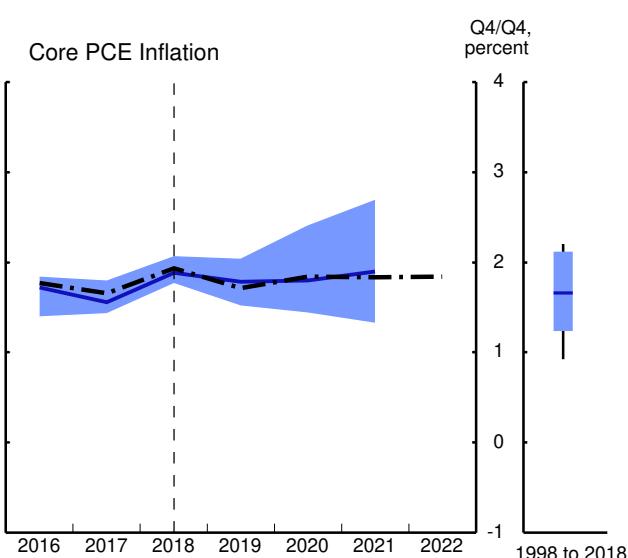
### PCE Inflation



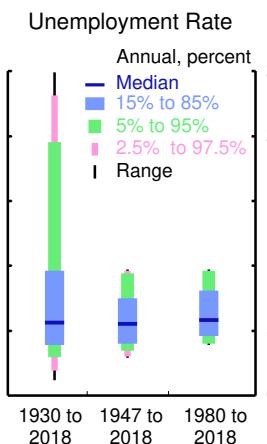
### Real GDP Growth



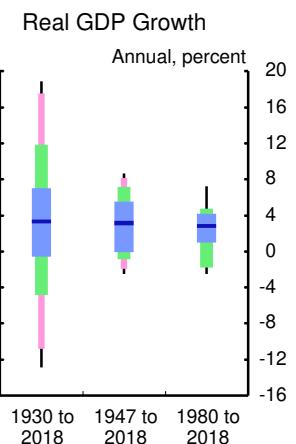
### Core PCE Inflation



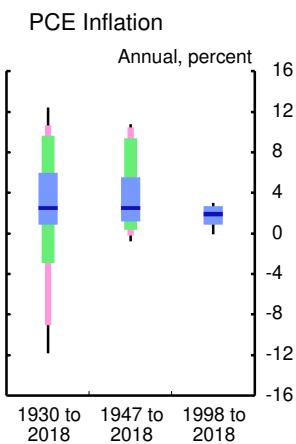
### Historical Distributions



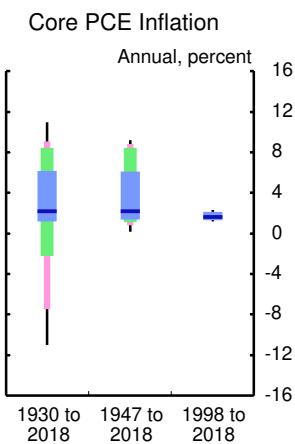
### Real GDP Growth



### PCE Inflation



### Core PCE Inflation



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

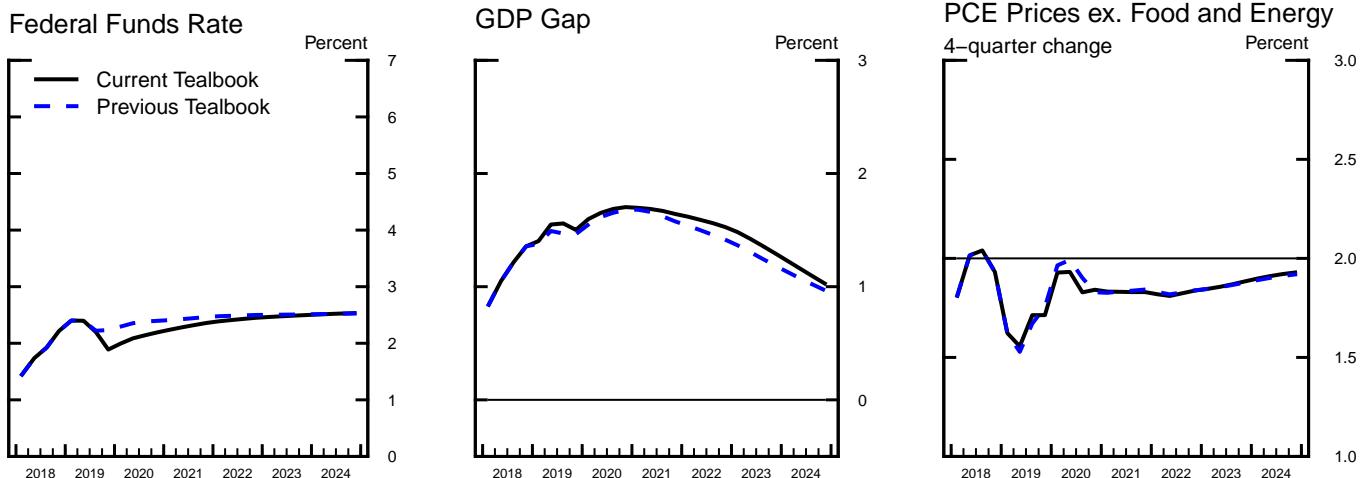
1. Augmented Tealbook prediction intervals use 2- and 3-year-ahead forecast errors from Blue Chip, CBO, and CEA to extend the Tealbook prediction intervals through 2022.

## Policy Rules and the Staff Projection

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

	(Percent)	<u>2019:Q4</u>	<u>2020:Q1</u>
Inertial Taylor (1999) rule	<b>2.40</b>	<b>2.63</b>	
<i>Previous Tealbook projection</i>	2.40	2.64	
Taylor (1993) rule	<b>2.80</b>	<b>3.16</b>	
<i>Previous Tealbook projection</i>	2.84	3.19	
First-difference rule	<b>2.18</b>	<b>2.20</b>	
<i>Previous Tealbook projection</i>	2.24	2.26	
Flexible price-level targeting rule	<b>1.89</b>	<b>1.66</b>	
<i>Previous Tealbook projection</i>	1.89	1.67	
<i>Addendum:</i>			
Tealbook baseline	<b>1.89</b>	<b>1.99</b>	

### Key Elements of the Staff Projection



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

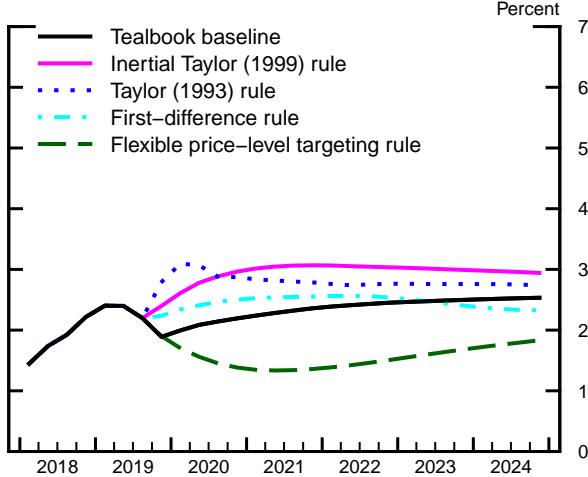
	(Percent)	Current Value	Current-Quarter Estimate Based on Previous Tealbook	Previous Tealbook
Tealbook baseline				
FRB/US $r^*$	1.28	1.39	1.40	
Average projected real federal funds rate	.41	.57	.56	
SEP-consistent baseline				
FRB/US $r^*$	.33	.33	.33	
Average projected real federal funds rate	.06	.06	.06	

1. The lines denoted "Previous Tealbook projection" report prescriptions based on the previous Tealbook's staff outlook for inflation and resource slack. Rules that have a lagged policy rate as a right-hand-side variable are conditional on the current-Tealbook value of the lagged policy rate.

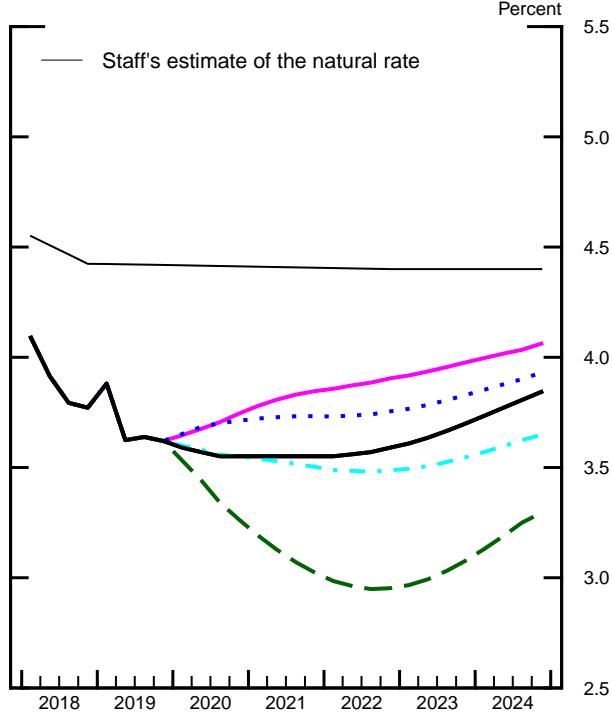
2. The "FRB/US  $r^*$ " is the level of the real federal funds rate that, if maintained over a 12-quarter period (beginning in the current quarter) in the FRB/US model, sets the output gap equal to zero in the final quarter of that period given either the Tealbook or SEP-consistent projection. The SEP-consistent baseline corresponds to the September 2019 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  $r^*$ .

## Simple Policy Rule Simulations

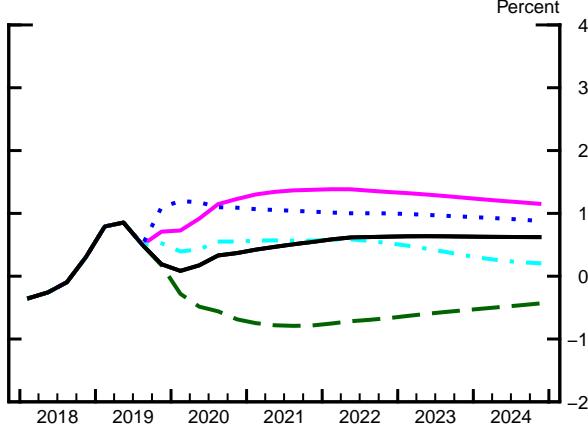
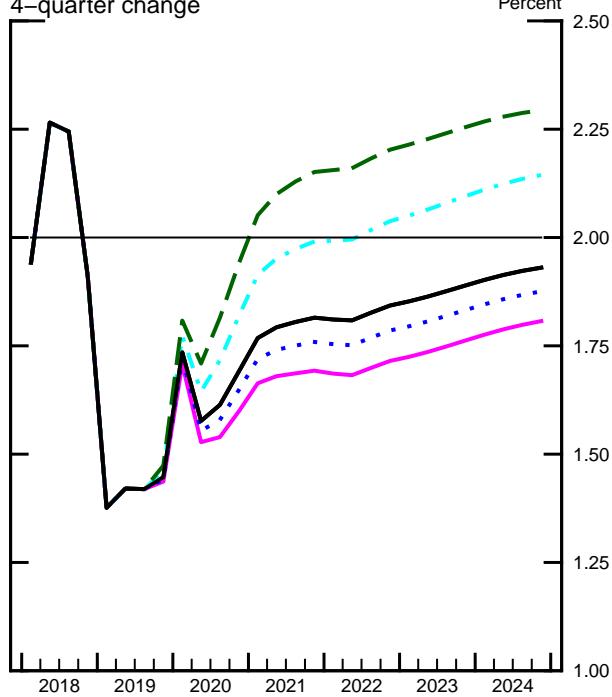
Nominal Federal Funds Rate



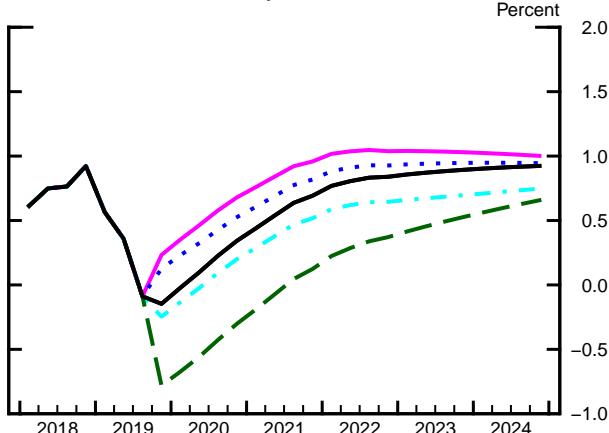
Unemployment Rate



Real Federal Funds Rate

PCE Inflation  
4-quarter change

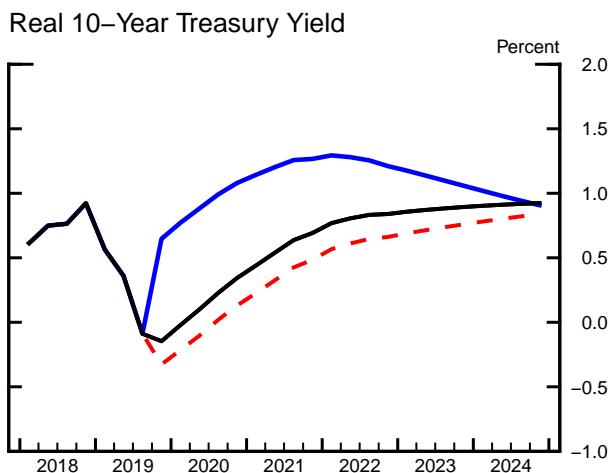
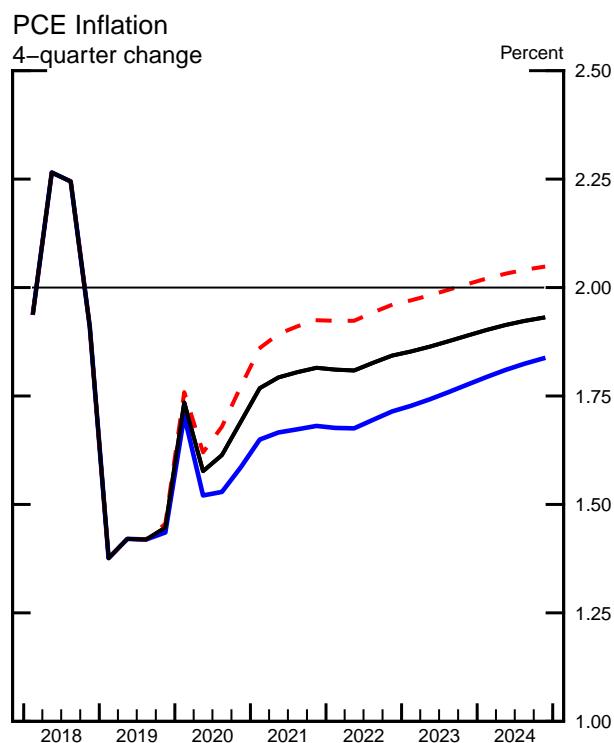
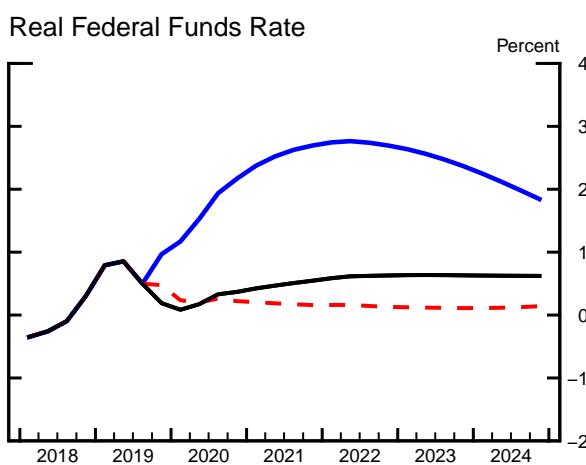
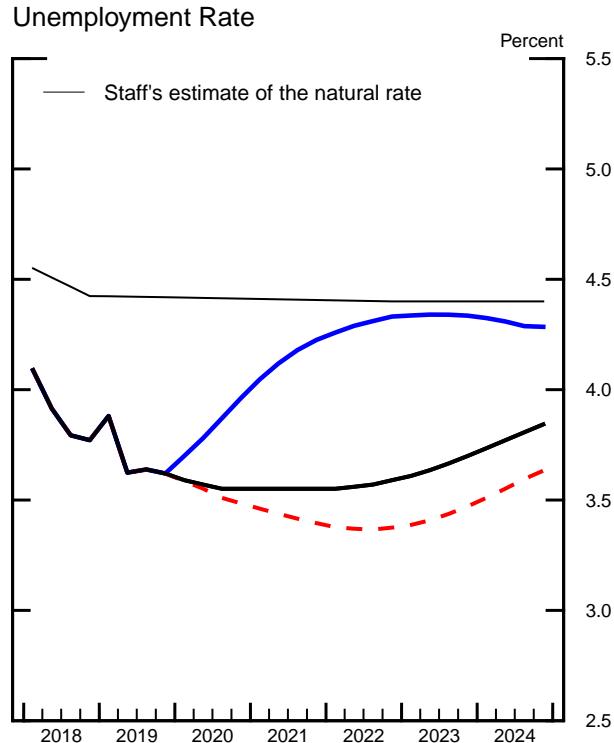
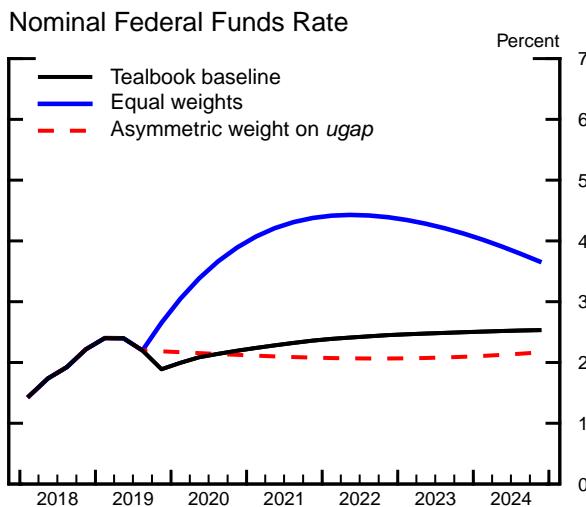
Real 10-Year Treasury Yield



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	2019	2020	2021	2022	2023	2024
<i>Nominal federal funds rate<sup>1</sup></i>						
Inertial Taylor (1999)	2.4	3.0	3.1	3.0	3.0	2.9
Taylor (1993)	2.8	2.9	2.8	2.8	2.8	2.7
First-difference	2.2	2.5	2.6	2.5	2.4	2.3
Flexible price-level targeting	1.9	1.4	1.4	1.5	1.7	1.8
Extended Tealbook baseline	1.9	2.2	2.4	2.5	2.5	2.5
<i>Real GDP</i>						
Inertial Taylor (1999)	2.1	1.6	1.6	1.7	1.6	1.5
Taylor (1993)	2.1	1.7	1.7	1.7	1.6	1.5
First-difference	2.1	2.0	1.9	1.9	1.6	1.5
Flexible price-level targeting	2.1	2.6	2.3	2.0	1.5	1.4
Extended Tealbook baseline	2.1	2.0	1.8	1.7	1.5	1.4
<i>Unemployment rate<sup>1</sup></i>						
Inertial Taylor (1999)	3.6	3.7	3.8	3.9	4.0	4.1
Taylor (1993)	3.6	3.7	3.7	3.8	3.8	3.9
First-difference	3.6	3.5	3.5	3.5	3.5	3.6
Flexible price-level targeting	3.6	3.3	3.0	3.0	3.1	3.3
Extended Tealbook baseline	3.6	3.6	3.6	3.6	3.7	3.8
<i>Total PCE prices</i>						
Inertial Taylor (1999)	1.4	1.6	1.7	1.7	1.8	1.8
Taylor (1993)	1.4	1.6	1.8	1.8	1.8	1.9
First-difference	1.5	1.8	2.0	2.0	2.1	2.1
Flexible price-level targeting	1.5	1.9	2.2	2.2	2.3	2.3
Extended Tealbook baseline	1.4	1.7	1.8	1.8	1.9	1.9
<i>Core PCE prices</i>						
Inertial Taylor (1999)	1.7	1.7	1.7	1.7	1.8	1.8
Taylor (1993)	1.7	1.8	1.8	1.8	1.8	1.9
First-difference	1.7	2.0	2.0	2.0	2.1	2.1
Flexible price-level targeting	1.7	2.1	2.2	2.2	2.2	2.3
Extended Tealbook baseline	1.7	1.8	1.8	1.8	1.9	1.9

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	2019		2020				2021	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
<i>Nominal federal funds rate<sup>1</sup></i>								
Inertial Taylor (1999)	2.2	2.4	2.6	2.8	2.9	3.0	3.0	3.0
Taylor (1993)	2.2	2.8	3.1	3.1	2.9	2.9	2.8	2.8
First-difference	2.2	2.2	2.3	2.4	2.5	2.5	2.5	2.5
Flexible price-level targeting	2.2	1.9	1.7	1.6	1.5	1.4	1.3	1.3
Extended Tealbook baseline	2.2	1.9	2.0	2.1	2.1	2.2	2.2	2.3
<i>Real GDP</i>								
Inertial Taylor (1999)	2.0	2.1	1.7	1.6	1.6	1.6	1.5	1.5
Taylor (1993)	2.0	2.1	1.8	1.7	1.6	1.7	1.6	1.7
First-difference	2.0	2.1	1.9	1.9	1.9	2.0	2.0	1.9
Flexible price-level targeting	2.0	2.1	2.0	2.2	2.4	2.6	2.6	2.5
Extended Tealbook baseline	2.0	2.1	1.9	1.9	1.9	2.0	1.9	1.9
<i>Unemployment rate<sup>1</sup></i>								
Inertial Taylor (1999)	3.6	3.6	3.6	3.7	3.7	3.7	3.8	3.8
Taylor (1993)	3.6	3.6	3.7	3.7	3.7	3.7	3.7	3.7
First-difference	3.6	3.6	3.6	3.6	3.6	3.5	3.5	3.5
Flexible price-level targeting	3.6	3.6	3.5	3.4	3.3	3.3	3.2	3.1
Extended Tealbook baseline	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
<i>Total PCE prices</i>								
Inertial Taylor (1999)	1.4	1.4	1.7	1.5	1.5	1.6	1.7	1.7
Taylor (1993)	1.4	1.4	1.7	1.6	1.6	1.6	1.7	1.7
First-difference	1.4	1.5	1.8	1.6	1.7	1.8	1.9	2.0
Flexible price-level targeting	1.4	1.5	1.8	1.7	1.8	1.9	2.1	2.1
Extended Tealbook baseline	1.4	1.4	1.7	1.6	1.6	1.7	1.8	1.8
<i>Core PCE prices</i>								
Inertial Taylor (1999)	1.7	1.7	1.9	1.9	1.8	1.7	1.7	1.7
Taylor (1993)	1.7	1.7	1.9	1.9	1.8	1.8	1.8	1.8
First-difference	1.7	1.7	2.0	2.0	1.9	2.0	2.0	2.0
Flexible price-level targeting	1.7	1.7	2.0	2.1	2.0	2.1	2.1	2.1
Extended Tealbook baseline	1.7	1.7	1.9	1.9	1.8	1.8	1.8	1.8

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	2019	2020	2021	2022	2023	2024
<i>Nominal federal funds rate<sup>1</sup></i>						
Equal weights	2.7	3.9	4.4	4.4	4.1	3.7
Asymmetric weight on <i>ugap</i>	2.2	2.1	2.1	2.1	2.1	2.2
Extended Tealbook baseline	1.9	2.2	2.4	2.5	2.5	2.5
<i>Real GDP</i>						
Equal weights	2.1	1.1	1.2	1.6	1.7	1.8
Asymmetric weight on <i>ugap</i>	2.1	2.1	2.0	1.8	1.6	1.4
Extended Tealbook baseline	2.1	2.0	1.8	1.7	1.5	1.4
<i>Unemployment rate<sup>1</sup></i>						
Equal weights	3.6	4.0	4.2	4.3	4.3	4.3
Asymmetric weight on <i>ugap</i>	3.6	3.5	3.4	3.4	3.5	3.6
Extended Tealbook baseline	3.6	3.6	3.6	3.6	3.7	3.8
<i>Total PCE prices</i>						
Equal weights	1.4	1.6	1.7	1.7	1.8	1.8
Asymmetric weight on <i>ugap</i>	1.5	1.8	1.9	2.0	2.0	2.0
Extended Tealbook baseline	1.4	1.7	1.8	1.8	1.9	1.9
<i>Core PCE prices</i>						
Equal weights	1.7	1.7	1.7	1.7	1.8	1.8
Asymmetric weight on <i>ugap</i>	1.7	1.9	1.9	2.0	2.0	2.0
Extended Tealbook baseline	1.7	1.8	1.8	1.8	1.9	1.9

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	2019		2020				2021	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
<i>Nominal federal funds rate<sup>1</sup></i>								
Equal weights	2.2	2.7	3.0	3.4	3.7	3.9	4.1	4.2
Asymmetric weight on ugap	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1
Extended Tealbook baseline	2.2	1.9	2.0	2.1	2.1	2.2	2.2	2.3
<i>Real GDP</i>								
Equal weights	2.0	2.1	1.6	1.4	1.2	1.1	1.1	1.1
Asymmetric weight on ugap	2.0	2.1	1.9	1.9	2.0	2.1	2.1	2.1
Extended Tealbook baseline	2.0	2.1	1.9	1.9	1.9	2.0	1.9	1.9
<i>Unemployment rate<sup>1</sup></i>								
Equal weights	3.6	3.6	3.7	3.8	3.9	4.0	4.0	4.1
Asymmetric weight on ugap	3.6	3.6	3.6	3.6	3.5	3.5	3.5	3.4
Extended Tealbook baseline	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
<i>Total PCE prices</i>								
Equal weights	1.4	1.4	1.7	1.5	1.5	1.6	1.6	1.7
Asymmetric weight on ugap	1.4	1.5	1.8	1.6	1.7	1.8	1.9	1.9
Extended Tealbook baseline	1.4	1.4	1.7	1.6	1.6	1.7	1.8	1.8
<i>Core PCE prices</i>								
Equal weights	1.7	1.7	1.9	1.9	1.7	1.7	1.7	1.7
Asymmetric weight on ugap	1.7	1.7	2.0	2.0	1.9	1.9	1.9	1.9
Extended Tealbook baseline	1.7	1.7	1.9	1.9	1.8	1.8	1.8	1.8

1. Percent, average for the quarter.

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

Interval	Nominal GDP		Real GDP		PCE price index		Core PCE price index		Unemployment rate <sup>1</sup>	
	09/06/19	10/17/19	09/06/19	10/17/19	09/06/19	10/17/19	09/06/19	10/17/19	09/06/19	10/17/19
<i>Quarterly</i>										
2019:Q1	3.9	3.9	3.1	3.1	.4	.4	1.1	1.1	3.9	3.9
Q2	4.4	4.7	1.9	2.0	2.3	2.4	1.7	1.9	3.6	3.6
Q3	4.1	3.7	1.7	1.7	1.6	1.6	2.1	2.2	3.7	3.6
Q4	3.7	3.3	1.8	1.6	1.6	1.4	2.1	1.7	3.7	3.6
2020:Q1	4.0	3.7	2.1	2.2	1.8	1.5	1.9	1.9	3.6	3.6
Q2	4.2	4.1	2.0	2.0	1.8	1.7	1.9	1.9	3.6	3.6
Q3	3.9	3.9	1.9	1.9	1.8	1.7	1.8	1.8	3.6	3.6
Q4	3.8	3.7	1.9	1.8	1.8	1.8	1.8	1.8	3.6	3.6
2021:Q1	3.8	3.7	1.9	1.8	1.9	1.8	1.9	1.9	3.6	3.6
Q2	3.9	3.9	1.8	1.8	1.9	1.8	1.9	1.9	3.6	3.6
Q3	3.7	3.7	1.7	1.8	1.8	1.8	1.8	1.8	3.6	3.6
Q4	3.6	3.6	1.7	1.8	1.8	1.8	1.8	1.8	3.6	3.6
<i>Two-quarter<sup>2</sup></i>										
2019:Q2	4.2	4.3	2.5	2.6	1.3	1.4	1.4	1.5	-.2	-.2
Q4	3.9	3.5	1.8	1.6	1.6	1.5	2.1	2.0	.1	.0
2020:Q2	4.1	3.9	2.1	2.1	1.8	1.6	1.9	1.9	-.1	.0
Q4	3.8	3.8	1.9	1.9	1.8	1.7	1.8	1.8	.0	.0
2021:Q2	3.9	3.8	1.8	1.8	1.9	1.8	1.9	1.9	.0	.0
Q4	3.6	3.7	1.7	1.8	1.8	1.8	1.8	1.8	.0	.0
<i>Four-quarter<sup>3</sup></i>										
2018:Q4	4.9	4.9	2.5	2.5	1.9	1.9	1.9	1.9	-.3	-.3
2019:Q4	4.0	3.9	2.1	2.1	1.5	1.4	1.8	1.7	-.1	-.2
2020:Q4	4.0	3.9	2.0	2.0	1.8	1.7	1.8	1.8	-.1	.0
2021:Q4	3.7	3.8	1.8	1.8	1.8	1.8	1.8	1.8	.0	.0
2022:Q4	3.7	3.7	1.7	1.7	1.8	1.8	1.8	1.8	.0	.0
<i>Annual</i>										
2018	5.4	5.4	2.9	2.9	2.1	2.1	1.9	1.9	3.9	3.9
2019	4.1	4.1	2.2	2.2	1.4	1.4	1.6	1.7	3.7	3.7
2020	4.0	3.8	1.9	1.9	1.8	1.7	1.9	1.9	3.6	3.6
2021	3.8	3.8	1.8	1.8	1.8	1.8	1.8	1.8	3.6	3.6
2022	3.7	3.7	1.7	1.7	1.8	1.8	1.8	1.8	3.6	3.6

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	2019			2020				2021				2019 <sup>1</sup>	2020 <sup>1</sup>	2021 <sup>1</sup>	2022 <sup>1</sup>
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Real GDP <i>Previous Tealbook</i>	2.0 1.9	1.7 1.7	1.6 1.8	2.2 2.1	2.0 2.0	1.9 1.9	1.8 1.9	1.8 1.9	1.8 1.8	1.8 1.7	1.8 1.7	2.1 2.1	2.0 2.0	1.8 1.8	1.7 1.7
Final sales <i>Previous Tealbook</i>	3.0 2.9	1.8 1.8	1.8 2.2	2.4 2.4	2.4 2.2	1.9 1.7	2.2 2.2	2.1 2.0	2.0 1.9	1.7 1.5	1.6 1.5	2.3 2.4	2.2 2.1	1.8 1.7	1.6 1.6
Priv. dom. final purch. <i>Previous Tealbook</i>	3.3 3.3	2.1 2.2	2.1 2.2	2.0 2.3	2.5 2.4	2.4 2.2	2.4 2.4	2.3 2.2	2.2 2.1	2.0 1.8	1.8 1.7	2.3 2.3	2.3 2.3	2.1 2.0	1.8 1.7
Personal cons. expend. <i>Previous Tealbook</i>	4.6 4.7	2.8 3.2	2.3 2.3	2.4 2.4	2.5 2.4	2.5 2.4	2.4 2.3	2.4 2.3	2.3 2.3	2.3 2.3	2.3 2.3	2.7 2.8	2.5 2.4	2.4 2.3	2.3 2.2
Durables	13.0	9.0	3.6	2.5	3.5	3.1	2.4	2.3	2.2	2.1	2.1	6.4	2.9	2.2	2.2
Nondurables	6.5	4.5	3.0	2.8	2.2	2.2	2.2	2.2	2.2	2.1	2.1	4.0	2.3	2.1	2.0
Services	2.8	1.4	1.9	2.2	2.5	2.5	2.5	2.5	2.5	2.4	2.4	1.8	2.4	2.4	2.4
Residential investment <i>Previous Tealbook</i>	-3.0 -3.1	4.8 1.9	5.8 6.3	7.3 11.5	7.3 7.4	3.1 2.4	.9 .2	-1.7 -2.3	-2.8 -4.1	-3.2 -4.7	-3.8 -4.8	1.6 1.0	4.6 5.3	-2.9 -4.0	-3.8 -4.7
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	-1.0 -1.4	-2.1 -3.0	-.2 .9	-1.3 -.8	1.0 1.0	1.6 1.3	2.7 3.1	2.9 3.2	2.8 3.2	1.7 1.2	1.0 .9	.3 .2	1.0 1.2	2.1 2.1	.9 .8
Equipment & intangibles <i>Previous Tealbook</i>	2.1 2.0	1.0 -2.7	1.0 .9	-.5 .0	2.0 1.8	2.6 2.4	3.8 4.3	3.9 4.4	3.8 4.5	2.6 1.9	1.7 1.6	2.1 1.1	2.0 2.1	3.0 3.1	1.7 1.6
Nonres. structures <i>Previous Tealbook</i>	-11.1 -12.4	-12.6 -3.9	-4.2 .8	-4.0 -3.4	-2.8 -1.8	-2.2 -2.5	-1.4 -1.1	-.9 -1.1	-1.2 -1.3	-1.3 -1.4	-1.6 -1.7	-6.2 -3.1	-2.6 -2.2	-1.3 -1.4	-2.1 -2.2
Net exports <sup>2</sup> <i>Previous Tealbook<sup>2</sup></i>	-981 -981	-998 -998	-1005 -995	-991 -986	-999 -997	-1017 -1016	-1012 -1011	-1012 -1011	-1012 -1016	-1025 -1028	-1036 -1039	-982 -979	-1005 -1003	-1021 -1023	-1045 -1052
Exports	-5.7	.6	-1.3	4.6	1.8	1.9	2.4	2.8	3.3	3.5	3.6	-.6	2.7	3.3	3.6
Imports	.0	2.4	-.1	1.6	2.2	3.4	1.1	1.9	2.5	3.9	3.8	.2	2.1	3.0	3.2
Gov't. cons. & invest. <i>Previous Tealbook</i>	4.8 4.6	1.3 1.4	.9 1.5	2.0 1.5	2.4 2.1	.6 .5	.5 .3	.4 .4	.9 .9	.8 .8	.9 .9	2.5 2.6	1.4 1.1	.7 .7	.9 .9
Federal	8.3	2.2	1.9	3.7	4.6	-.2	-.5	-.7	.6	.4	.5	3.6	1.9	.2	.7
Defense	3.3	1.3	2.4	4.1	2.5	1.4	.7	.1	.3	.4	.0	3.6	2.2	.2	.7
Nonddefense	16.1	3.6	1.1	3.0	7.7	-2.3	-2.2	-2.0	.9	.2	1.3	3.6	1.5	.1	.6
State & local	2.7	.7	.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.8	1.0	1.0	1.1
Change in priv. inventories <sup>2</sup> <i>Previous Tealbook<sup>2</sup></i>	69 68	66 64	55 40	45 24	20 14	23 28	1 12	-11 4	-24 -4	-18 6	-8 17	76 72	22 20	-15 6	7 40

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

2. Billions of chained (2012) dollars; annual values show annual averages.

**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	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Real GDP <i>Previous Tealbook</i>	2.6 2.6	2.9 2.9	1.9 1.9	2.0 2.0	2.8 2.8	2.5 2.5	2.1 2.1	2.0 2.0	1.8 1.8	1.7 1.7
Final sales <i>Previous Tealbook</i>	2.0 2.0	3.2 3.2	1.8 1.8	2.2 2.2	2.9 2.9	2.2 2.2	2.3 2.4	2.2 2.1	1.8 1.7	1.6 1.6
Priv. dom. final purch. <i>Previous Tealbook</i>	2.6 2.6	4.5 4.5	2.5 2.5	2.8 2.8	3.4 3.4	2.8 2.8	2.3 2.3	2.3 2.3	2.1 2.0	1.8 1.7
Personal cons. expend. <i>Previous Tealbook</i>	1.9 1.9	3.8 3.8	2.9 2.9	2.8 2.8	2.9 2.9	2.6 2.6	2.7 2.8	2.5 2.4	2.4 2.3	2.3 2.2
Durables	5.0	9.2	5.8	7.3	7.7	3.8	6.4	2.9	2.2	2.2
Nondurables	2.8	3.2	2.8	1.8	3.7	2.5	4.0	2.3	2.1	2.0
Services	1.1	3.2	2.5	2.4	2.0	2.5	1.8	2.4	2.4	2.4
Residential investment <i>Previous Tealbook</i>	7.1 7.1	7.7 7.7	9.1 9.1	3.9 3.9	4.2 4.2	-4.4 -4.4	1.6 1.0	4.6 5.3	-2.9 -4.0	-3.8 -4.7
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	5.4 5.4	6.9 6.9	-.9 -.9	2.4 2.4	5.4 5.4	5.9 5.9	.3 .2	1.0 1.2	2.1 2.1	.9 .8
Equipment & intangibles <i>Previous Tealbook</i>	5.1 5.1	6.1 6.1	2.3 2.3	1.9 1.9	6.6 6.6	6.8 6.8	2.1 1.1	2.0 2.1	3.0 3.1	1.7 1.6
Nonres. structures <i>Previous Tealbook</i>	6.7 6.7	9.3 9.3	-10.9 -10.9	4.3 4.3	1.5 1.5	2.6 2.6	-6.2 -3.1	-2.6 -2.2	-1.3 -1.4	-2.1 -2.2
Net exports <sup>1</sup> <i>Previous Tealbook<sup>1</sup></i>	-533 -533	-577 -577	-722 -722	-784 -784	-850 -850	-920 -920	-982 -979	-1005 -1003	-1021 -1023	-1045 -1052
Exports	6.0	2.9	-1.5	1.1	5.5	.4	-.6	2.7	3.3	3.6
Imports	3.0	6.5	3.2	3.4	5.6	3.2	.2	2.1	3.0	3.2
Gov't. cons. & invest. <i>Previous Tealbook</i>	-2.4 -2.4	.3 .3	2.3 2.3	1.5 1.5	.8 .8	1.5 1.5	2.5 2.6	1.4 1.1	.7 .7	.9 .9
Federal	-6.1	-1.1	1.1	.1	1.7	2.7	3.6	1.9	.2	.7
Defense	-6.5	-3.4	-.4	-.8	1.9	4.0	3.6	2.2	.2	.7
Nondefense	-5.5	2.7	3.4	1.5	1.4	.7	3.6	1.5	.1	.6
State & local	.2	1.2	3.0	2.3	.4	.9	1.8	1.0	1.0	1.1
Change in priv. inventories <sup>1</sup> <i>Previous Tealbook<sup>1</sup></i>	109 109	86 86	132 132	23 23	32 32	48 48	76 72	22 20	-15 6	7 40

1. Billions of chained (2012) dollars; annual values show annual averages.

# Greensheets

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

Item	2019			2020				2021				2019 <sup>1</sup>	2020 <sup>1</sup>	2021 <sup>1</sup>	2022 <sup>1</sup>
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Real GDP <i>Previous Tealbook</i>	2.0 1.9	1.7 1.7	1.6 1.8	2.2 2.1	2.0 2.0	1.9 1.9	1.8 1.9	1.8 1.9	1.8 1.8	1.8 1.7	1.8 1.7	2.1 2.1	2.0 2.0	1.8 1.8	1.7 1.7
Final sales <i>Previous Tealbook</i>	2.9 2.9	1.7 1.8	1.8 2.2	2.3 2.4	2.4 2.2	1.9 1.7	2.2 2.2	2.1 2.0	2.0 1.9	1.7 1.5	1.6 1.5	2.3 2.4	2.2 2.1	1.8 1.7	1.6 1.6
Priv. dom. final purch. <i>Previous Tealbook</i>	2.8 2.8	1.8 1.8	1.8 1.9	1.7 1.9	2.1 2.0	2.0 1.9	2.0 2.0	1.9 1.9	1.9 1.8	1.7 1.5	1.6 1.5	1.9 2.0	2.0 2.0	1.8 1.7	1.5 1.5
Personal cons. expend. <i>Previous Tealbook</i>	3.0 3.1	1.9 2.2	1.6 1.6	1.6 1.6	1.7 1.6	1.7 1.6	1.7 1.6	1.6 1.6	1.6 1.6	1.6 1.6	1.6 1.5	1.8 1.9	1.7 1.6	1.6 1.6	1.6 1.5
Durables	.9	.6	.3	.2	.2	.2	.2	.2	.1	.1	.1	.4	.2	.1	.1
Nondurables	.9	.6	.4	.4	.3	.3	.3	.3	.3	.3	.3	.6	.3	.3	.3
Services	1.3	.7	.9	1.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	.8	1.1	1.2	1.1
Residential investment <i>Previous Tealbook</i>	-.1 -.1	.2 .1	.2 .2	.3 .4	.3 .3	.1 .1	.0 .0	-.1 -.1	-.1 -.2	-.1 -.2	-.1 -.2	.1 .0	.2 .2	-.1 -.2	-.1 -.2
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	-.1 -.2	-.3 -.4	.0 .1	-.2 -.1	.1 .1	.2 .2	.4 .4	.4 .4	.4 .4	.2 .2	.1 .1	.0 .0	.1 .2	.3 .3	.1 .1
Equipment & intangibles <i>Previous Tealbook</i>	.2 .2	.1 -.3	.1 .1	-.1 .0	.2 .2	.3 .2	.4 .4	.4 .4	.4 .5	.3 .2	.2 .2	.2 .1	.2 .2	.3 .3	.2 .2
Nonres. structures <i>Previous Tealbook</i>	-.4 -.4	-.4 -.1	-.1 .0	-.1 -.1	-.1 -.1	-.1 -.1	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	-.2 -.1	-.1 -.1	0.0 0.0	-.1 -.1
Net exports <i>Previous Tealbook</i>	-.7 -.7	-.3 -.3	-.1 .1	.3 .2	-.1 -.2	-.3 -.3	.1 .1	0.0 0.0	0.0 0.0	-.2 -.2	-.1 -.1	-.1 -.1	.0 .0	-.1 -.1	-.1 -.1
Exports	-.7	.1	-.2	.5	.2	.2	.3	.3	.4	.4	.4	-.1	.3	.4	.4
Imports	.0	-.4	.0	-.2	-.3	-.5	-.2	-.3	-.3	-.6	-.5	.0	-.3	-.4	-.5
Gov't. cons. & invest. <i>Previous Tealbook</i>	.8 .8	.2 .2	.2 .3	.4 .3	.4 .4	.1 .1	.1 .1	.1 .1	.2 .2	.1 .1	.1 .1	.4 .4	.2 .2	.1 .1	.2 .2
Federal	.5	.1	.1	.2	.3	.0	.0	.0	.0	.0	.0	.2	.1	.0	.0
Defense	.1	.1	.1	.2	.1	.1	.0	.0	.0	.0	.0	.1	.1	.0	.0
Nondefense	.4	.1	.0	.1	.2	-.1	-.1	-.1	.0	.0	.0	.1	.0	.0	.0
State & local	.3	.1	.0	.1	.1	.1	.1	.1	.1	.1	.1	.2	.1	.1	.1
Change in priv. inventories <i>Previous Tealbook</i>	-.9 -.9	-.1 -.1	-.2 -.4	-.2 -.3	-.4 -.2	.1 .3	-.4 -.3	-.2 -.1	-.2 -.1	.1 .2	.2 .2	-.2 -.2	-.2 -.1	.0 .0	.1 .1

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

Class II FOMC – Restricted (FR)

Authorized for Public Release

October 18, 2019

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

Item	2019			2020				2021				2019 <sup>1</sup>	2020 <sup>1</sup>	2021 <sup>1</sup>	2022 <sup>1</sup>
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
GDP chain-wt. price index <i>Previous Tealbook</i>	2.4 2.4	2.1 2.4	1.7 1.8	1.5 1.8	2.0 2.1	1.9 2.0	1.9 1.9	1.9 1.9	2.1 2.1	1.9 2.0	1.8 1.9	1.8 1.9	1.8 1.9	1.9 1.9	2.0 2.0
PCE chain-wt. price index <i>Previous Tealbook</i>	2.4 2.3	1.6 1.6	1.4 1.6	1.5 1.8	1.7 1.8	1.7 1.8	1.8 1.8	1.8 1.9	1.8 1.9	1.8 1.8	1.8 1.8	1.4 1.5	1.7 1.8	1.8 1.8	1.8 1.8
Energy <i>Previous Tealbook</i>	18.4 18.4	-8.2 -8.6	-4.8 -9.6	-8.1 -2.5	-2.2 -1.0	-.9 -.2	-.3 -.1	.4 .4	.5 .5	.5 .5	.7 .7	-3.6 -5.0	-2.9 -1.0	.5 .5	1.1 1.0
Food <i>Previous Tealbook</i>	.6 .6	-.4 1.1	1.2 2.7	2.3 2.4	2.3 2.4	2.3 2.4	2.3 2.4	2.3 2.4	2.3 2.4	2.3 2.4	2.3 2.4	1.1 1.8	2.3 2.4	2.3 2.4	2.3 2.4
Ex. food & energy <i>Previous Tealbook</i>	1.9 1.7	2.2 2.1	1.7 2.1	1.9 1.9	1.9 1.8	1.8 1.8	1.9 1.9	1.9 1.9	1.8 1.8	1.8 1.8	1.8 1.8	1.7 1.8	1.8 1.8	1.8 1.8	1.8 1.8
Ex. food & energy, market based <i>Previous Tealbook</i>	1.4 1.4	1.9 2.0	1.6 1.9	1.8 1.8	1.7 1.7	1.7 1.6	1.7 1.6	1.7 1.7	1.7 1.7	1.6 1.7	1.7 1.7	1.7 1.7	1.7 1.7	1.7 1.7	1.7 1.7
CPI <i>Previous Tealbook</i>	2.9 2.9	1.8 1.8	1.7 1.6	1.6 2.0	2.0 2.1	2.1 2.1	2.1 2.1	2.2 2.2	2.2 2.2	2.2 2.2	2.2 2.2	1.8 1.8	2.0 2.1	2.2 2.2	2.3 2.3
Ex. food & energy <i>Previous Tealbook</i>	1.8 1.8	3.0 2.9	2.3 2.4	2.3 2.3	2.3 2.3	2.3 2.2	2.3 2.2	2.3 2.3	2.3 2.3	2.3 2.3	2.3 2.3	2.3 2.4	2.3 2.3	2.3 2.3	2.3 2.3
ECI, hourly compensation <sup>2</sup> <i>Previous Tealbook<sup>2</sup></i>	2.1 2.1	2.8 2.8	2.8 2.8	2.7 2.7	2.7 2.7	2.7 2.7	2.7 2.7	2.7 2.7	2.7 2.7	2.7 2.6	2.6 2.6	2.6 2.6	2.7 2.7	2.7 2.7	2.6 2.6
Business sector															
Output per hour <i>Previous Tealbook</i>	2.6 2.1	-.4 -.1	.0 .3	1.4 1.3	1.2 1.2	1.3 1.4	1.3 1.3	1.3 1.2	1.3 1.2	1.3 1.2	1.3 1.3	1.4 1.5	1.3 1.3	1.3 1.2	1.4 1.4
Compensation per hour <i>Previous Tealbook</i>	5.2 5.2	3.1 3.5	2.4 3.1	3.3 3.6	3.7 3.6	3.7 3.6	3.7 3.6	3.6 3.6	3.6 3.6	3.5 3.5	3.5 3.5	5.0 5.3	3.6 3.6	3.5 3.5	3.4 3.4
Unit labor costs <i>Previous Tealbook</i>	2.5 3.0	3.5 3.6	2.4 2.8	1.9 2.3	2.5 2.4	2.4 2.2	2.4 2.3	2.3 2.3	2.2 2.3	2.2 2.3	2.2 2.2	3.5 3.7	2.3 2.3	2.2 2.3	2.0 2.0
Core goods imports chain-wt. price index <sup>3</sup> <i>Previous Tealbook<sup>3</sup></i>	-.6 -.7	-1.0 -1.2	.4 -.8	1.0 .1	1.1 .9	.9 .9	.9 1.1	1.0 1.2	1.0 1.1	.9 1.0	1.0 .9	-.7 -1.1	1.0 .7	1.0 1.0	.9 .9

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	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
GDP chain-wt. price index <i>Previous Tealbook</i>	1.8 1.8	1.5 1.5	.9 .9	1.5 1.5	2.0 2.0	2.3 2.3	1.8 1.9	1.8 1.9	1.9 1.9	2.0 2.0
PCE chain-wt. price index <i>Previous Tealbook</i>	1.2 1.2	1.1 1.1	.3 .3	1.5 1.5	1.8 1.8	1.9 1.9	1.4 1.5	1.7 1.8	1.8 1.8	1.8 1.8
Energy <i>Previous Tealbook</i>	-2.9 -2.9	-7.1 -7.1	-16.4 -16.4	2.0 2.0	8.0 8.0	3.9 3.9	-3.6 -5.0	-2.9 -1.0	.5 .5	1.1 1.0
Food <i>Previous Tealbook</i>	.7 .7	2.8 2.8	.3 .3	-1.8 -1.8	.7 .7	.5 .5	1.1 1.8	2.3 2.4	2.3 2.4	2.3 2.4
Ex. food & energy <i>Previous Tealbook</i>	1.6 1.6	1.5 1.5	1.2 1.2	1.8 1.8	1.7 1.7	1.9 1.9	1.7 1.8	1.8 1.8	1.8 1.8	1.8 1.8
Ex. food & energy, market based <i>Previous Tealbook</i>	1.1 1.1	1.1 1.1	1.1 1.1	1.4 1.4	1.2 1.2	1.7 1.7	1.7 1.7	1.7 1.7	1.7 1.7	1.7 1.7
CPI <i>Previous Tealbook</i>	1.2 1.2	1.2 1.2	.4 .4	1.8 1.8	2.1 2.1	2.2 2.2	1.8 1.8	2.0 2.1	2.2 2.2	2.3 2.3
Ex. food & energy <i>Previous Tealbook</i>	1.7 1.7	1.7 1.7	2.0 2.0	2.2 2.2	1.8 1.8	2.2 2.2	2.3 2.4	2.3 2.3	2.3 2.3	2.3 2.3
ECI, hourly compensation <sup>1</sup> <i>Previous Tealbook<sup>1</sup></i>	2.0 2.0	2.3 2.3	1.9 1.9	2.2 2.2	2.6 2.6	3.0 3.0	2.6 2.6	2.7 2.7	2.7 2.7	2.6 2.6
Business sector										
Output per hour <i>Previous Tealbook</i>	1.8 1.8	.3 .3	.6 .6	1.4 1.4	1.1 1.1	1.1 1.1	1.4 1.5	1.3 1.3	1.3 1.2	1.4 1.4
Compensation per hour <i>Previous Tealbook</i>	-.2 -.2	3.0 3.0	2.3 2.3	2.2 2.2	3.7 3.7	2.1 2.1	5.0 5.3	3.6 3.6	3.5 3.5	3.4 3.4
Unit labor costs <i>Previous Tealbook</i>	-2.0 -2.0	2.7 2.7	1.7 1.7	.8 .8	2.6 2.6	1.0 1.0	3.5 3.7	2.3 2.3	2.2 2.3	2.0 2.0
Core goods imports chain-wt. price index <sup>2</sup> <i>Previous Tealbook<sup>2</sup></i>	-2.2 -2.2	-.4 -.4	-4.3 -4.3	-.9 -.9	.9 .9	.2 .2	-.7 -.1	1.0 .7	1.0 1.0	.9 .9

1. Private-industry workers.

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

### Other Macroeconomic Indicators

Item	2019			2020				2021				2019 <sup>1</sup>	2020 <sup>1</sup>	2021 <sup>1</sup>	2022 <sup>1</sup>	Class II FOMC – Restricted (FR) Authorized for Public Release
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
<i>Employment and production</i>																
Nonfarm payroll employment <sup>2</sup>	152	157	124	146	193	14	110	104	94	84	74	152	116	89	68	
Unemployment rate <sup>3</sup>	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	
<i>Previous Tealbook<sup>3</sup></i>	3.6	3.7	3.7	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.7	3.6	3.6	3.6	
Natural rate of unemployment <sup>3</sup>	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
<i>Previous Tealbook<sup>3</sup></i>	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
Employment-to-Population Ratio <sup>3</sup>	60.6	60.8	60.8	60.7	60.6	60.6	60.5	60.5	60.4	60.4	60.3	60.8	60.5	60.3	60.1	
Employment-to-Population Trend <sup>3</sup>	60.0	60.0	59.9	59.9	59.8	59.8	59.8	59.7	59.7	59.7	59.6	59.9	59.8	59.6	59.4	
Output gap <sup>4</sup>	1.5	1.6	1.5	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.5	1.7	1.6	1.5	
<i>Previous Tealbook<sup>4</sup></i>	1.5	1.5	1.5	1.5	1.6	1.7	1.7	1.7	1.7	1.6	1.6	1.5	1.7	1.6	1.4	
Industrial production <sup>5</sup>	-2.2	1.2	1.2	1.6	1.3	1.0	.7	1.2	1.0	1.1	1.0	-.4	1.1	1.1	.8	Page 121 of 128
<i>Previous Tealbook<sup>5</sup></i>	-2.1	1.6	.7	.8	1.5	1.6	.8	1.2	1.0	1.1	1.0	-.5	1.2	1.1	.8	
Manufacturing industr. prod. <sup>5</sup>	-3.2	1.1	.3	1.9	1.2	1.0	.9	.8	.9	1.2	1.0	-.9	1.2	1.0	.8	
<i>Previous Tealbook<sup>5</sup></i>	-3.1	1.2	-.3	.7	1.1	1.3	1.0	.9	1.0	1.1	1.0	-1.0	1.0	1.0	.8	
Capacity utilization rate - mfg. <sup>3</sup>	75.5	75.5	75.2	75.5	75.6	75.7	75.8	75.9	76.0	76.2	76.3	75.2	75.8	76.3	77.0	
<i>Previous Tealbook<sup>3</sup></i>	75.5	75.5	75.2	75.2	75.3	75.4	75.4	75.5	75.7	75.8	75.9	75.2	75.4	75.9	76.4 <th data-kind="ghost"></th>	
Housing starts <sup>6</sup>	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.4	1.3	1.2	
Light motor vehicle sales <sup>6</sup>	17.0	17.0	17.0	16.9	16.9	16.8	16.7	16.7	16.6	16.6	16.6	17.0	16.8	16.6	16.5 <th data-kind="ghost"></th>	
<i>Income and saving</i>																
Nominal GDP <sup>5</sup>	4.7	3.7	3.3	3.7	4.1	3.9	3.7	3.7	3.9	3.7	3.6	3.9	3.9	3.8	3.7	
Real disposable pers. income <sup>5</sup>	2.4	3.1	2.3	2.6	1.9	1.5	2.0	2.7	1.7	1.5	1.7	3.1	2.0	1.9	2.1	
<i>Previous Tealbook<sup>5</sup></i>	2.5	3.2	2.3	2.5	1.6	1.1	2.0	2.5	1.4	1.2	1.5	3.1	1.8	1.7	1.7	
Personal saving rate <sup>3</sup>	8.0	8.1	8.1	8.2	8.0	7.8	7.7	7.8	7.7	7.5	7.3	8.1	7.7	7.3	7.2	
<i>Previous Tealbook<sup>3</sup></i>	8.0	8.0	8.0	8.1	7.9	7.6	7.5	7.6	7.4	7.2	7.0	8.0	7.5	7.0	6.6 <th data-kind="ghost"></th>	
Corporate profits <sup>7</sup>	16.0	4.7	-.4	2.0	.9	2.1	-2.4	.7	.3	2.0	.8	.9	.6	1.0	3.4	October 18, 2019
Profit share of GNP <sup>3</sup>	9.6	9.6	9.6	9.5	9.5	9.4	9.3	9.2	9.1	9.1	9.0	9.6	9.3	9.0	9.0	
Gross national saving rate <sup>3</sup>	18.1	18.2	18.1	18.0	18.0	18.0	17.9	17.8	17.8	17.7	17.6	18.1	17.9	17.6	17.4	
Net national saving rate <sup>3</sup>	2.6	3.0	2.8	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.0	2.8	2.5	2.0	1.7	

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	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<i>Employment and production</i>										
Nonfarm payroll employment <sup>1</sup>	192	251	227	193	179	223	152	116	89	68
Unemployment rate <sup>2</sup>	7.0	5.7	5.0	4.8	4.1	3.8	3.6	3.6	3.6	3.6
<i>Previous Tealbook</i> <sup>2</sup>	7.0	5.7	5.0	4.8	4.1	3.8	3.7	3.6	3.6	3.6
Natural rate of unemployment <sup>2</sup>	5.4	5.1	4.9	4.8	4.6	4.4	4.4	4.4	4.4	4.4
<i>Previous Tealbook</i> <sup>2</sup>	5.4	5.1	4.9	4.8	4.6	4.4	4.4	4.4	4.4	4.4
Employment-to-Population Ratio <sup>2</sup>	58.5	59.3	59.4	59.8	60.2	60.6	60.8	60.5	60.3	60.1
Employment-to-Population Trend <sup>2</sup>	60.4	60.3	60.2	60.1	60.1	60.1	59.9	59.8	59.6	59.4
Output gap <sup>3</sup>	-3.0	-1.0	-.5	-.3	.6	1.4	1.5	1.7	1.6	1.5
<i>Previous Tealbook</i> <sup>3</sup>	-3.0	-1.0	-.5	-.3	.6	1.4	1.5	1.7	1.6	1.4
Industrial production	2.3	3.4	-3.4	-.3	3.6	4.0	-.4	1.1	1.1	.8
<i>Previous Tealbook</i>	2.3	3.4	-3.4	-.3	3.6	4.0	-.5	1.2	1.1	.8
Manufacturing industr. prod.	1.1	1.4	-1.7	.3	2.5	2.2	-.9	1.2	1.0	.8
<i>Previous Tealbook</i>	1.1	1.4	-1.7	.3	2.5	2.2	-1.0	1.0	1.0	.8
Capacity utilization rate - mfg. <sup>2</sup>	74.5	75.8	74.9	74.2	75.8	77.0	75.2	75.8	76.3	77.0
<i>Previous Tealbook</i> <sup>2</sup>	74.5	75.8	74.9	74.2	75.8	77.0	75.2	75.4	75.9	76.4
Housing starts <sup>4</sup>	.9	1.0	1.1	1.2	1.2	1.2	1.3	1.4	1.3	1.2
Light motor vehicle sales <sup>4</sup>	15.5	16.5	17.4	17.5	17.1	17.2	17.0	16.8	16.6	16.5
<i>Income and saving</i>										
Nominal GDP	4.4	4.5	2.8	3.5	4.9	4.9	3.9	3.9	3.8	3.7
Real disposable pers. income	-2.5	5.3	3.0	1.6	3.4	3.9	3.1	2.0	1.9	2.1
<i>Previous Tealbook</i>	-2.5	5.3	3.0	1.6	3.4	3.9	3.1	1.8	1.7	1.7
Personal saving rate <sup>2</sup>	6.3	7.5	7.5	6.5	6.8	7.8	8.1	7.7	7.3	7.2
<i>Previous Tealbook</i> <sup>2</sup>	6.3	7.5	7.5	6.5	6.8	7.8	8.0	7.5	7.0	6.6
Corporate profits <sup>5</sup>	3.9	6.7	-10.8	3.3	-.6	4.2	.9	.6	1.0	3.4
Profit share of GNP <sup>2</sup>	11.8	12.1	10.5	10.5	9.9	9.9	9.6	9.3	9.0	9.0
Gross national saving rate <sup>2</sup>	19.2	20.3	19.6	18.1	18.0	17.9	18.1	17.9	17.6	17.4
Net national saving rate <sup>2</sup>	4.0	5.3	4.5	2.7	2.7	2.4	2.8	2.5	2.0	1.7

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. Level, millions; values are annual averages.

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

## Staff Projections of Government-Sector Accounts and Related Items

Item	2017	2018	2019	2020	2021	2022	2019			2020
							Q2	Q3	Q4	Q1
<b>Unified federal budget<sup>1</sup></b>										
Receipts	3,316	3,330	3,450	3,701	3,844	4,017	1,102	841	804	796
Outlays	3,982	4,109	4,418	4,615	4,832	5,161	1,158	1,062	1,154	1,179
Surplus/deficit	-665	-779	-969	-914	-988	-1,144	-56	-221	-350	-383
Surplus/deficit	-3.5	-3.8	-4.6	-4.1	-4.3	-4.8	-1.1	-4.2	-6.5	-7.1
<i>Previous Tealbook</i>	-3.5	-3.8	-4.6	-4.2	-4.3	-4.8	-1.1	-4.2	-6.7	-7.2
Primary surplus/deficit	-2.1	-2.2	-2.8	-2.5	-2.6	-2.9	1.2	-3.0	-4.6	-5.4
Net interest	1.4	1.6	1.8	1.7	1.8	1.9	2.2	1.2	1.9	1.7
Cyclically adjusted surplus/deficit	-3.5	-4.2	-5.2	-4.9	-5.1	-5.6	-1.7	-4.9	-7.3	-7.9
Federal debt held by public	76.0	77.5	79.1	80.2	81.8	84.0	77.0	79.1	80.0	80.6
<b>Government in the NIPA<sup>2</sup></b>										
Purchases	.8	1.5	2.5	1.4	.7	.9	4.8	1.3	.9	2.0
Consumption	.6	1.6	2.1	1.0	.4	.6	4.0	1.8	1.1	1.6
Investment	2.0	1.5	4.3	2.9	2.0	2.0	7.8	.0	.2	3.9
State and local construction	-1.8	-1.5	4.6	1.0	1.0	1.0	14.5	-5.0	-5.0	1.0
Real disposable personal income	3.5	3.9	3.1	2.0	1.9	2.1	2.4	3.1	2.3	2.6
Contribution from transfers <sup>3</sup>	.2	.4	1.1	.5	.6	.8	.7	.4	.4	.9
Contribution from taxes <sup>3</sup>	-.9	.4	-1.0	-.5	-.5	-.6	-1.1	.3	-.1	-.5
<b>Government employment</b>										
Federal	-2	0	3	0	1	1	5	9	-5	23
State and local	9	8	12	9	9	9	2	29	9	9
<b>Fiscal indicators<sup>2</sup></b>										
Fiscal effect (FE) <sup>4</sup>	.2	.4	.9	.6	.4	.4	1.4	.6	.4	.7
Discretionary policy actions (FI)	.3	.6	.7	.4	.1	.2	1.1	.5	.4	.6
<i>Previous Tealbook</i>	.3	.6	.7	.4	.1	.2	1.1	.5	.5	.5
Federal purchases	.1	.2	.2	.1	.0	.0	.5	.1	.1	.2
State and local purchases	.0	.1	.2	.1	.1	.1	.3	.1	.0	.1
Taxes and transfers	.1	.3	.3	.2	.0	.0	.3	.2	.2	.2
Cyclical	-.1	-.1	-.1	.0	.0	.0	-.1	-.1	-.1	.0
Other	.0	-.1	.3	.2	.2	.2	.4	.3	.2	.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 aggregate demand (excluding any multiplier effects and financial offsets). It equals the sum of the direct contributions to aggregate demand 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).

## Greensheets

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

Measure and country	Projected											
	2019				2020				2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Real GDP<sup>1</sup></b>												
Total foreign	1.5	2.1	1.8	1.8	2.2	2.3	2.4	2.4	2.5	2.5	2.6	2.6
<i>Previous Tealbook</i>	1.6	2.1	1.9	1.9	2.3	2.4	2.4	2.5	2.6	2.6	2.6	2.6
Advanced foreign economies	1.3	2.0	1.1	.7	1.3	1.4	1.5	1.5	1.6	1.7	1.7	1.7
Canada	.5	3.7	1.4	1.4	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.8
Japan	2.2	1.3	1.5	-2.8	1.1	1.2	.9	.9	.8	.8	.7	.8
United Kingdom	2.3	-.9	1.0	.9	.7	.7	.7	.7	1.4	1.4	1.4	1.4
Euro area	1.7	.8	.4	.8	1.0	1.2	1.4	1.5	1.7	1.8	1.8	1.7
Germany	1.5	-.3	.1	.7	1.1	1.2	1.2	1.4	1.5	1.6	1.5	1.5
Emerging market economies	1.7	2.1	2.4	2.7	3.0	3.2	3.3	3.3	3.4	3.4	3.5	3.5
Asia	4.2	3.7	3.6	4.0	4.3	4.5	4.4	4.3	4.3	4.3	4.3	4.3
Korea	-1.5	4.2	2.2	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
China	7.3	5.5	5.5	5.7	5.6	5.6	5.6	5.7	5.7	5.7	5.7	5.7
Latin America	-.7	.5	1.1	1.4	1.7	1.8	2.1	2.1	2.3	2.4	2.6	2.6
Mexico	-1.0	.1	1.0	1.2	1.6	1.7	2.0	2.0	2.2	2.3	2.5	2.5
Brazil	-.3	1.8	1.1	2.3	2.0	2.3	2.5	2.6	2.8	2.8	2.8	2.8
<b>Addendum</b>												
Emerging market economies ex. China	.4	1.3	1.7	2.0	2.4	2.6	2.8	2.7	2.8	2.9	2.9	2.9
<b>Consumer prices<sup>2</sup></b>												
Total foreign	.8	3.3	2.3	2.6	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3
<i>Previous Tealbook</i>	.8	3.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3
Advanced foreign economies	.8	2.1	.9	1.5	1.3	1.3	1.5	1.5	1.5	1.5	1.5	1.6
Canada	1.6	3.4	1.6	1.9	1.8	1.9	2.0	2.0	2.0	2.0	2.0	2.0
Japan	.9	.3	.3	2.2	.6	.7	1.0	1.1	1.0	1.0	1.0	1.0
United Kingdom	1.1	2.6	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
Euro area	.2	2.1	.7	1.0	1.1	1.1	1.2	1.3	1.4	1.4	1.4	1.5
Germany	-.1	2.5	.1	1.5	1.6	1.6	1.7	1.8	1.9	2.0	2.1	2.1
Emerging market economies	.8	4.1	3.2	3.3	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8
Asia	.4	3.9	3.3	3.4	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Korea	-3.3	2.7	-.6	1.5	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1
China	.6	4.3	4.6	4.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Latin America	1.7	4.9	3.2	3.4	3.6	3.5	3.4	3.4	3.4	3.3	3.3	3.3
Mexico	1.1	4.5	2.8	2.9	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Brazil	2.9	5.2	2.2	2.8	3.8	3.8	3.8	3.8	3.7	3.7	3.7	3.7
<b>Addendum</b>												
Emerging market economies ex. China	1.0	3.9	2.1	2.9	3.2	3.1	3.1	3.1	3.0	3.0	3.0	3.0

1. Foreign GDP aggregates calculated using shares of U.S. exports.

2. Foreign CPI aggregates calculated using shares of U.S. non-oil imports.

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

Measure and country	2013	2014	2015	2016	2017	2018	Projected			
							2019	2020	2021	2022
<b>Real GDP<sup>1</sup></b>										
Total foreign	3.0	3.0	2.1	2.8	3.1	2.2	1.8	2.3	2.6	2.6
<i>Previous Tealbook</i>	3.0	3.0	2.1	2.8	3.1	2.2	1.9	2.4	2.6	2.6
Advanced foreign economies	2.4	2.0	.9	1.9	2.7	1.4	1.3	1.4	1.7	1.7
Canada	3.4	2.8	-.4	1.8	2.9	1.6	1.8	1.6	1.8	1.8
Japan	2.8	-.4	1.0	1.2	2.4	.3	.5	1.0	.8	.8
United Kingdom	2.7	2.5	2.4	1.8	1.6	1.5	.8	.7	1.4	1.5
Euro area	.7	1.6	2.0	2.1	3.0	1.2	.9	1.3	1.8	1.7
Germany	1.5	2.3	1.3	1.9	3.4	.6	.5	1.2	1.5	1.6
Emerging market economies	3.6	3.9	3.2	3.8	3.4	3.1	2.3	3.2	3.4	3.4
Asia	5.4	5.1	4.6	5.1	5.2	4.4	3.9	4.4	4.3	4.2
Korea	3.7	2.6	3.4	2.7	2.8	3.0	1.8	2.4	2.4	2.3
China	7.6	7.1	6.8	6.8	6.7	6.4	6.0	5.6	5.7	5.6
Latin America	1.7	2.8	1.9	2.5	1.7	1.4	.6	1.9	2.5	2.6
Mexico	1.2	3.4	2.8	3.3	1.5	1.6	.3	1.8	2.4	2.5
Brazil	2.6	-.2	-5.5	-2.3	2.2	1.1	1.2	2.3	2.8	2.8
<b>Addendum</b>										
Emerging market economies ex. China	2.7	3.1	2.4	3.1	2.7	2.3	1.4	2.6	2.9	2.9
<b>Consumer prices<sup>2</sup></b>										
Total foreign	2.4	2.0	1.4	1.9	2.5	2.4	2.2	2.3	2.3	2.3
<i>Previous Tealbook</i>	2.4	2.0	1.4	1.9	2.5	2.4	2.2	2.3	2.3	2.3
Advanced foreign economies	1.0	1.2	.5	.9	1.5	1.7	1.3	1.4	1.5	1.6
Canada	1.0	2.0	1.3	1.4	1.8	2.1	2.1	1.9	2.0	2.0
Japan	1.4	2.6	.1	.3	.6	.8	.9	.9	1.0	1.1
United Kingdom	2.1	.9	.1	1.2	3.0	2.3	1.8	1.9	1.9	1.9
Euro area	.8	.2	.3	.7	1.4	1.9	1.0	1.2	1.4	1.5
Germany	1.4	.4	.5	1.1	1.6	2.2	1.0	1.7	2.0	2.0
Emerging market economies	3.4	2.6	2.0	2.6	3.2	2.9	2.9	2.9	2.8	2.8
Asia	3.2	1.8	1.5	2.1	2.0	2.1	2.7	2.6	2.6	2.6
Korea	1.1	1.0	.9	1.4	1.4	1.8	.0	2.0	2.1	2.1
China	2.9	1.5	1.4	2.1	1.8	2.2	3.4	2.5	2.5	2.5
Latin America	4.0	4.7	3.2	4.0	6.4	5.1	3.3	3.5	3.3	3.2
Mexico	3.6	4.2	2.3	3.3	6.6	4.8	2.8	3.2	3.2	3.2
Brazil	5.8	6.5	10.4	7.1	2.8	4.1	3.3	3.8	3.7	3.5
<b>Addendum</b>										
Emerging market economies ex. China	3.8	3.5	2.4	3.0	4.2	3.5	2.5	3.1	3.0	3.0

1. Foreign GDP aggregates calculated using shares of U.S. exports.

2. Foreign CPI aggregates calculated using shares of U.S. non-oil imports.

## U.S. Current Account

## Quarterly Data

	2019				Projected				2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Billions of dollars, s.a.a.r.											

<b>U.S. current account balance</b>	<b>-544.8</b>	<b>-512.8</b>	<b>-502.0</b>	<b>-529.0</b>	<b>-525.1</b>	<b>-511.9</b>	<b>-537.2</b>	<b>-540.9</b>	<b>-547.5</b>	<b>-534.6</b>	<b>-553.0</b>	<b>-577.5</b>
<i>Previous Tealbook</i>	-529.1	-482.7	-501.1	-511.7	-501.1	-496.1	-518.4	-520.9	-524.5	-516.6	-533.4	-556.5
Current account as percent of GDP	-2.6	-2.4	-2.3	-2.4	-2.4	-2.3	-2.4	-2.4	-2.4	-2.3	-2.4	-2.5
<i>Previous Tealbook</i>	-2.5	-2.3	-2.3	-2.4	-2.3	-2.2	-2.3	-2.3	-2.3	-2.2	-2.3	-2.4
Net goods & services	-625.9	-653.3	-647.5	-642.2	-630.2	-626.9	-637.6	-633.5	-634.7	-626.3	-633.5	-644.3
Investment income, net	240.4	283.4	295.0	270.0	260.2	257.8	250.0	249.4	242.4	234.5	230.0	223.7
Direct, net	312.9	346.1	364.1	348.3	351.5	360.1	361.7	371.6	375.0	377.9	385.2	390.5
Portfolio, net	-72.5	-62.7	-69.1	-78.3	-91.2	-102.4	-111.7	-122.2	-132.6	-143.4	-155.2	-166.8
Other income and transfers, net	-159.3	-142.8	-149.5	-156.9	-155.1	-142.8	-149.5	-156.9	-155.1	-142.8	-149.5	-156.9

	Annual Data										Projected
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
	Billions of dollars										
<b>U.S. current account balance</b>	<b>-348.8</b>	<b>-365.2</b>	<b>-407.8</b>	<b>-428.3</b>	<b>-439.6</b>	<b>-491.0</b>	<b>-522.2</b>	<b>-528.8</b>	<b>-553.2</b>	<b>-578.3</b>	
<i>Previous Tealbook</i>	-348.8	-365.2	-407.8	-428.3	-439.6	-491.0	-506.1	-509.1	-532.7	-561.1	
Current account as percent of GDP	-2.1	-2.1	-2.2	-2.3	-2.3	-2.4	-2.4	-2.4	-2.4	-2.4	
<i>Previous Tealbook</i>	-2.1	-2.1	-2.2	-2.3	-2.3	-2.4	-2.4	-2.3	-2.3	-2.3	
Net goods & services	-461.1	-489.6	-498.5	-503.0	-550.1	-627.7	-642.2	-632.1	-634.7	-644.5	
Investment income, net	215.4	228.9	214.7	211.1	238.7	266.9	272.2	254.4	232.6	217.2	
Direct, net	283.3	284.2	284.6	278.0	304.0	330.3	342.8	361.2	382.1	410.2	
Portfolio, net	-67.9	-55.3	-70.0	-66.9	-65.3	-63.4	-70.6	-106.9	-149.5	-193.0	
Other income and transfers, net	-103.1	-104.6	-123.9	-136.4	-128.2	-130.2	-152.1	-151.1	-151.1	-151.1	

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

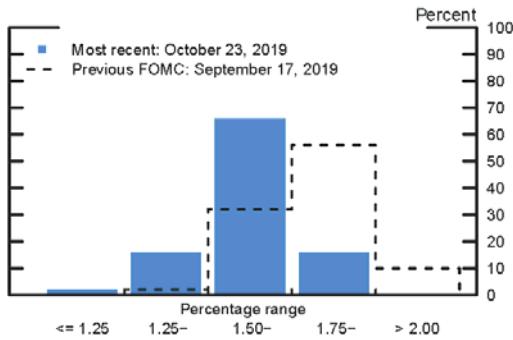
October 24, 2019

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

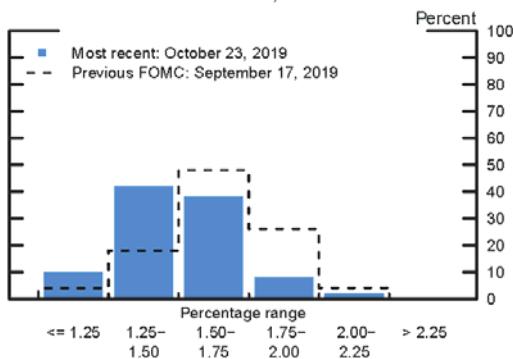
Figure 1: Market-Implied Probability Distribution of the Federal Funds Rate in November 2019



Note: Estimated from federal funds futures options, not adjusted for risk premiums. The distribution for November 2019 is used to provide a read on the distribution following the October FOMC meeting.

Source: CME Group, Board staff calculations.

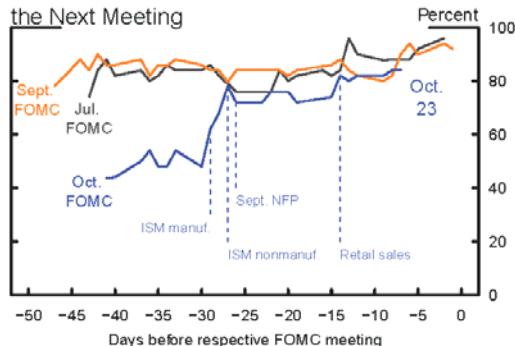
Figure 3: Market-Implied Probability Distribution of the Federal Funds Rate, Year-End 2019



Note: Estimated from federal funds futures options, not adjusted for risk premiums. The distribution for January 2020 is used to provide a read on the distribution at the end of 2019.

Source: CME Group, Board staff calculations.

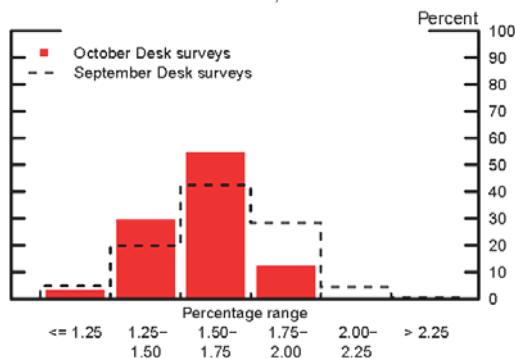
Figure 2: Option-Implied Probability of a Decline in the Federal Funds Rate at the Next Meeting



Note: Probabilities implied by federal funds futures options, not adjusted for risk premiums. Each line represents the probability of a decline in the average federal funds rate below the target range in effect until the next meeting.

Source: CME Group, Board staff calculations.

Figure 4: Desk Surveys Probability Distribution of the Federal Funds Rate, Year-End 2019



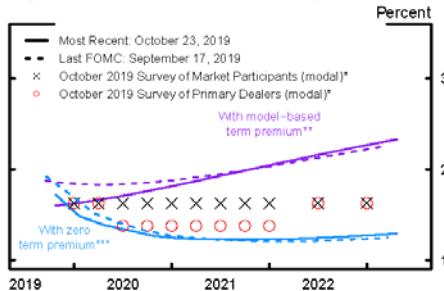
Note: Probabilities are the averages of the probabilities assigned by respondents to the Survey of Market Participants and Survey of Primary Dealers to different ranges of the federal funds rate following the December FOMC meeting.

Source: FRBNY

target range, to decline an additional 28 basis point by end-2020, and to remain flat thereafter. In contrast, the latest path from a staff term structure model that adjusts for term premiums (the purple lines) suggests a shorter easing cycle, with the federal funds rate expected to decline 26 basis points by end-2019, before rising around 20 basis points in both 2020 and 2021. The expected federal funds rate path implied by an alternative macro-finance model (not shown) lies closer to the unadjusted forward rate path and suggests a reduction in the federal funds rate of 30 basis points by end-2019 and an additional 17 basis points by end-2020.

Results from the Desk's October Surveys of Primary Dealers and Market Participants offered somewhat differing perspectives on the expected federal funds rate path. The modal path for the federal funds rate reported by the median respondent to the Survey of Primary Dealers (the open red circles in figure 5) points to expectations for a 25-basis-point decline in the target range by year-end 2019 and an additional 25-basis-point cut in the first quarter of 2020. In contrast, the implied modal path from the Survey of Market Participants (the black crosses), although similarly suggesting a 25-basis-point decline in the target range by year-end, has a flat path thereafter.

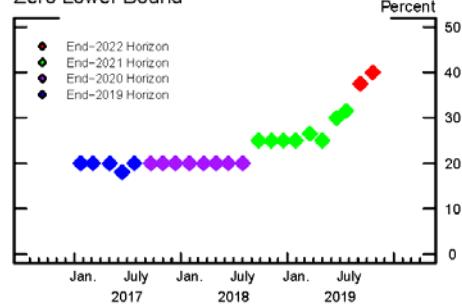
Figure 5: Federal Funds Rate Projections



\* Median of respondents' modal paths for the federal funds rate.  
 \*\* Adjusting for premiums using a term structure model maintained by Board staff.  
 \*\*\* Estimated using overnight index swap quotes with a spline approach and a term premium of zero basis points.

Source: Bloomberg, Federal Reserve Board staff estimates, FRBNY.

Figure 6: Probability of Returning to the Zero Lower Bound\*



\* The Desk surveys ask for the probability of moving to the zero lower bound at some point between the date of the survey and the end of the indicated horizon. Source: FRBNY.

Figure 7: Market-Based Probability of the 3-Month LIBOR Turning Negative, Two Years Ahead



Note: Estimated from options on Eurodollar futures using a model based on a mixture of normal distributions.  
 Source: CME Group, Board staff calculations.

Figure 8: Measures of Longer-Run Federal Funds Rate Expectations



\* Monthly average 5-to-10-year forward rate derived from prices of Treasury securities.

\*\* Monthly average 5-to-10-year forward rate adjusted for three alternative model-based term premium estimates using Kim and Wright (2005), D'Amico, Kim, and Wei (2018), and Kim and Prebsch (2019).

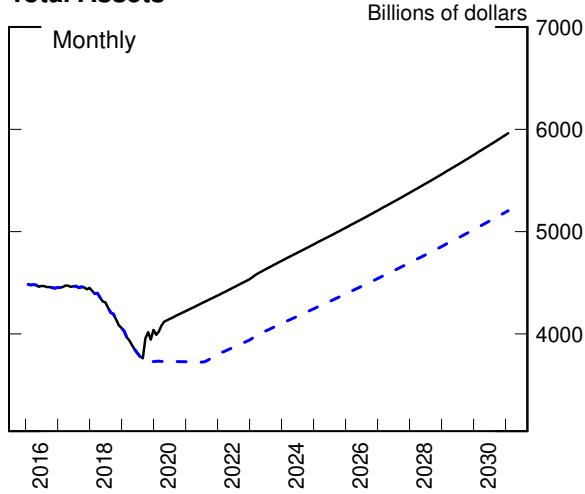
\*\*\* Most recent long-run survey value is from the June 2019 Blue Chip survey.

Note: Forward rates and term structure model estimates for October 2019 are based on values through October 23.  
 Source: Blue Chip, FRBNY; Federal Reserve Board staff estimates.

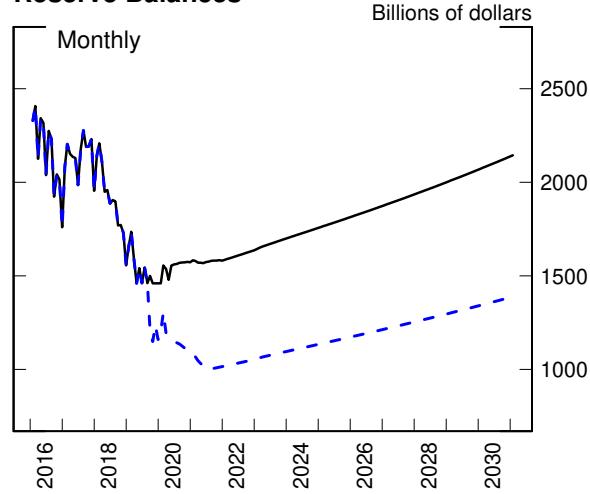
## Total Assets and Selected Balance Sheet Items

— October Tealbook baseline      - - - September Tealbook baseline

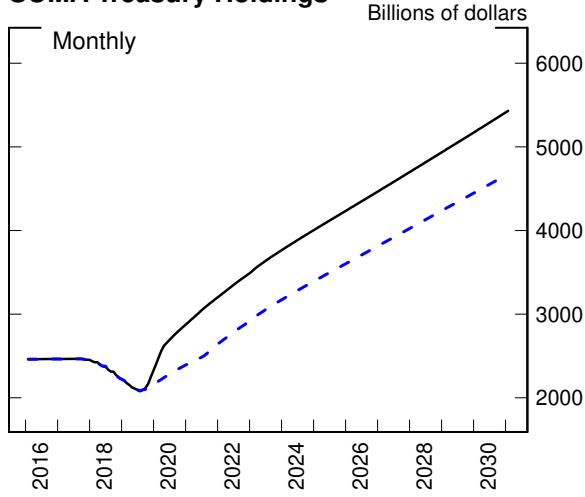
### Total Assets



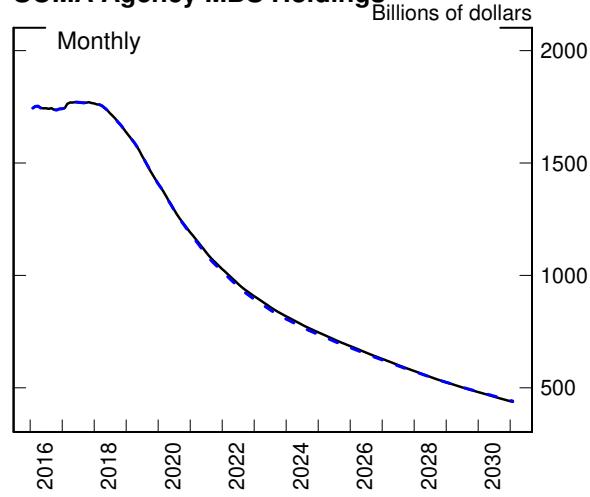
### Reserve Balances



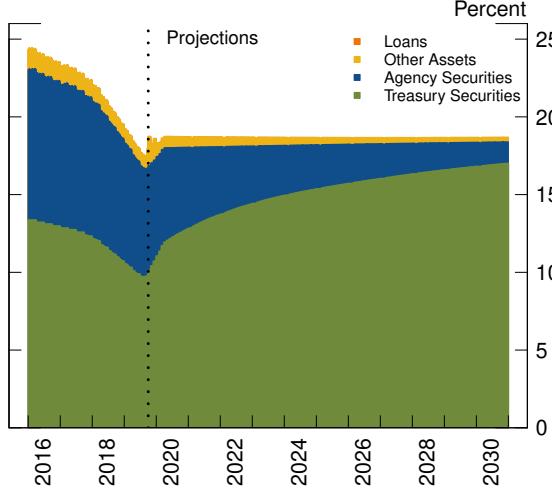
### SOMA Treasury Holdings



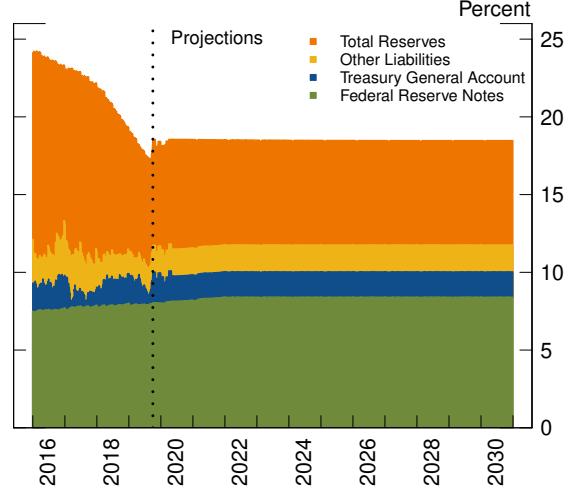
### SOMA Agency MBS Holdings



### Assets as a Percent of GDP

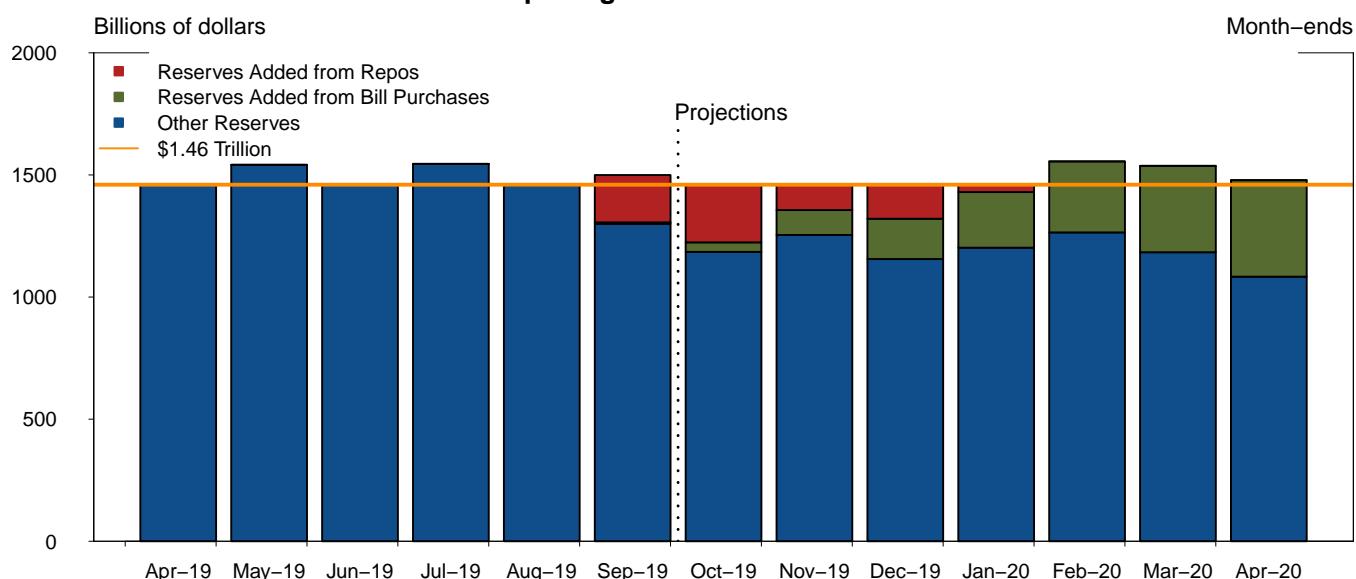


### Liabilities as a Percent of GDP



## SOMA Open Market Operations and Their Near-Term Effect on Reserve Balances

### Decomposing the Path of Reserve Balances

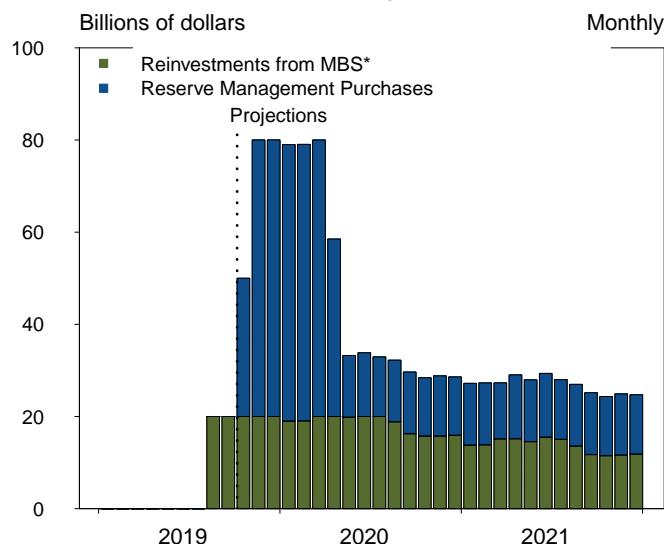


### Balance Sheet & Income

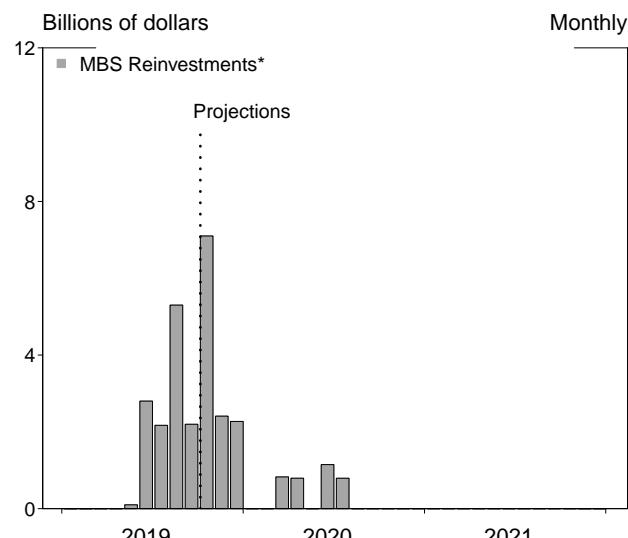
#### Reinvestments from Agency Securities\*

Date	Reserve Management Purchases of Treasury Securities		to Treasury Securities		to Agency MBS	
	Period	Since Oct 2019	Period	Since Aug 2019	Period	Since Aug 2019
2019: October	30.0	30.0	20.0	60.0	7.1	14.6
2019: November	60.0	90.0	20.0	80.0	2.4	17.0
2019: December	60.0	150.0	20.0	100.0	2.3	19.3
2020:Q1	180.0	330.0	58.1	158.1	0.8	20.1
2019	150.0	150.0	100.0	100.0	24.3	19.3
2020	323.7	473.7	220.5	320.5	3.6	22.8
2021	158.9	632.6	163.3	483.8	0.0	22.8
2022	163.3	795.9	120.6	604.4	0.0	22.8

#### SOMA Treasury Securities



#### SOMA MBS Securities



\* Principal payments from holdings of agency securities below \$20 billion per month are reinvested into Treasury securities, while those above are reinvested into agency MBS.

**Federal Reserve Balance Sheet**  
**Month-end Projections – October Tealbook**  
(Billions of dollars)

	Historical*			Projections				
	Aug 2014	Sep 2017	Sep 2019	Dec 2019	Dec 2020	Dec 2022	Dec 2025	Dec 2030
Total assets	4,416	4,460	3,957	4,039	4,222	4,534	5,037	5,945
<b>Selected assets</b>								
Loans and other credit extensions**	2	6	1	0	0	0	0	0
Securities held outright	4,157	4,240	3,585	3,737	4,067	4,397	4,921	5,853
U.S. Treasury securities	2,437	2,465	2,116	2,326	2,874	3,487	4,233	5,411
Agency debt securities	42	7	2	2	2	2	2	2
Agency mortgage-backed securities	1,678	1,768	1,467	1,408	1,192	908	686	441
Unamortized premiums	209	162	127	125	114	96	74	47
Unamortized discounts	-19	-14	-13	-12	-11	-10	-8	-6
Total other assets	66	66	256	190	50	50	50	50
Total liabilities	4,360	4,419	3,917	3,999	4,181	4,490	4,987	5,882
<b>Selected liabilities</b>								
Federal Reserve notes in circulation	1,249	1,533	1,716	1,740	1,847	2,034	2,262	2,669
Reverse repurchase agreements	277	432	294	301	312	336	374	441
Deposits with Federal Reserve Banks	2,825	2,447	1,902	1,954	2,017	2,115	2,346	2,766
Reserve balances held by depository institutions	2,762	2,190	1,500	1,460	1,572	1,636	1,813	2,138
U.S. Treasury, General Account	49	176	328	423	371	399	443	523
Other deposits	15	82	74	72	74	80	89	105
Earnings remittances due to the U.S. Treasury	3	2	1	0	0	0	0	0
Total Federal Reserve Bank capital***	56	41	39	39	40	44	50	63

Source: Federal Reserve H.4.1 daily data and staff calculations.

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

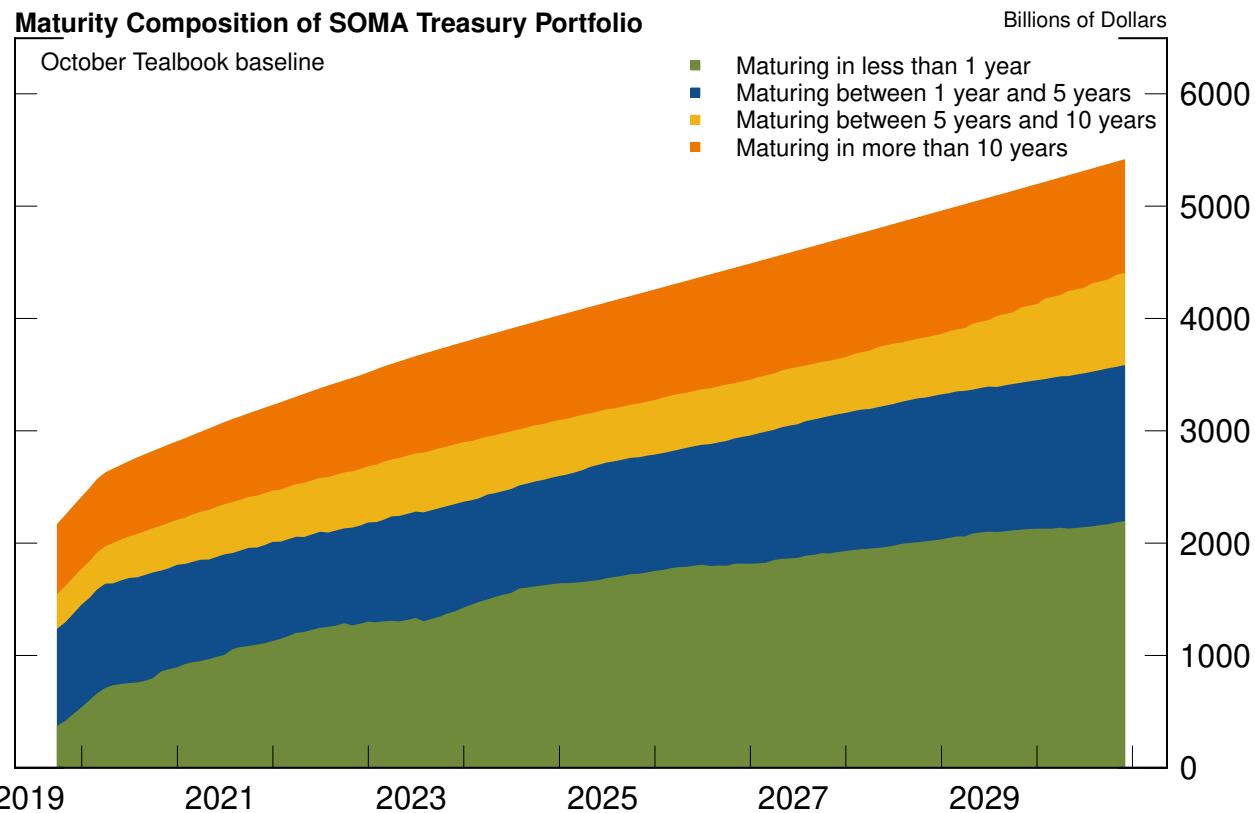
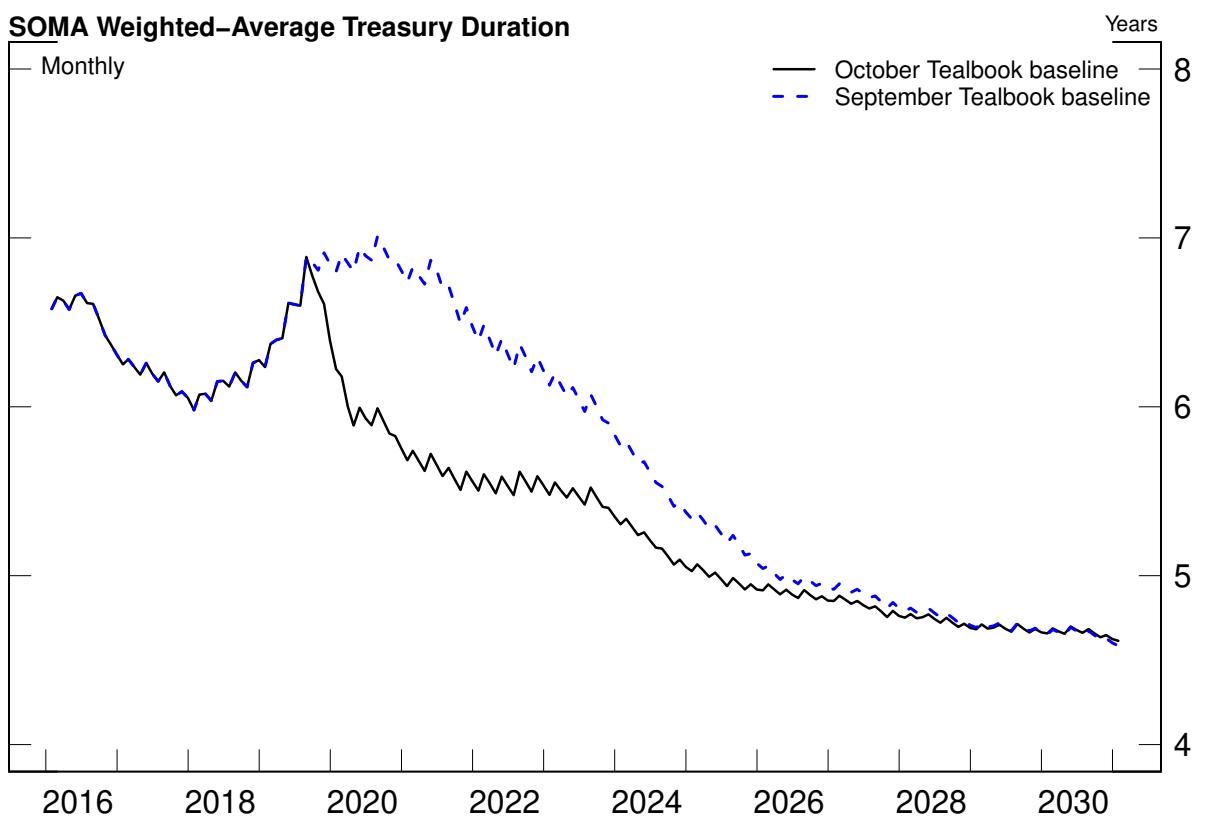
\*August 2014 corresponds to the peak month-end value of reserve balances; September 2017 corresponds to the last month-end before the initiation of the normalization program; September 2019 is the most recent historical value

\*\*Loans and other credit extensions includes discount window credit; central bank liquidity swaps; and net portfolio holdings of Maiden Lane LLC.

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

## Projections for the Characteristics of SOMA Treasury Securities Holdings

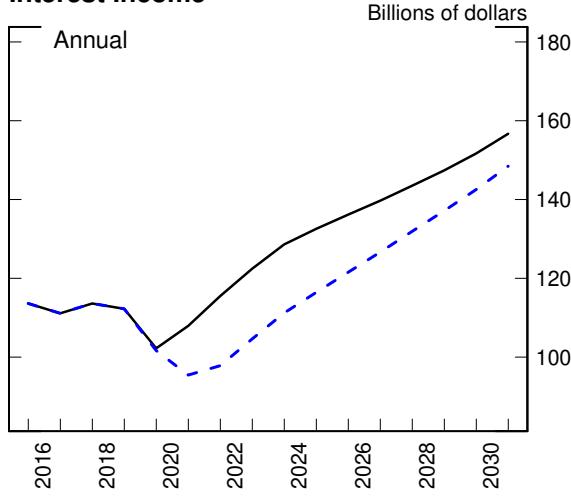
Balance Sheet &amp; Income



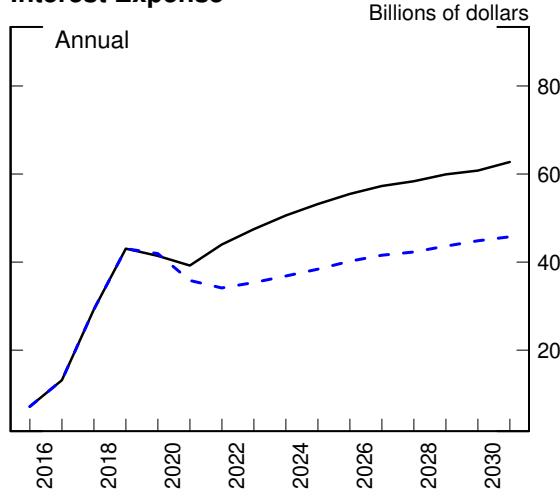
## Income Projections

— October Tealbook baseline      - - - September Tealbook baseline

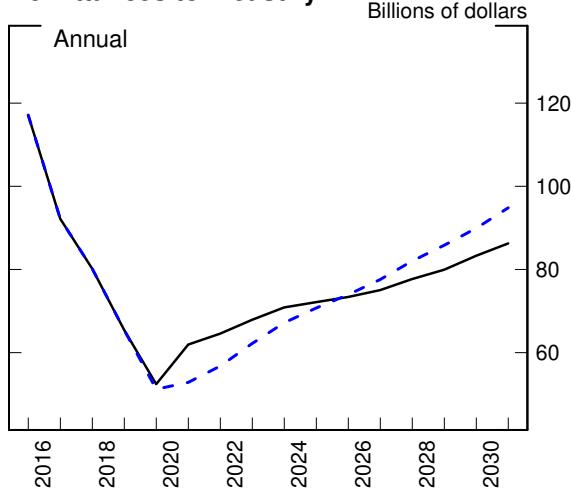
### Interest Income



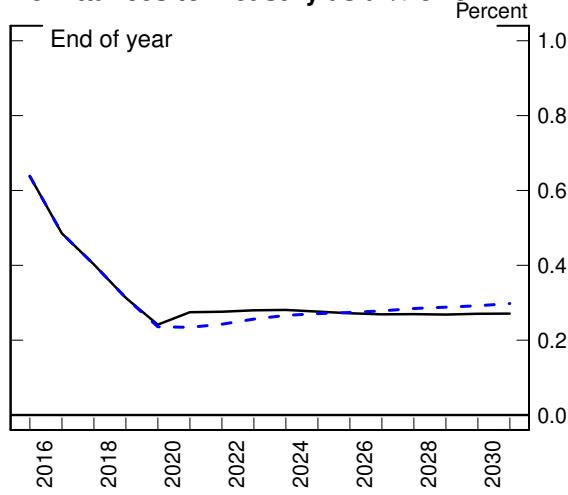
### Interest Expense



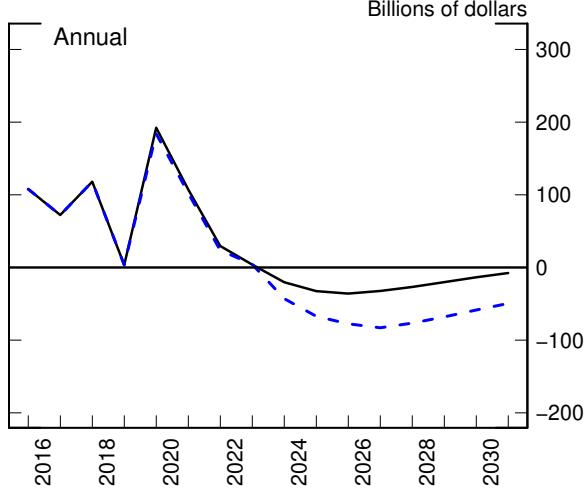
### Remittances to Treasury



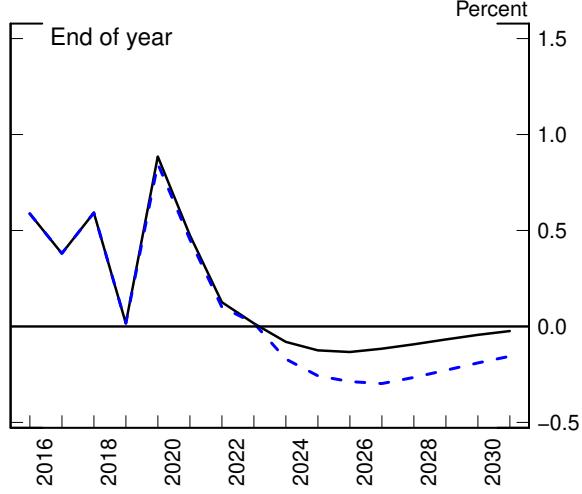
### Remittances to Treasury as a % of GDP



### Unrealized Gains/Losses



### Unrealized Gains/Losses as a % of GDP



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

Date	October Tealbook	September Tealbook
Quarterly Averages		
2019:Q4	-137	-130
2020:Q1	-136	-129
Q2	-135	-128
Q3	-135	-127
Q4	-134	-125
2021:Q4	-131	-121
2022:Q4	-128	-117
2023:Q4	-124	-112
2024:Q4	-122	-109
2025:Q4	-120	-107
2026:Q4	-118	-105
2027:Q4	-116	-103
2028:Q4	-115	-101
2029:Q4	-113	-99
2030:Q4	-111	-97