

**Prefatory Note**

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

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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

September 6, 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

## Revisions to the Staff Projection since the Previous SEP

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

Trade tensions, global growth concerns, and financial market conditions have fluctuated notably since the June forecast, but our projections for slowing GDP growth and an unemployment rate that essentially moves sideways over the medium term are quite similar. On balance, GDP at the end of 2022 is slightly higher and the unemployment rate is a bit lower than in June. Even so, the output gap is now projected to roughly flatten out at a lower level, as we have revised up our assumption for potential output—largely reflecting a downward revision to our assumed natural rate of unemployment from 4.6 percent to 4.4 percent—in the current projection.

The less-tight resource utilization shows through to slightly lower projected inflation over the medium term relative to the June Tealbook. Core inflation is forecast to move sideways at 1.8 percent—equal to our estimate of underlying inflation—as the effects of still-tight resource utilization are offset by an appreciating dollar. Total inflation is forecast to run in line with core inflation after this year, because energy prices are projected to become less of a drag on inflation.

The assumed path for the federal funds rate is currently a bit lower than in June, reflecting the FOMC's decision to reduce the federal funds rate target in July, along with the smaller output gap and lower inflation in the current projection.

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

Variable	2019		2019	2020	2021	2022	Longer run
	H1	H2					
Real GDP <sup>1</sup> <i>June Tealbook</i>	2.5 2.4	1.8 1.7	2.1 2.0	2.0 2.1	1.8 1.7	1.7 1.5	1.7 1.7
Unemployment rate <sup>2</sup> <i>June Tealbook</i>	3.6 3.6	3.7 3.7	3.7 3.7	3.6 3.7	3.6 3.7	3.6 3.8	4.4 4.6
PCE inflation <sup>1</sup> <i>June Tealbook</i>	1.3 1.4	1.6 1.6	1.5 1.5	1.8 1.9	1.8 1.9	1.8 1.9	2.0 2.0
Core PCE inflation <sup>1</sup> <i>June Tealbook</i>	1.4 1.5	2.1 2.1	1.8 1.8	1.8 1.9	1.8 1.9	1.8 1.9	n.a. n.a.
Federal funds rate <sup>2</sup> <i>June Tealbook</i>	2.40 2.39	2.23 2.40	2.23 2.40	2.40 2.56	2.46 2.62	2.50 2.64	2.50 2.50
Memo: Federal funds rate, end of period <i>June Tealbook</i>	2.38 2.39	2.24 2.40	2.24 2.40	2.40 2.56	2.47 2.62	2.50 2.64	2.50 2.50
Output gap <sup>2,3</sup> <i>June Tealbook</i>	1.5 2.0	1.5 1.9	1.5 1.9	1.7 2.2	1.6 2.0	1.4 1.7	n.a. n.a.

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

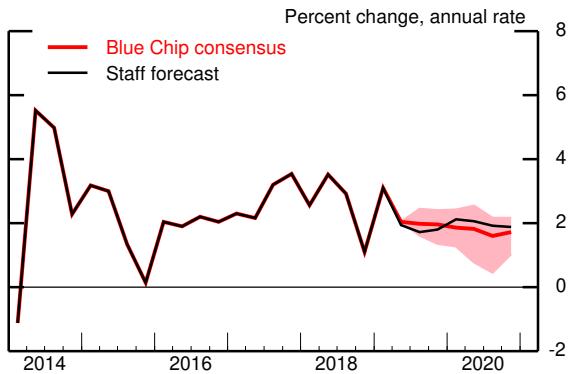
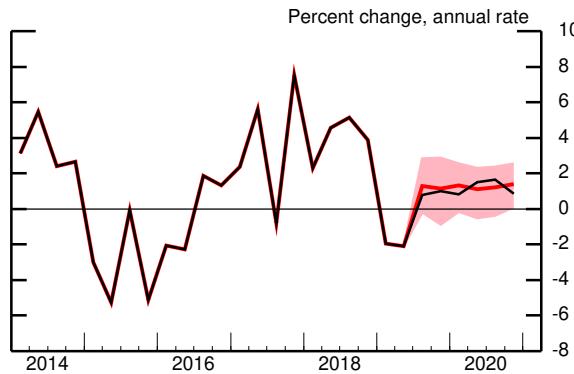
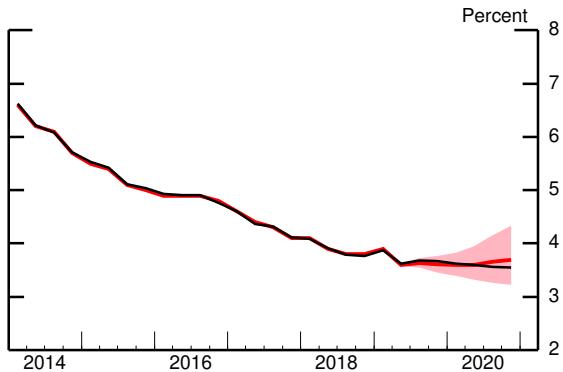
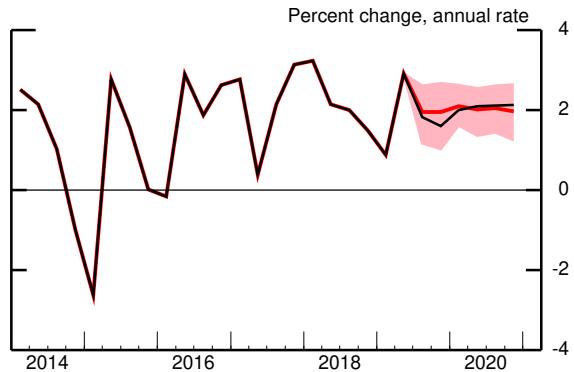
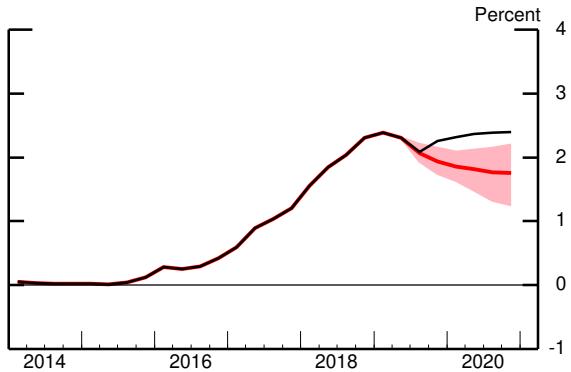
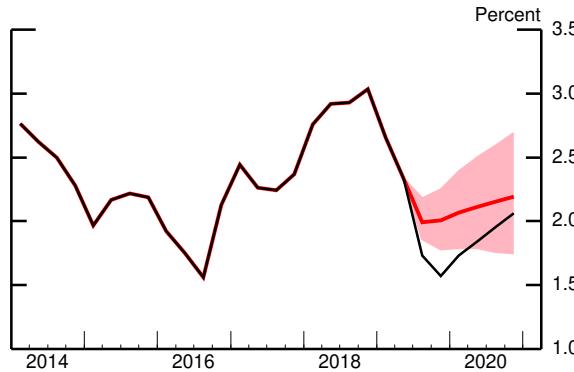
2. Percent, final quarter of period indicated.

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

n.a. Not available.

## Tealbook Forecast Compared with Blue Chip

(Blue Chip survey released August 10, 2019)

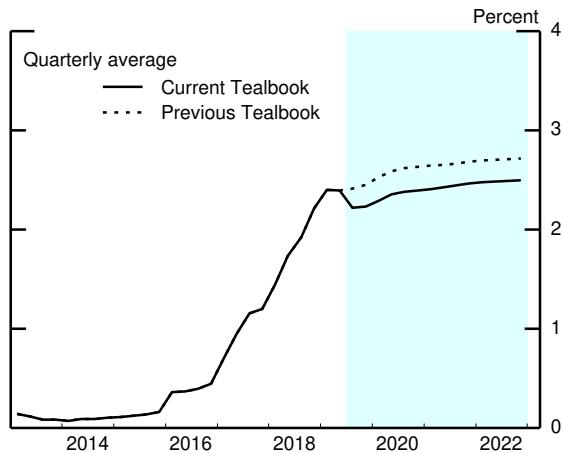
**Real GDP****Industrial Production****Unemployment Rate****Consumer Price Index****Treasury Bill Rate****10-Year Treasury Yield**

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.

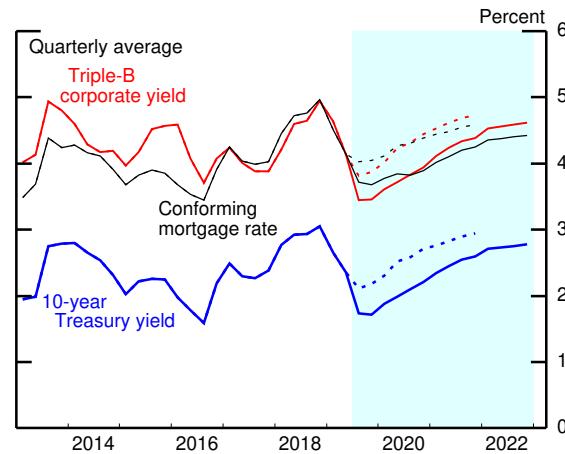
Note: The shaded area represents the area between the Blue Chip top 10 and bottom 10 averages.

## Key Background Factors underlying the Baseline Staff Projection

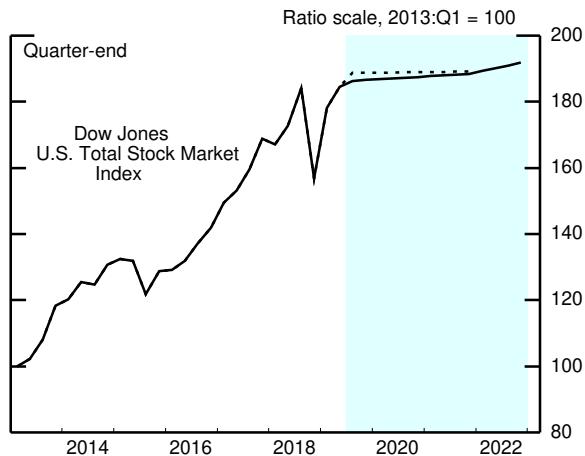
Federal Funds Rate



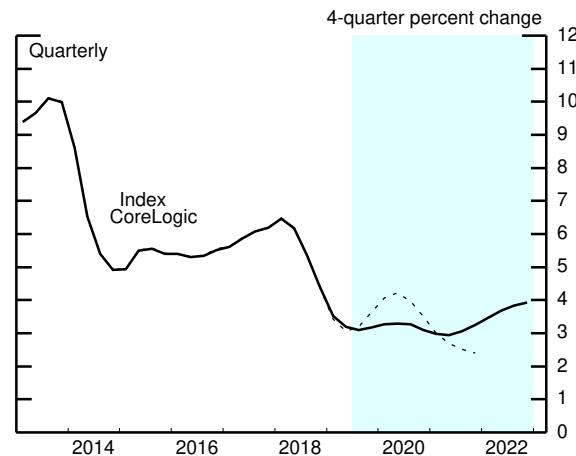
Long-Term Interest Rates



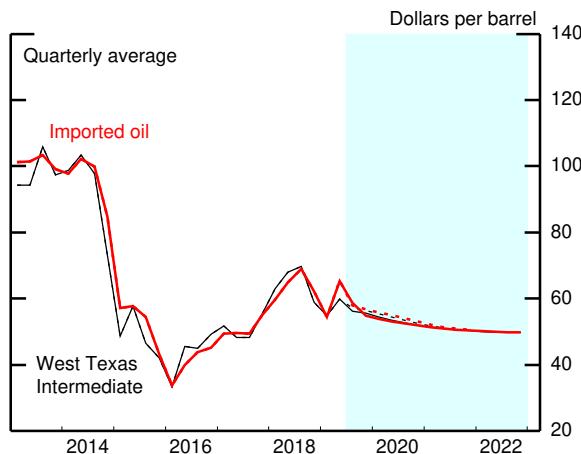
Equity Prices



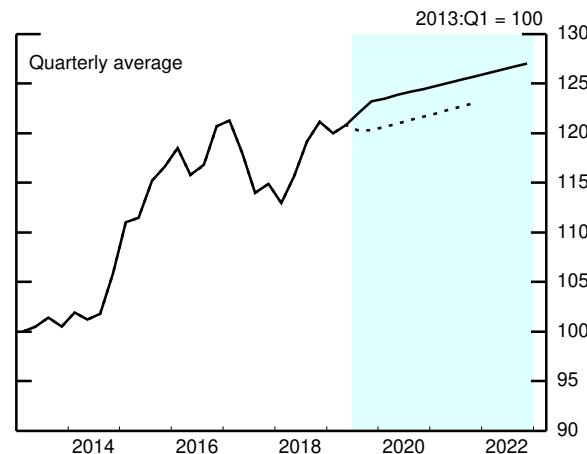
House Prices



Crude Oil Prices



Broad Real Dollar



## The Bipartisan Budget Act of 2019

The Bipartisan Budget Act of 2019 (BBA 2019) was signed into law on August 2. The legislation increased the caps that constrain federal discretionary budget authority in both fiscal years 2020 and 2021 to about \$1.37 trillion.<sup>1</sup> Notably, the agreement eliminated the risk that budget authority in fiscal 2020 and 2021 would be constrained by the caps agreed to under the Budget Control Act of 2011, which were about \$150 billion lower. In addition to increasing the caps for the next two years, the BBA 2019 suspended the statutory federal debt limit through July 31, 2021.

Although the BBA 2019 set higher nominal caps on budget levels, the spending is not authorized until legislators pass, and the President signs, fiscal 2020 and 2021 appropriations bills. Should the Congress and the Administration fail to reach an agreement on the necessary appropriations bills by the beginning of fiscal 2020 (October 1), they will need to pass a continuing resolution that temporarily extends funding in order to avoid a government shutdown.<sup>2</sup>

The new budget caps are about \$25 billion higher relative to the fiscal 2019 caps and support aggregate demand through their effect on government purchases. If enacted budget authority is set at the cap levels—as we expect and as has been the case in recent years—then we project that federal discretionary spending will rise a little faster than inflation, on average, over the next couple of years.<sup>3</sup> Specifically, the staff now expects that real federal purchases will increase 1.2 percent in 2020 and move roughly sideways in 2021 (table, line 1). In terms of contributions to real GDP growth, the staff estimates that the direct first-round effect of federal purchases on aggregate demand will be about 0.3 percentage point in 2019, step down to 0.1 percentage point in 2020, and be roughly neutral in 2021 (line 3), close to the previous Tealbook (line 4).<sup>4</sup>

<b>Real Federal NIPA Purchases</b>				
	(Percent change, Q4/Q4)			
	2018	2019	2020	2021
(1) Current	2.7	4.3	1.2	.2
(2) July Tealbook	2.7	4.5	1.7	.8
<b>Contribution to real GDP growth, percentage points</b>				
(3) Current	.20	.30	.10	.00
(4) July Tealbook	.20	.30	.10	.05

Source: Staff estimates.

<sup>1</sup> Some funding for discretionary spending is not subject to the caps, including appropriations designated for overseas contingency operations (such as those in Afghanistan and Iraq) and disaster relief. In fiscal 2019, those categories totaled \$116 billion in budget authority.

<sup>2</sup> Recall that the partial federal government shutdown last December and January began when the Congress and the Administration were unable to pass appropriations bills for fiscal 2019 despite having already agreed to budget caps in the Bipartisan Budget Act of 2018.

<sup>3</sup> Within a fiscal year, government agencies generally sign contracts for goods and services that commit to spending that year's budget authority. However, a significant share of the purchases of goods and services typically occurs in subsequent fiscal years. To estimate the timing of purchases, we rely on estimates of budget authority spendout rates from the Congressional Budget Office and the Department of Defense.

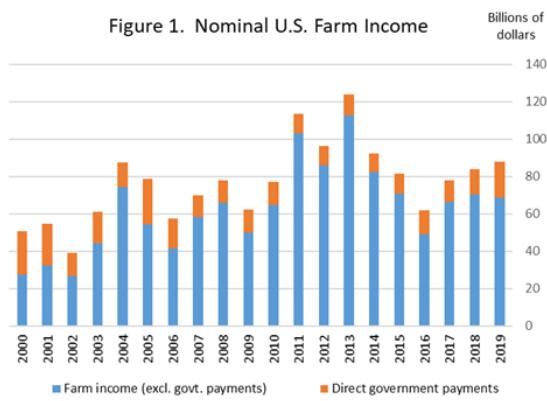
<sup>4</sup> To place these projected aggregate demand effects in a historical context, since 1979 the average annual contribution of federal purchases to the rate of change in real GDP is about 0.15 percentage point.

## Developments in the U.S. Agricultural Sector

The performance of the U.S. agricultural sector has been relatively subdued in recent years against a backdrop of fairly strong GDP growth. As shown in figure 1, nominal farm income was elevated from 2011 to 2013, reflecting strong export demand and elevated prices for agricultural commodities. Beginning in 2014, however, prices for major agricultural commodities dropped sharply and led to declines in farm income over the next few years. With prices for farm commodities having remained low, farm income is projected to rise only modestly this year, even after accounting for the increased support from direct government payments related to trade policies. The farm income figures for 2019 are USDA projections. Some private-sector analysts have indicated that the 2019 forecast appears overly optimistic and is likely to be marked down as more complete data become available.

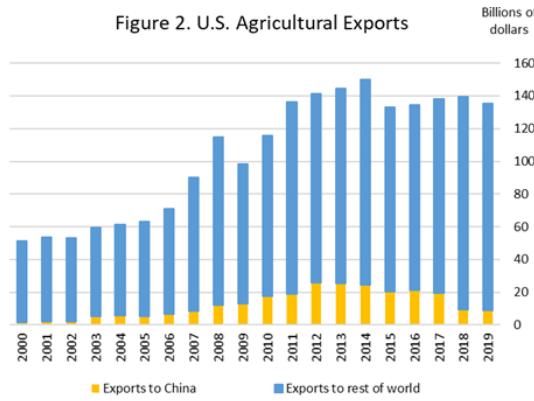
Over 2000 to 2014, U.S. agricultural exports increased almost 200 percent, with significant increases in exports to China (figure 2). Since then, however, U.S. agricultural exports have weakened, on average, as foreign production has risen strongly. Moreover, amid ongoing trade tensions, exports to China dropped sharply in 2018 and have fallen further so far this year. For example, the value of U.S. soybean exports to China dropped approximately 75 percent in 2018 compared with the previous year, and the pace in the first half of 2019 has remained unchanged from a year ago. Given recent trade tensions, China now buys most of its soybeans from Brazil, a pattern that some industry analysts suggest may become permanent and have long-lasting negative implications for U.S. producers.

Figure 1. Nominal U.S. Farm Income



Note: 2019 data are USDA forecasts.  
Source: USDA, Farm Income and Wealth Statistics.

Figure 2. U.S. Agricultural Exports



Note: Annualized based on change from January to July 2019 relative to same period in 2018.  
Source: USDA, Foreign Agriculture Service.

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

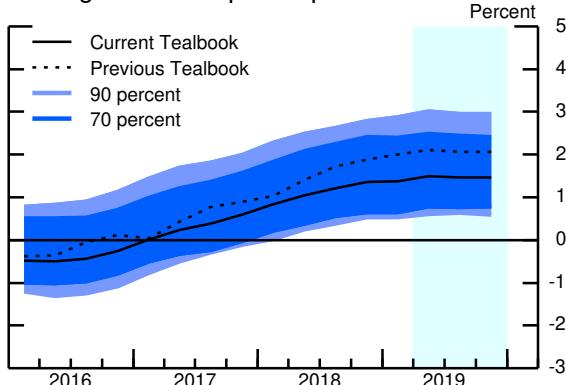
(Percent change at annual rate from final quarter of preceding period except as noted)

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>1.5</b>	<b>1.5</b>
<i>Previous Tealbook</i>	.9	1.9	2.1	2.1	2.1	2.1
Real GDP	2.8	2.5	2.1	1.9	1.7	1.8
<i>Previous Tealbook</i>	2.5	3.0	2.3	2.5	1.6	1.8
Measurement error in GDP	.1	-.1	.2	-.3	.0	.0
<i>Previous Tealbook</i>	.0	.2	.3	.3	.0	.0
Potential output	1.8	1.8	1.8	1.8	1.8	1.8
<i>Previous Tealbook</i>	1.7	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.

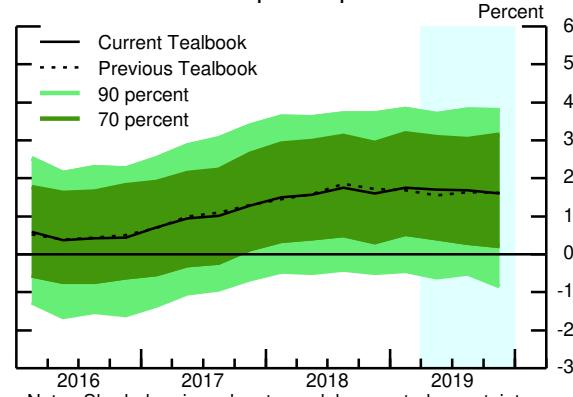
1. Percent, average for the final quarter in the period.

### Judgmental Output Gap



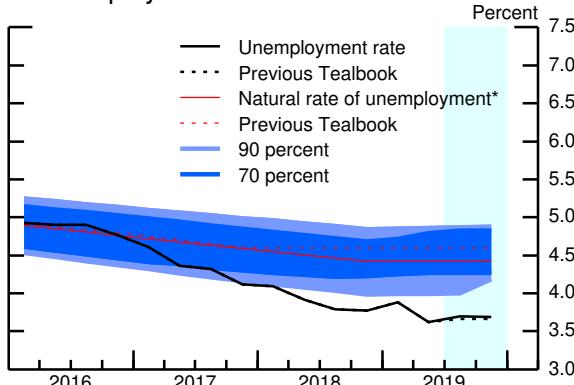
Note: Shaded regions show the distribution of historical revisions to the staff's estimates of the output gap.  
Source: Various macroeconomic data; staff assumptions.

### Model-Based Output Gap



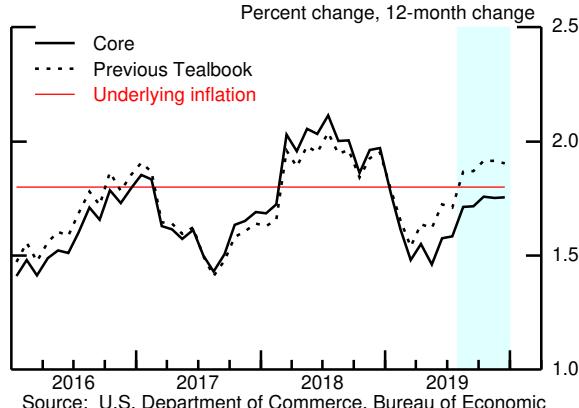
Note: Shaded regions denote model-computed uncertainty bands.  
Source: Various macroeconomic data; staff assumptions.

### 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.

## Summary of the Near-Term Outlook for GDP

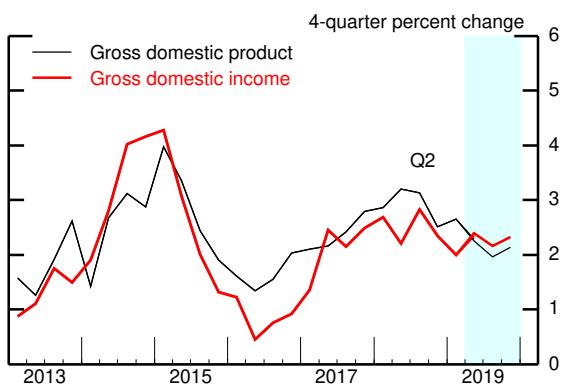
(Percent change at annual rate except as noted)

Measure	2019:Q2		2019:Q3		2019:H2	
	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook
<b>Real GDP</b>	<b>2.5</b>	<b>1.9</b>	<b>1.6</b>	<b>1.7</b>	<b>1.7</b>	<b>1.8</b>
Private domestic final purchases	3.1	3.3	2.2	2.2	2.2	2.2
Personal consumption expenditures	4.1	4.7	2.5	3.2	2.5	2.7
Residential investment	-2.6	-3.1	4.3	1.9	5.8	4.1
Nonres. private fixed investment	.0	-1.4	.0	-3.0	-.1	-1.1
Government purchases	6.2	4.6	1.1	1.4	1.2	1.4
<i>Contributions to change in real GDP</i>						
Inventory investment <sup>1</sup>	-.8	-.9	-.2	-.1	-.3	-.3
Net exports <sup>1</sup>	-.3	-.7	-.3	-.3	.0	-.1

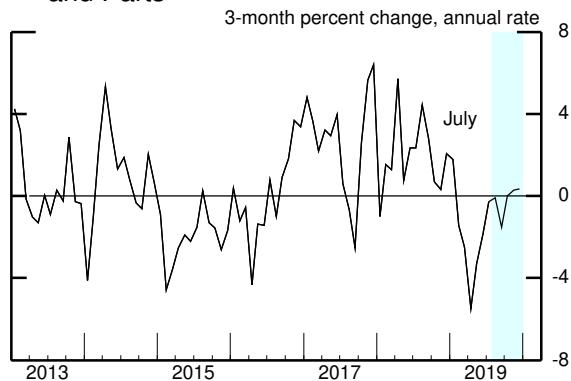
1. Percentage points.

### Recent Nonfinancial Developments (1)

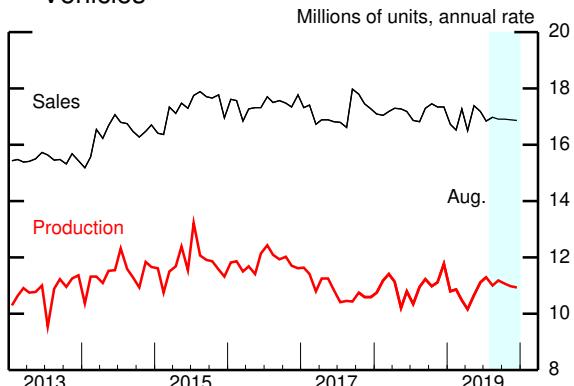
Real GDP and GDI



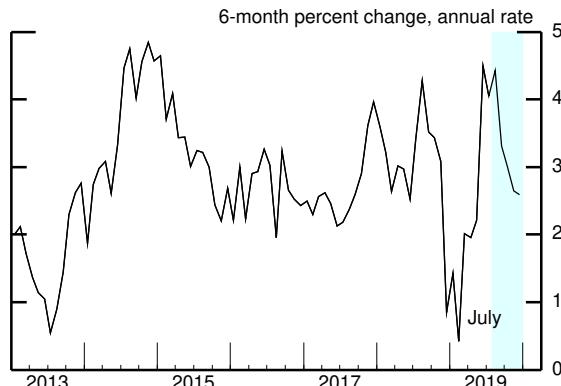
Manufacturing IP ex. Motor Vehicles and Parts



Sales and Production of Light Motor Vehicles

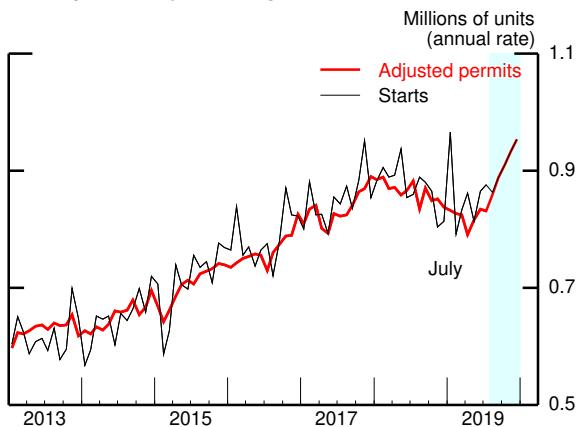


Real PCE Growth



## Recent Nonfinancial Developments (2)

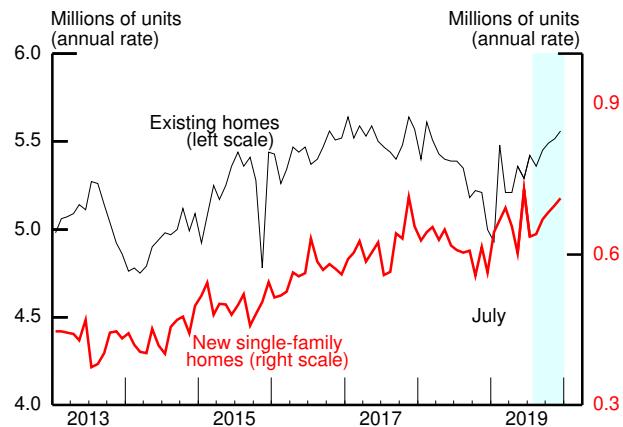
### Single-Family Housing Starts and Permits



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

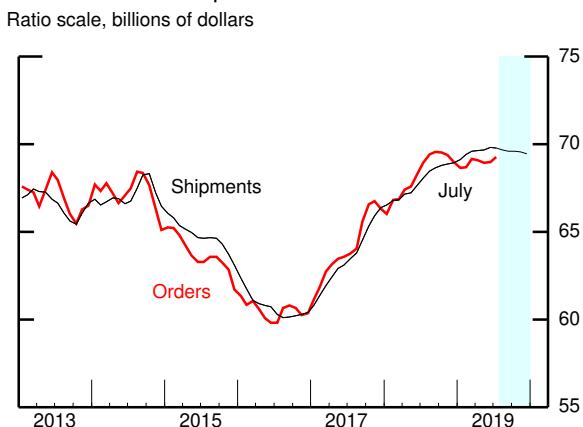
Source: U.S. Census Bureau.

### Home Sales



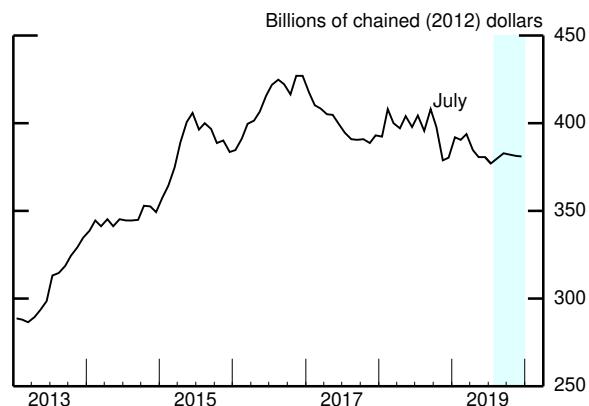
Source: For existing, National Association of Realtors; for new, U.S. Census Bureau.

### Nondefense Capital Goods ex. Aircraft



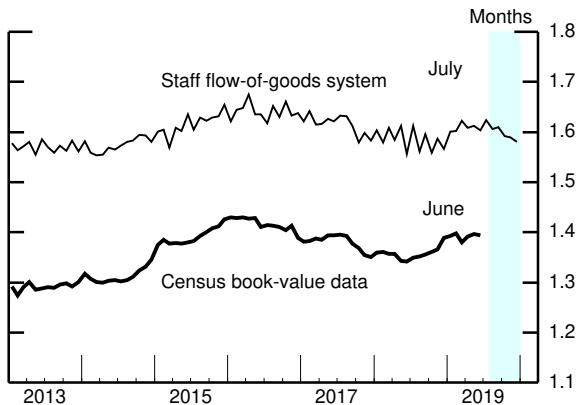
Note: Data are 3-month moving averages.  
Source: U.S. Census Bureau.

### Nonresidential Construction Put in Place



Note: Nominal CPIP deflated by BEA prices through 2019:Q1 and by the staff's estimated deflator thereafter.  
Source: U.S. Census Bureau.

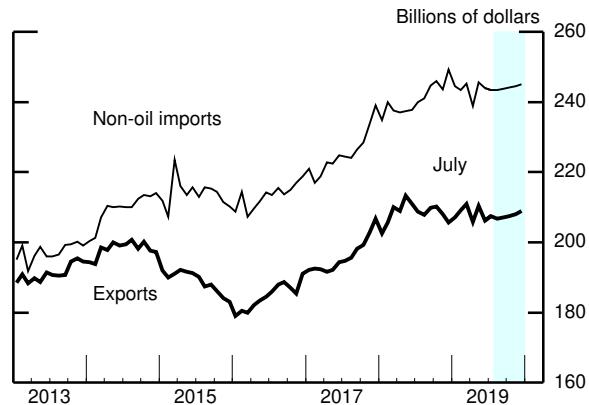
### Inventory Ratios



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

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

### Exports and Non-oil Imports



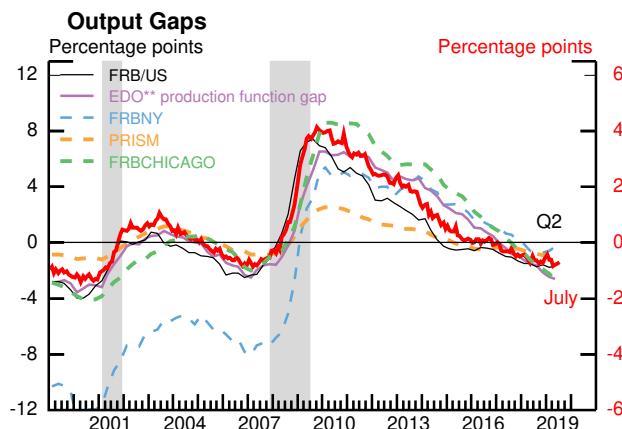
Note: Forecasts are linear interpolations of quarterly values.  
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis; U.S. Census Bureau.

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

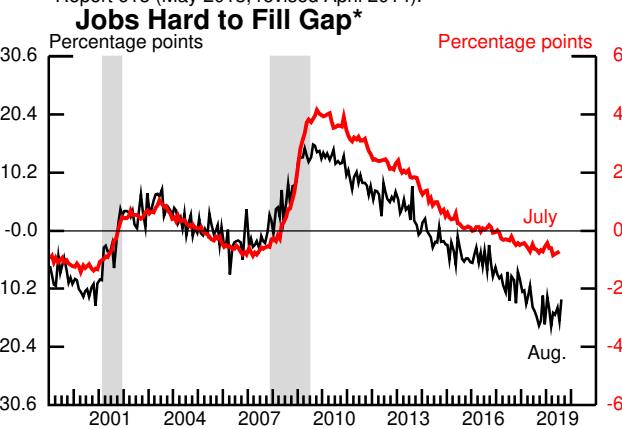
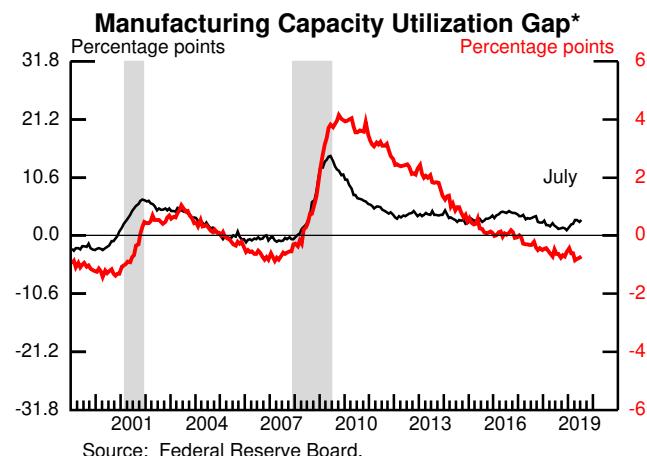
Federal Reserve entity	Type of model	Nowcast as of Sept. 4, 2019
Federal Reserve Bank		
Boston	• Mixed-frequency BVAR	1.4
New York	• Factor-augmented autoregressive model combination • Factor-augmented autoregressive model combination, financial factors only • Dynamic factor model	2.9 2.7 1.5
Cleveland	• Bayesian regressions with stochastic volatility • Tracking model	1.5 1.2
Atlanta	• Tracking model combined with Bayesian vector autoregressions (VARs), dynamic factor models, and factor-augmented autoregressions (known as GDPNow)	1.5
Chicago	• Dynamic factor models • Bayesian VARs	1.6 1.9
St. Louis	• Dynamic factor models • News index model • Let-the-data-decide regressions	2.0 2.7 2.5
Kansas City	• Accounting-based tracking estimate	1.0
Board of Governors	• Tealbook estimate (judgmental) • Monthly dynamic factor models (DFM-45) • Mixed-frequency dynamic factor model (DFM-BM)	1.7 1.9 2.9
Memo: Median of Federal Reserve System nowcasts		1.8

## Alternative Measures of Slack

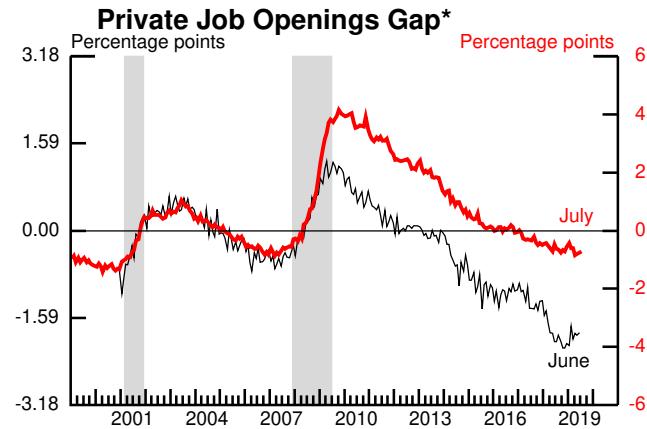
The red line in each panel is the staff's measure of the unemployment rate gap (right axis).



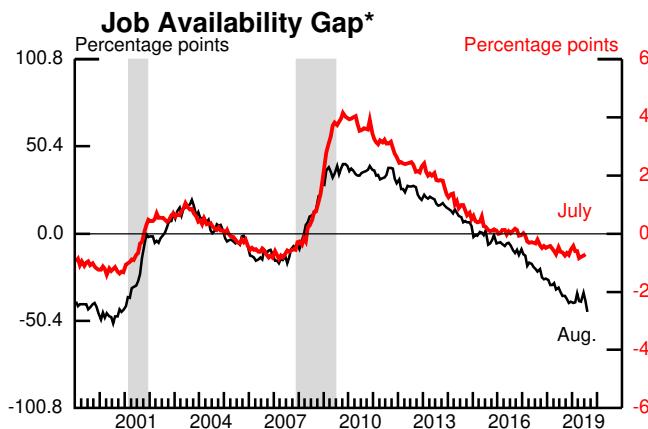
<sup>\*\*</sup> EDO is Estimated, Dynamic, Optimization-based model.  
Source: Federal Reserve Board; PRISM: Federal Reserve Bank of Philadelphia; PRISM Model Documentation (June 2011); FRBNY: Federal Reserve Bank of New York Staff Report 618 (May 2013, revised April 2014).



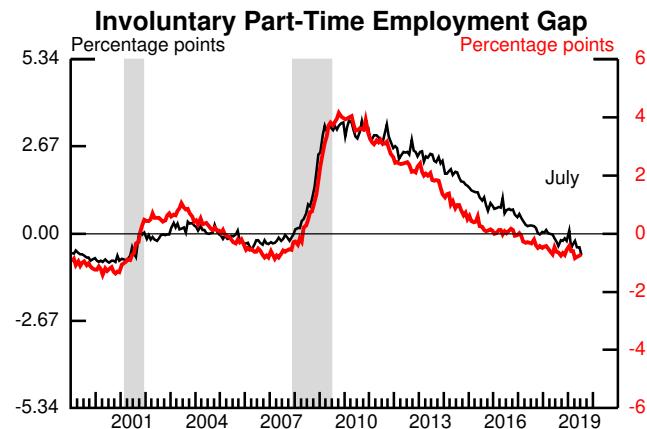
Note: Percent of small businesses surveyed with at least one "hard to fill" job opening. Seasonally adjusted by Federal Reserve Board staff.  
Source: National Federation of Independent Business, Small Business Economic Trends Survey.



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



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



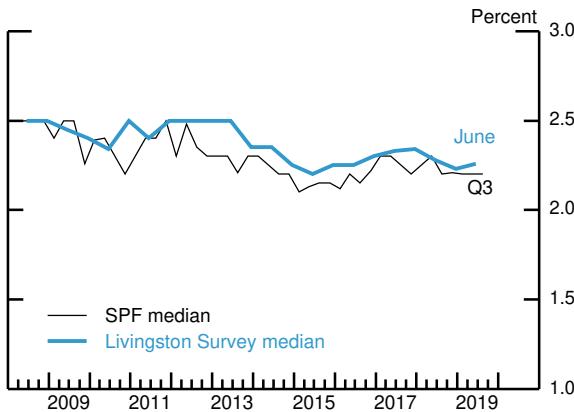
Note: Percent of employment.  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey.

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

Note: The shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research. Output gaps are multiplied by negative 0.52 to facilitate comparison with the unemployment rate gap. Manufacturing capacity utilization gap is constructed by subtracting its average rate from 1972 to 2018. Other gaps were constructed by subtracting each series' average in 2004:Q4 and 2005:Q1.

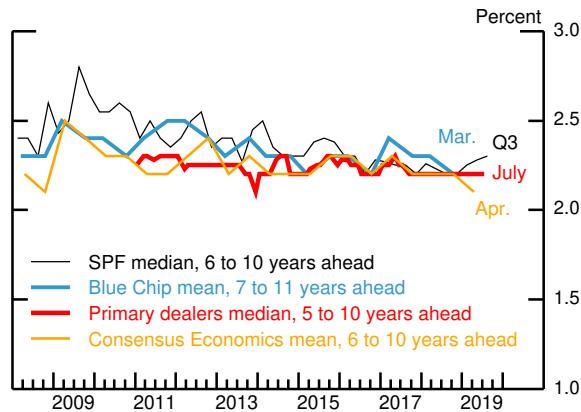
## Survey Measures of Longer-Term Inflation Expectations

CPI Next 10 Years



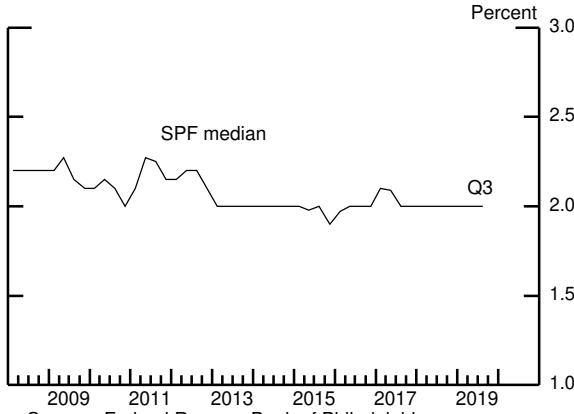
Note: SPF is Survey of Professional Forecasters.  
Source: Federal Reserve Bank of Philadelphia.

CPI Forward Expectations



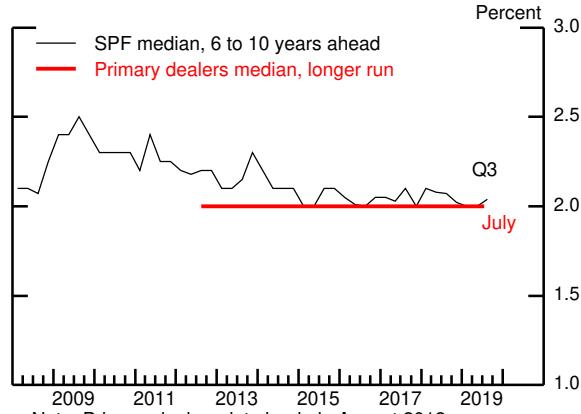
Source: Federal Reserve Bank of Philadelphia; Blue Chip Economic Indicators; Federal Reserve Bank of New York; Consensus Economics.

PCE Next 10 Years



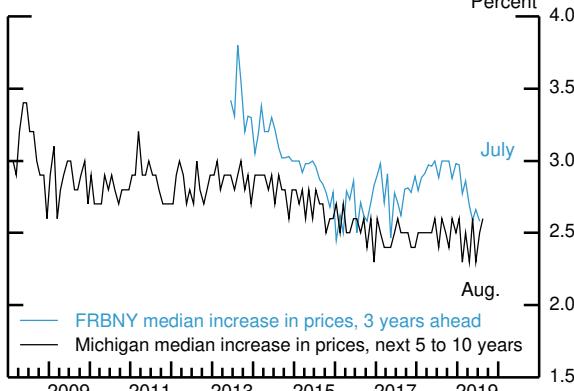
Source: Federal Reserve Bank of Philadelphia.

PCE Forward Expectations



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

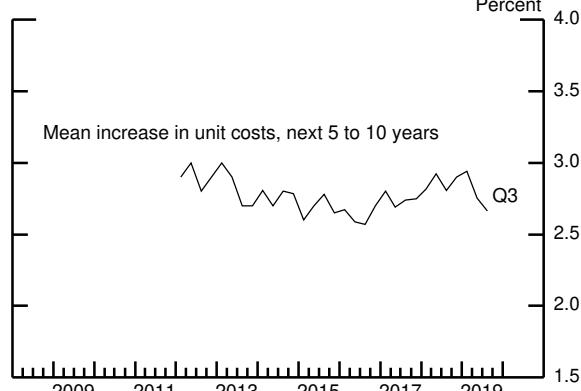
Surveys of Consumers



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

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

Survey of Business Inflation Expectations

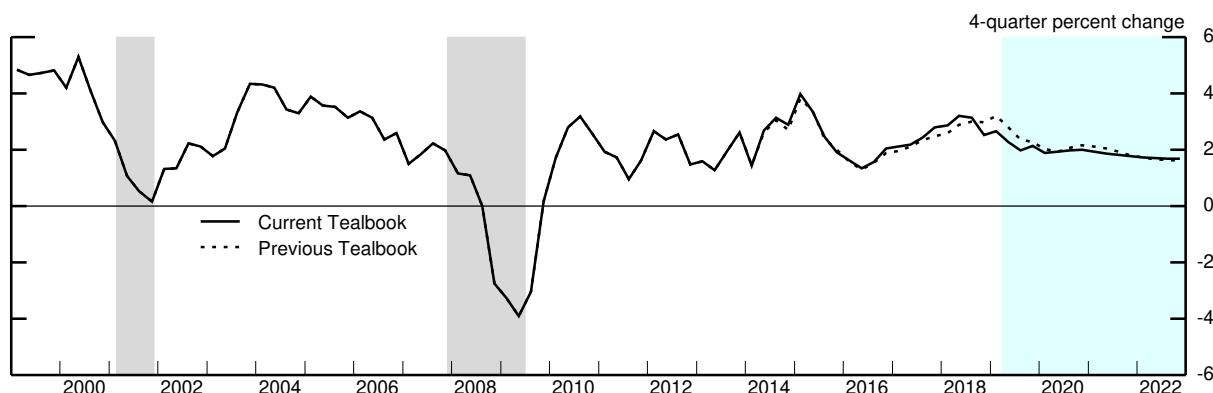


Note: Survey of businesses in the Sixth Federal Reserve District. Data begin in February 2012.  
Source: Federal Reserve Bank of Atlanta.

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

Measure	2018	2019 H1	2019 H2	2019	2020	2021	2022
<b>Real GDP</b>	<b>2.5</b>	<b>2.5</b>	<b>1.8</b>	<b>2.1</b>	<b>2.0</b>	<b>1.8</b>	<b>1.7</b>
<i>Previous Tealbook</i>	3.0	2.8	1.7	2.3	2.1	1.8	1.6
Final sales	2.2	2.7	2.0	2.4	2.1	1.7	1.6
<i>Previous Tealbook</i>	2.6	3.0	2.0	2.5	2.2	1.8	...
Personal consumption expenditures	2.6	2.9	2.7	2.8	2.4	2.3	2.2
<i>Previous Tealbook</i>	2.6	2.5	2.5	2.5	2.4	2.3	...
Residential investment	-4.4	-2.1	4.1	1.0	5.3	-4.0	-4.7
<i>Previous Tealbook</i>	-3.3	-2.3	5.8	1.6	2.8	-3.6	...
Nonresidential structures	2.6	-4.6	-1.5	-3.1	-2.2	-1.4	-2.2
<i>Previous Tealbook</i>	4.9	-2.2	-1.1	-1.6	-1.9	-.8	...
Equipment and intangibles	6.8	3.3	-.9	1.1	2.1	3.1	1.6
<i>Previous Tealbook</i>	7.6	3.5	.2	1.9	3.0	2.7	...
Federal purchases	2.7	5.1	3.6	4.3	1.2	.2	.7
<i>Previous Tealbook</i>	2.7	5.3	3.7	4.5	1.7	.8	...
State and local purchases	.9	2.9	.1	1.5	1.1	1.1	1.1
<i>Previous Tealbook</i>	.8	4.0	-.4	1.8	.9	1.0	...
Exports	.4	-.8	.7	-.1	2.2	3.2	3.5
<i>Previous Tealbook</i>	2.3	1.3	1.8	1.5	3.0	3.5	...
Imports	3.2	-.7	1.2	.3	2.1	3.1	3.2
<i>Previous Tealbook</i>	3.4	-.9	1.7	.4	2.3	3.2	...
Contributions to change in real GDP (percentage points)							
Inventory change	.3	-.2	-.3	-.2	-.1	.0	.1
<i>Previous Tealbook</i>	.4	-.2	-.3	-.2	-.1	.0	...
Net exports	-.4	.0	-.1	-.1	.0	-.1	-.1
<i>Previous Tealbook</i>	-.2	.3	.0	.1	.0	-.1	...

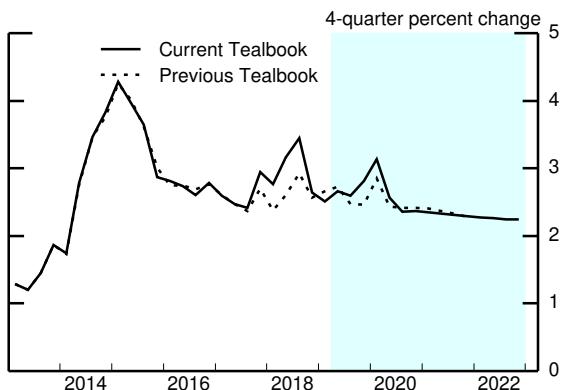
... Not applicable.

**Real GDP**

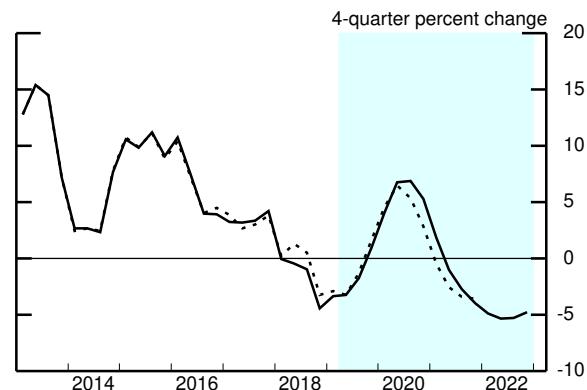
Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.  
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

## Components of Final Demand

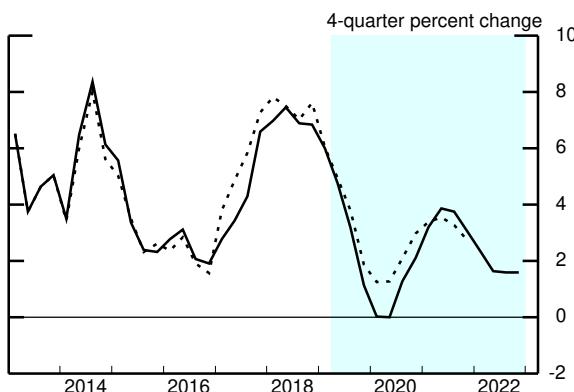
**Personal Consumption Expenditures**



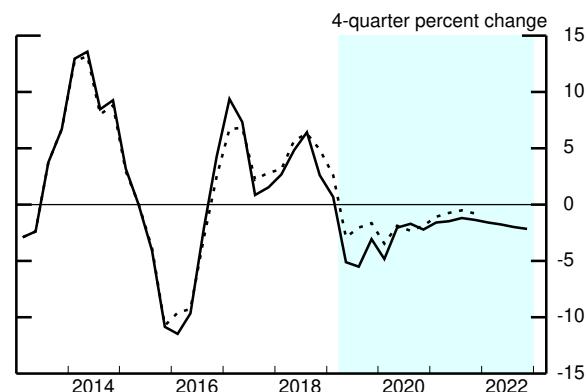
**Residential Investment**



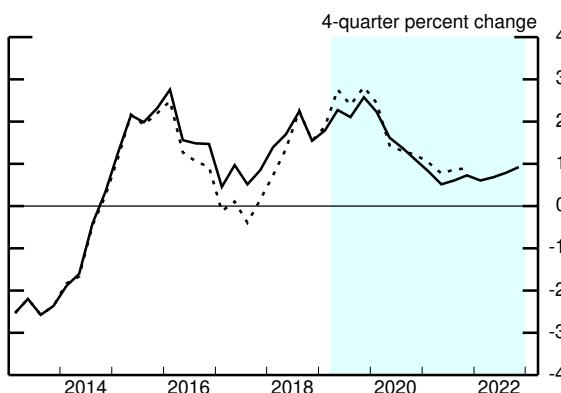
**Equipment and Intangibles**



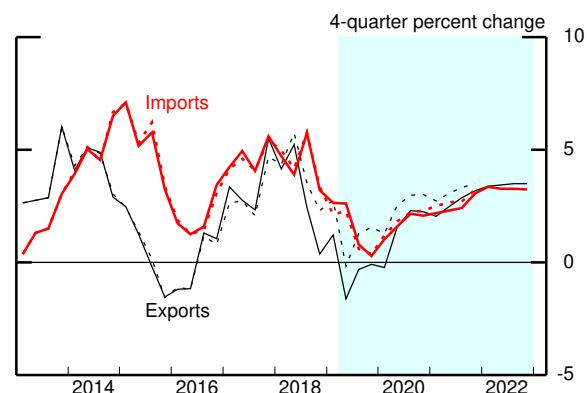
**Nonresidential Structures**



**Government Consumption and Investment**

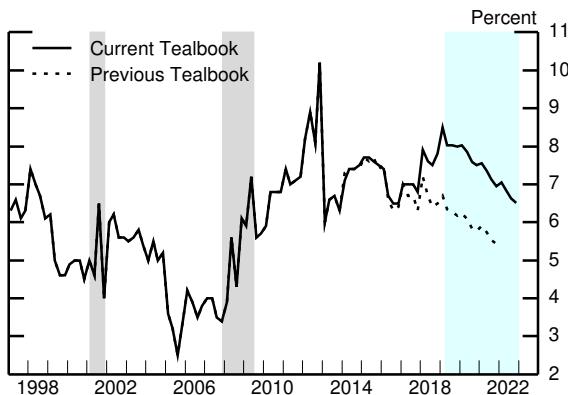


**Exports and Imports**

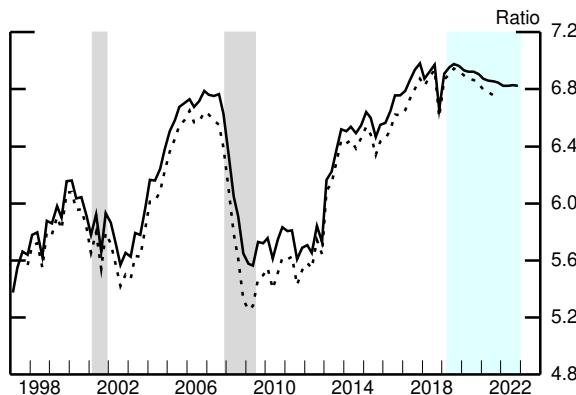


Source: U.S. Department of Commerce, Bureau of Economic Analysis.

## Aspects of the Medium-Term Projection

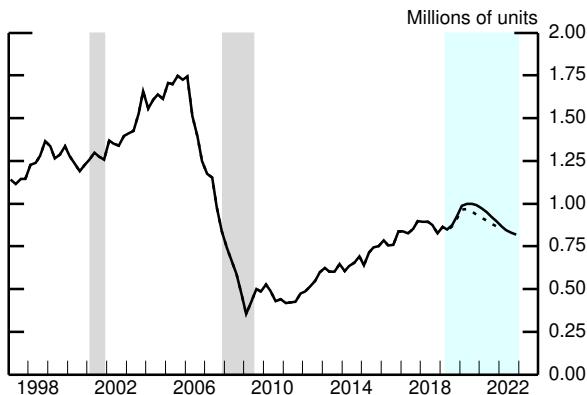
**Personal Saving Rate**

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

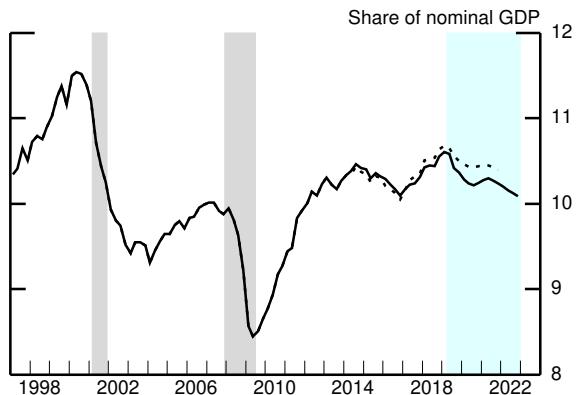
**Wealth-to-Income Ratio**

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

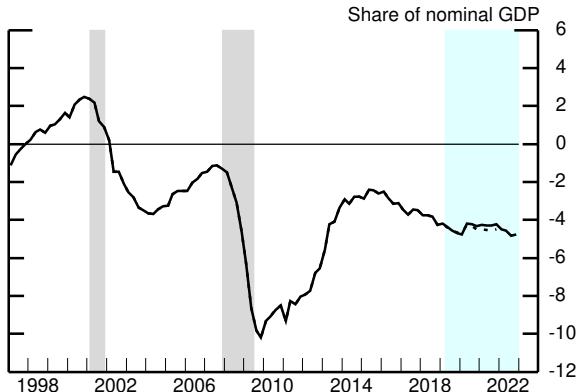
Source: For net worth, Federal Reserve Board, Financial Accounts of the United States; for income, U.S. Dept. of Commerce, Bureau of Economic Analysis.

**Single-Family Housing Starts**

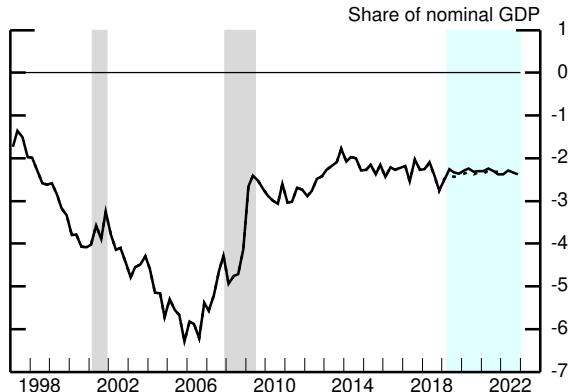
Source: U.S. Census Bureau.

**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.

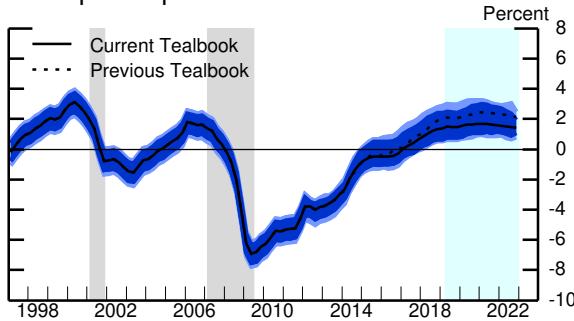
**Current Account Surplus/Deficit**

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

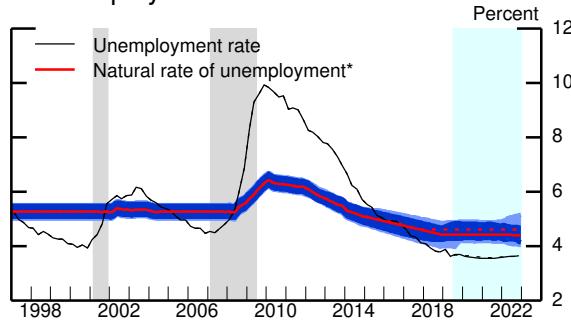
Output Gap



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

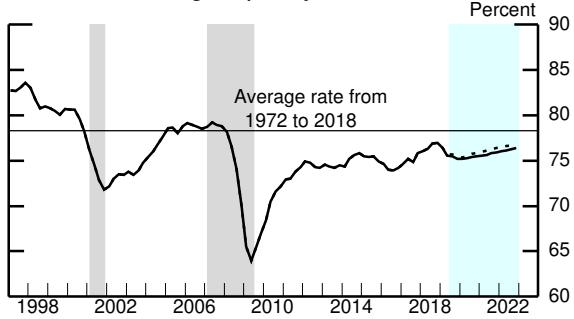


Note: Shaded regions show the 70 percent and 90 percent confidence intervals of the distribution of historical revisions to the staff's estimates of the natural rate.

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

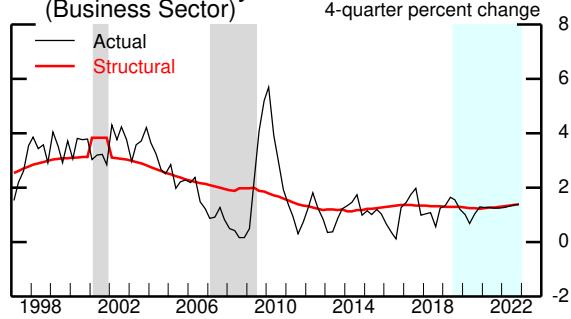
Source: Various macroeconomic data; staff assumptions.

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 3.1	3.6 3.6	2.7 2.7	1.9 1.9	1.5 1.4	1.8 1.8	1.8 1.8	1.8 1.8	1.9 1.9	1.8 1.8
Selected contributions: <sup>1</sup>										
Structural labor productivity <sup>2</sup> <i>Previous Tealbook</i>	1.7 1.7	2.9 2.9	2.7 2.7	1.8 1.8	1.3 1.2	1.3 1.3	1.3 1.3	1.2 1.2	1.3 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 1.5	1.3 1.3	.8 .8	.5 .5	.4 .4	.9 .7	.3 .2	.6 .6	.5 .5	.5 ...
Labor force participation <i>Previous Tealbook</i>	.4 .4	-.1 -.1	-.2 -.2	-.4 -.4	-.5 -.5	-.2 -.2	-.2 -.2	-.2 -.2	-.2 -.2	-.3 ...
Memo:										
Output gap <sup>3</sup> <i>Previous Tealbook</i>	-1.2 -1.2	2.5 2.5	.3 .3	-5.4 -5.4	.6 .9	1.4 1.9	1.5 2.1	1.7 2.4	1.6 2.3	1.4 2.1

... Not applicable.

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	163 173	136 155	149 164	115 147	88 111	65 ...
Private employment <sup>1</sup> <i>Previous Tealbook</i>	215 215	156 161	122 143	139 152	106 138	78 101	55 ...
Labor force participation rate <sup>2</sup> <i>Previous Tealbook</i>	63.0 63.0	62.9 62.9	63.0 62.9	63.0 62.9	62.7 62.9	62.6 62.8	62.3 ...
Civilian unemployment rate <sup>2</sup> <i>Previous Tealbook</i>	3.8 3.8	3.6 3.6	3.7 3.7	3.7 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	60.6 60.6	60.6 60.6	60.5 60.7	60.3 60.6	60.1 ...

... Not applicable.

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	1.3 1.6	1.6 1.8	1.5 1.7	1.8 1.8	1.8 1.8	1.8 1.9
Food and beverages <i>Previous Tealbook</i>	.5 .5	1.8 1.8	1.9 2.6	1.8 2.2	2.4 2.6	2.4 2.6	2.4 ...
Energy <i>Previous Tealbook</i>	3.9 3.5	-.7 -.8	-9.1 -6.8	-5.0 -3.8	-1.0 -1.4	.5 .0	1.0 ...
Excluding food and energy <i>Previous Tealbook</i>	1.9 1.9	1.4 1.7	2.1 2.2	1.8 1.9	1.8 1.9	1.8 1.9	1.8 1.9
Prices of core goods imports <sup>1</sup> <i>Previous Tealbook</i>	.2 .5	-1.2 -.6	-1.0 1.1	-1.1 .3	.7 .9	1.0 .8	.9 ...
<i>12-month percent change</i>	June 2019	July 2019	Aug. 2019 <sup>2</sup>	Sept. 2019 <sup>2</sup>	Oct. 2019 <sup>2</sup>	Nov. 2019 <sup>2</sup>	Dec. 2019 <sup>2</sup>
PCE chain-weighted price index <i>Previous Tealbook</i>	1.3 1.5	1.4 1.6	1.4 1.7	1.4 1.6	1.4 1.6	1.5 1.7	1.6 1.8
Excluding food and energy <i>Previous Tealbook</i>	1.6 1.7	1.6 1.7	1.7 1.9	1.7 1.9	1.8 1.9	1.8 1.9	1.8 1.9

... Not applicable.

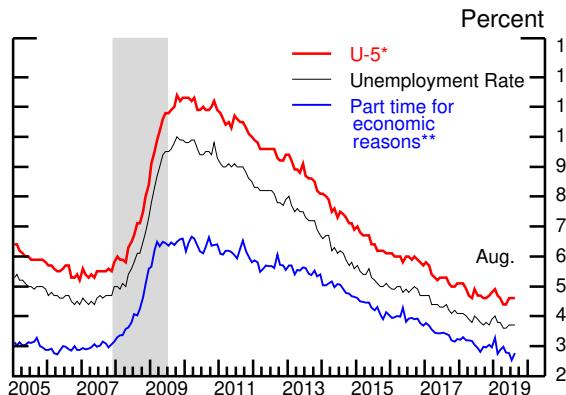
1. Core goods imports exclude computers, semiconductors, oil, and natural gas.

2. Staff Forecast.

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

## Labor Market Developments and Outlook (1)

### Measures of Labor Underutilization

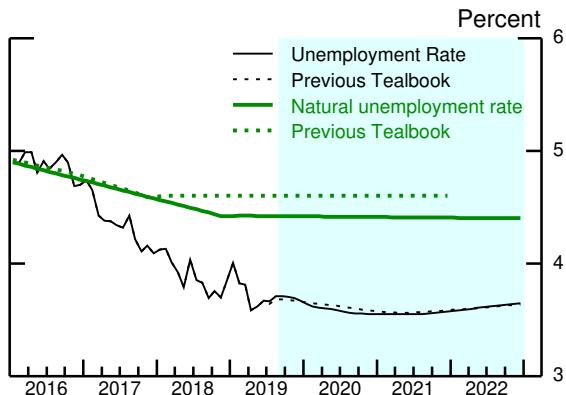


\* U-5 measures total unemployed persons plus all marginally attached to the labor force as a percent of the labor force plus persons marginally attached to the labor force.

\*\* Percent of Current Population Survey employment.

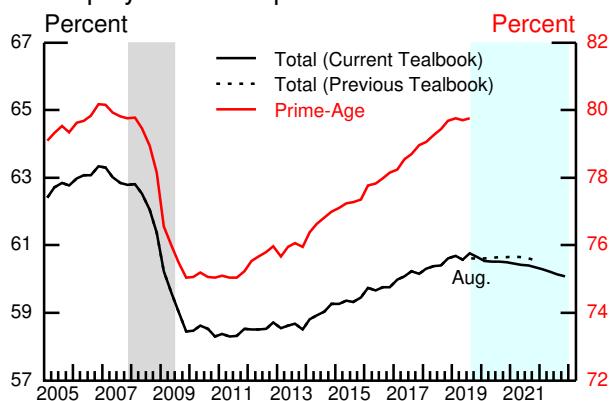
Source: U.S. Department of Labor, Bureau of Labor Statistics.

### Unemployment Rate



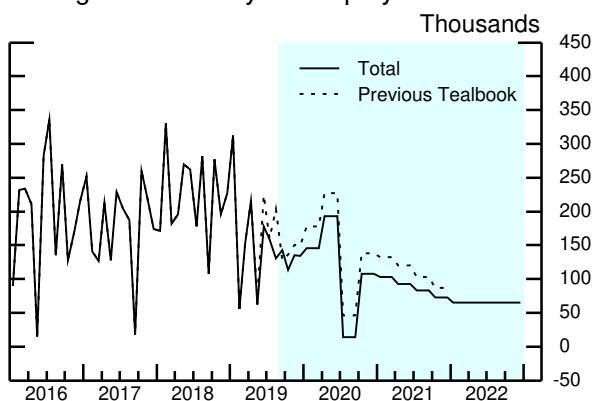
Source: U.S. Department of Labor, Bureau of Labor Statistics.

### Employment-to-Population Ratio



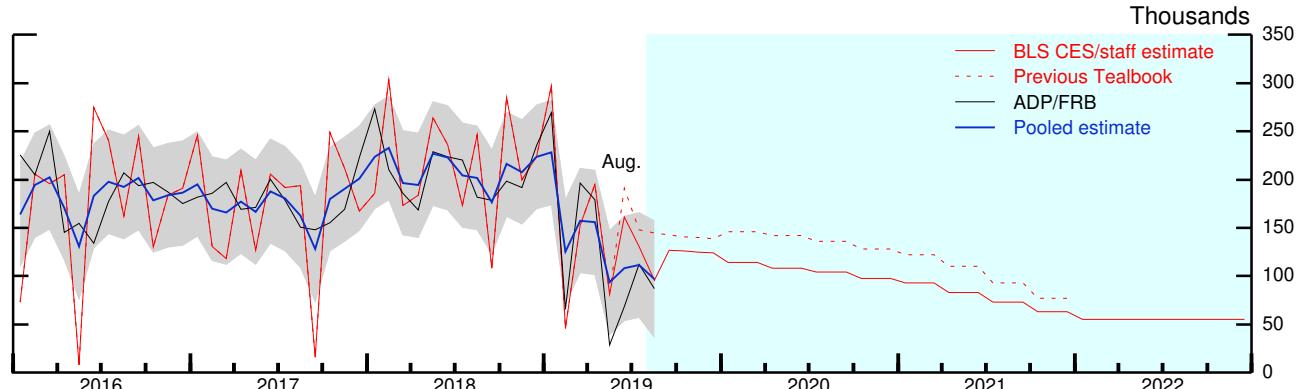
Source: U.S. Department of Labor, Bureau of Labor Statistics.  
Note: Every graph except the one for the prime-age population corresponds with the left axis.

### Change in Total Payroll Employment



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

### Change in Private Payroll Employment

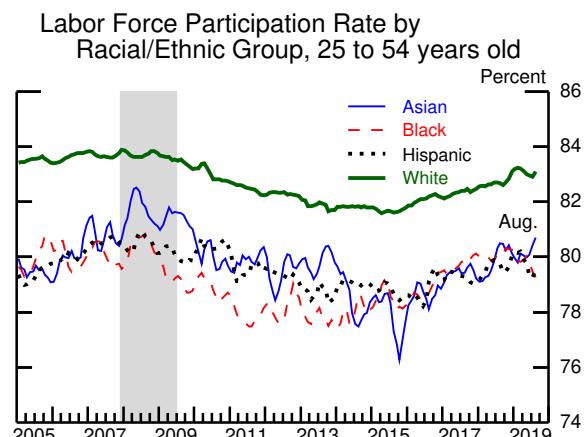
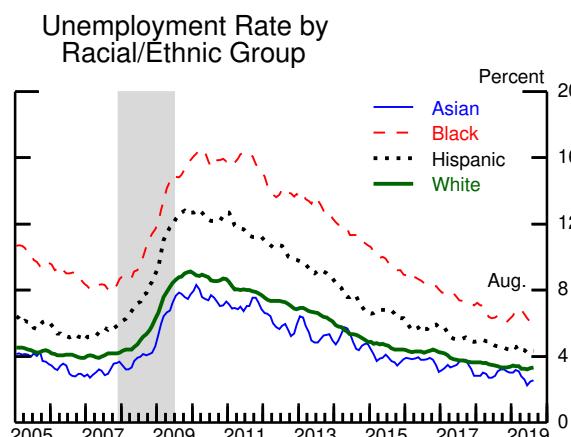
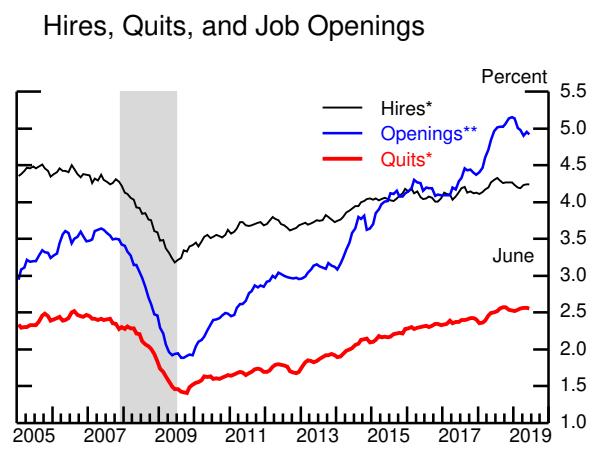
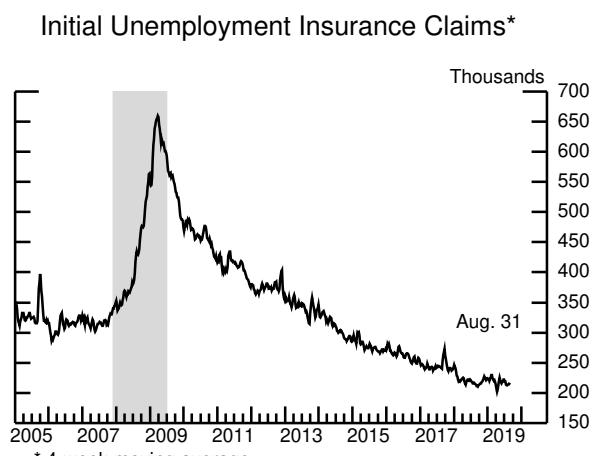
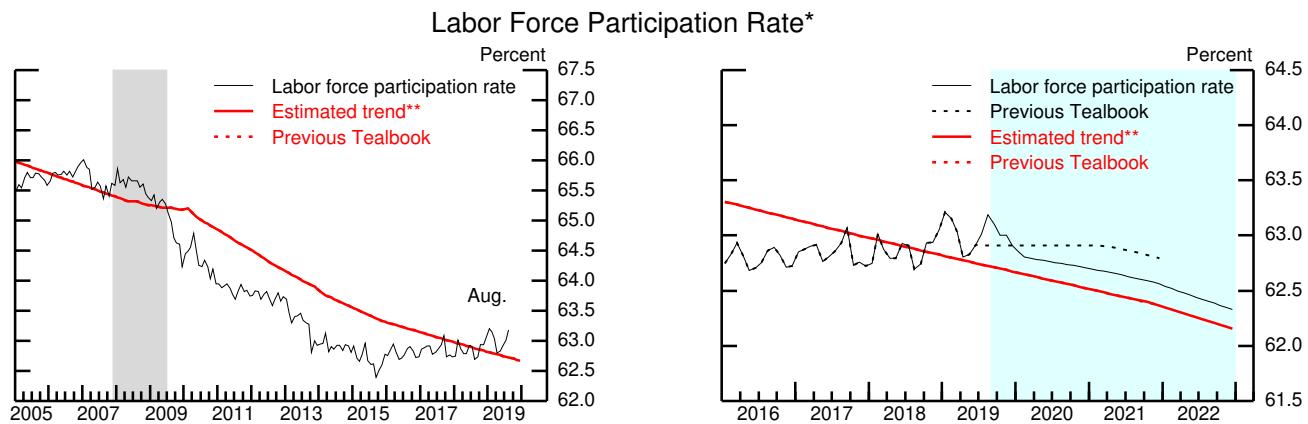


Note: Gray shaded area around blue line is 90 percent confidence interval around pooled estimate.

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.

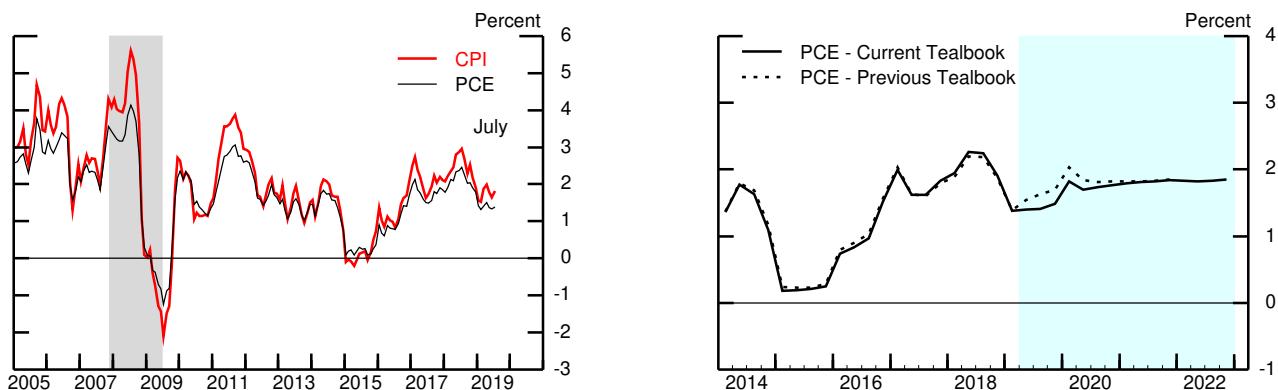
## Labor Market Developments and Outlook (2)



## Inflation Developments and Outlook (1)

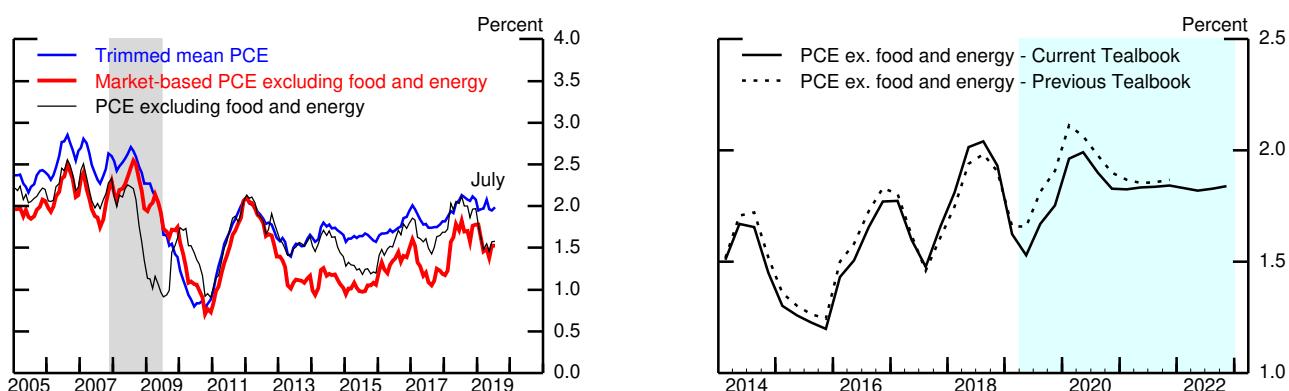
(Percent change from year-earlier period)

### Headline Consumer Price Inflation



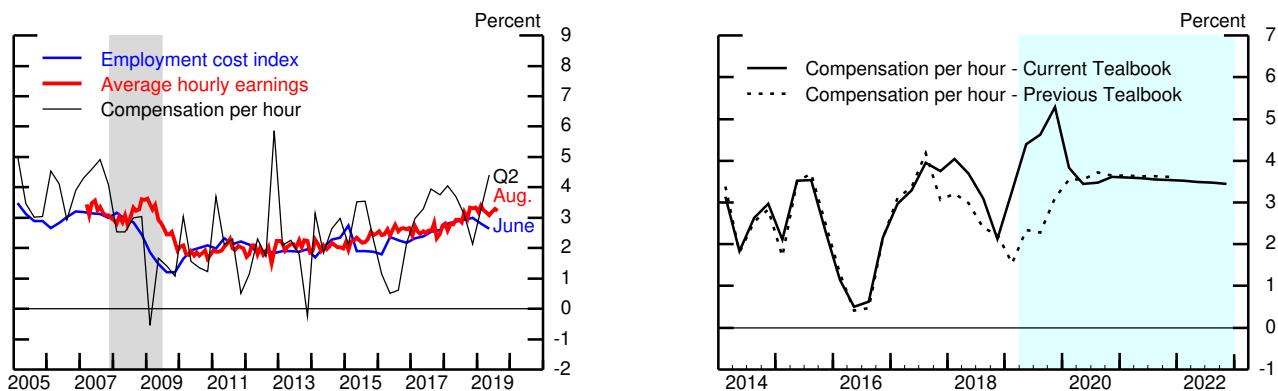
Source: For CPI, U.S. Department of Labor, Bureau of Labor Statistics; for PCE, U.S. Department of Commerce, Bureau of Economic Analysis.

### Measures of Core PCE Price Inflation



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

### Labor Cost Growth



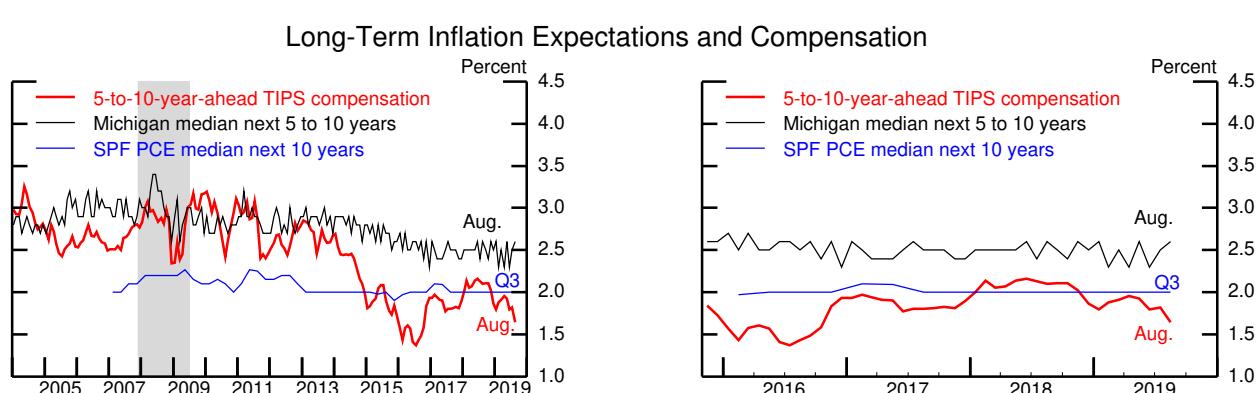
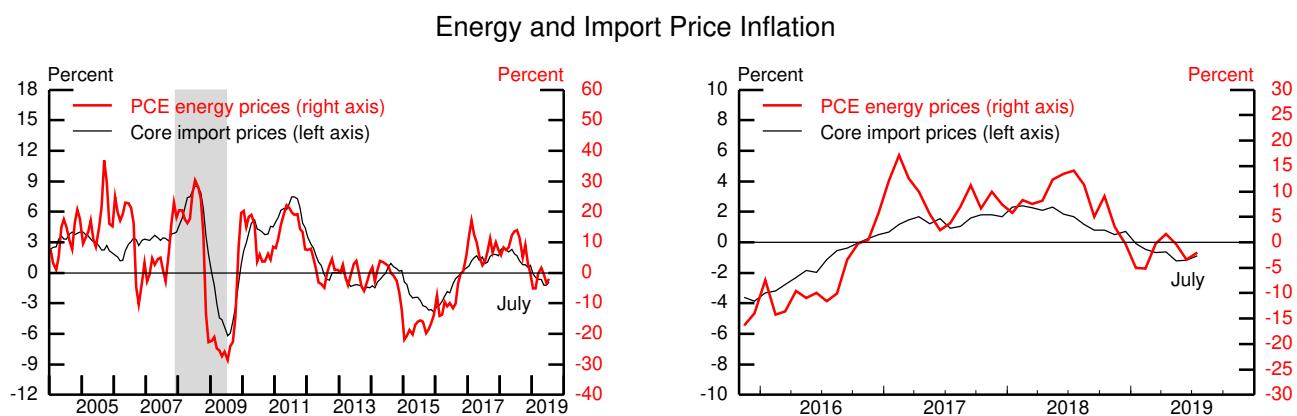
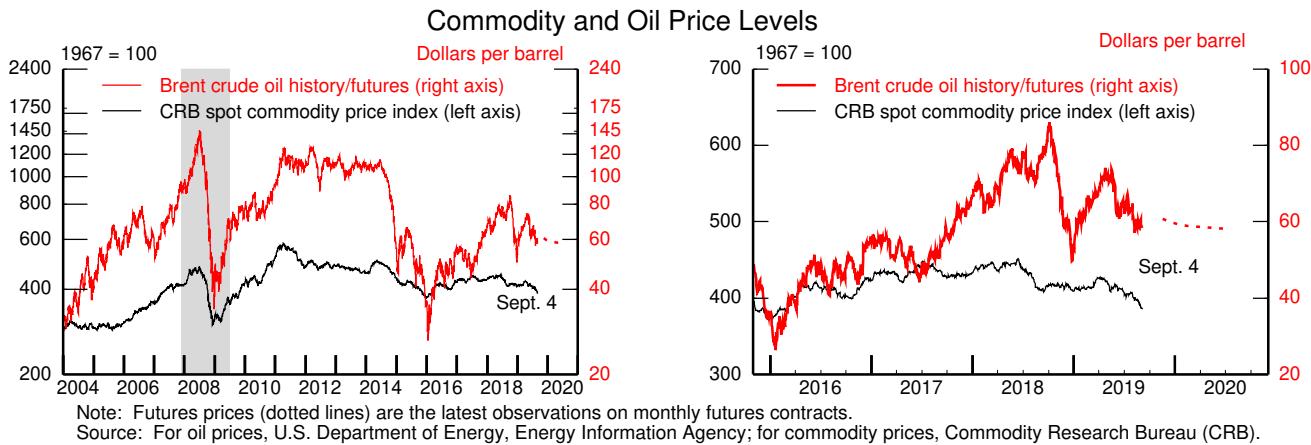
Note: Compensation per hour is for the business sector. Average hourly earnings are for the private nonfarm sector. The employment cost index is for the private sector.

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

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

## Inflation Developments and Outlook (2)

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



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

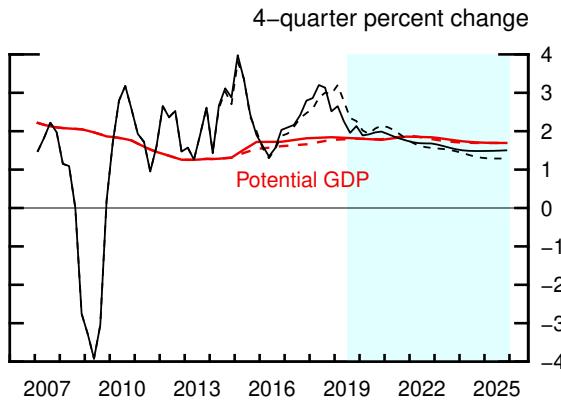
**The Long-Term Outlook**

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

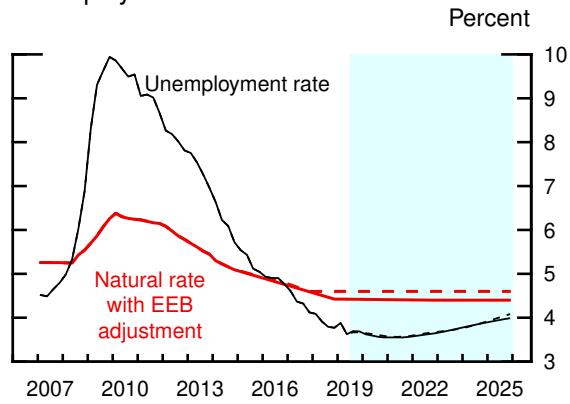
Measure	2019	2020	2021	2022	2023	2024	2025	Longer run
Real GDP Previous Tealbook	2.1 2.3	2.0 2.1	1.8 1.8	1.7 1.6	1.5 1.5	1.5 1.3	1.5 1.3	1.7 1.7
Civilian unemployment rate <sup>1</sup> Previous Tealbook	3.7 3.7	3.6 3.6	3.6 3.6	3.6 3.7	3.8 3.7	3.9 3.9	4.0 4.1	4.4 4.6
PCE prices, total Previous Tealbook	1.5 1.7	1.8 1.8	1.8 1.8	1.8 1.9	1.9 2.0	1.9 2.0	1.9 2.0	2.0 2.0
Core PCE prices Previous Tealbook	1.8 1.9	1.8 1.9	1.8 1.9	1.8 1.9	1.9 2.0	1.9 2.0	1.9 2.0	2.0 2.0
Federal funds rate <sup>1</sup> Previous Tealbook	2.23 2.45	2.40 2.64	2.46 2.68	2.50 2.72	2.51 2.76	2.53 2.77	2.53 2.75	2.50 2.50
10-year Treasury yield <sup>1</sup> Previous Tealbook	1.7 2.2	2.2 2.7	2.6 2.9	2.8 3.1	3.0 3.2	3.1 3.2	3.2 3.2	3.4 3.4

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

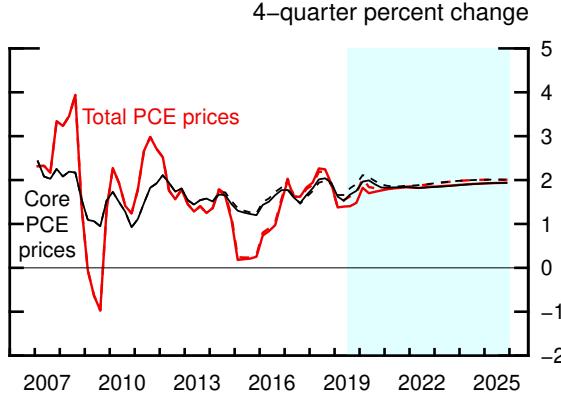
Real GDP



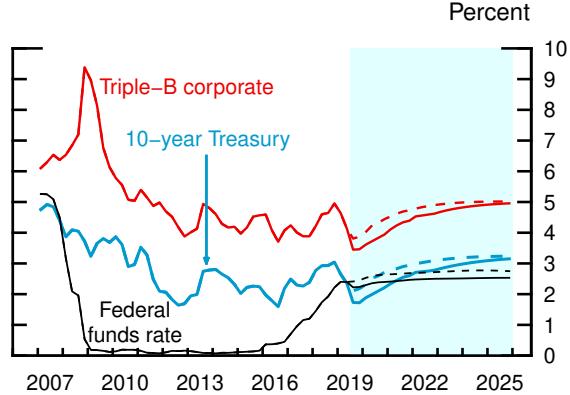
Unemployment Rate



PCE Prices



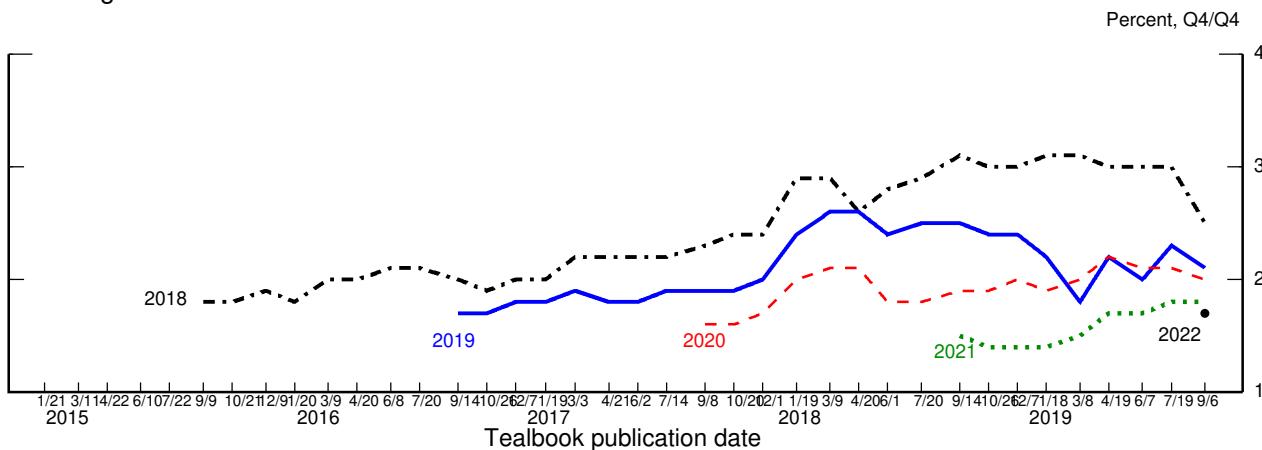
Interest Rates



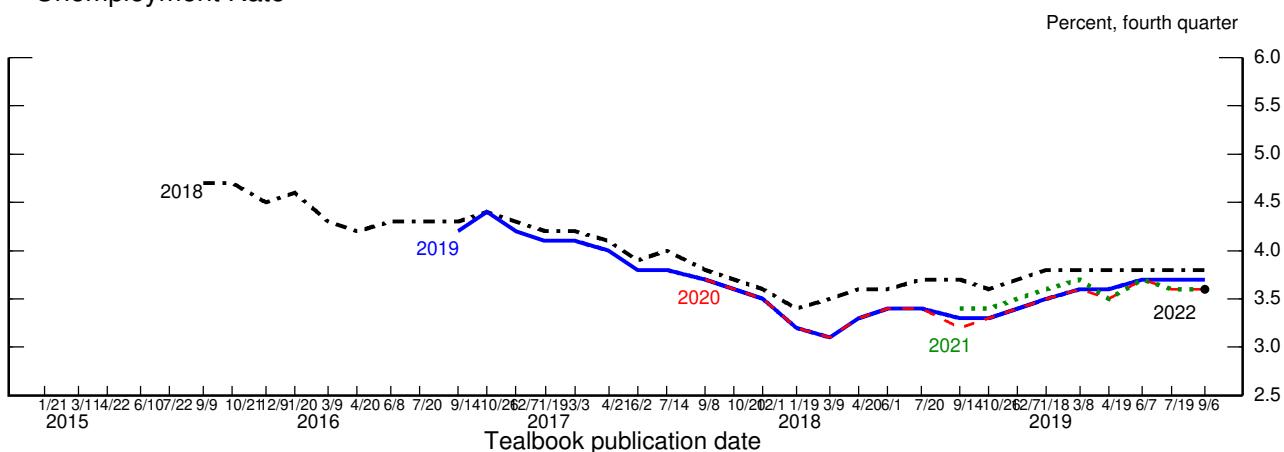
Note: In each panel, shading represents the projection period, and dashed lines are the previous Tealbook.

## Evolution of the Staff Forecast

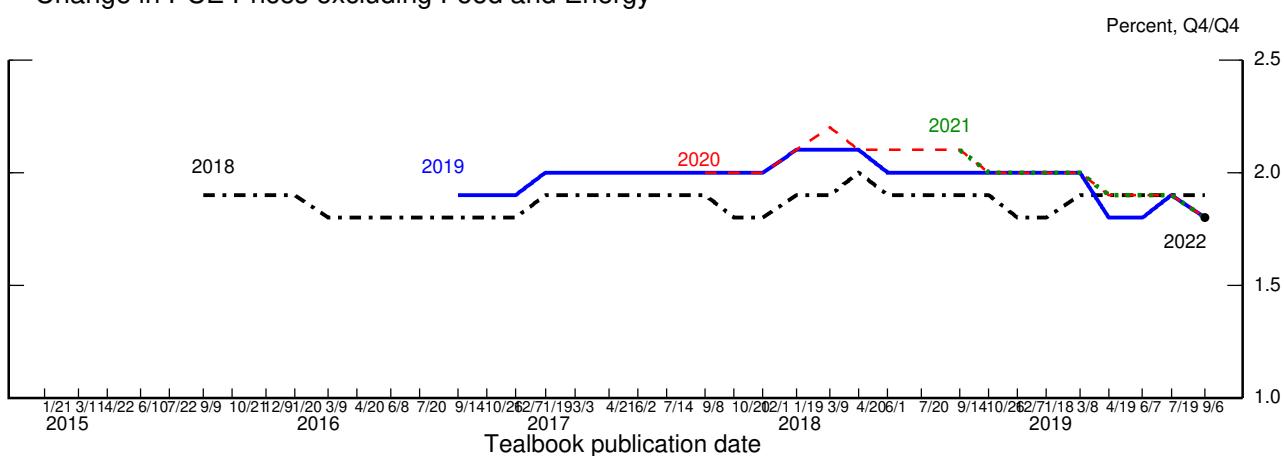
Change in Real GDP



Unemployment Rate



Change in PCE Prices excluding Food and Energy

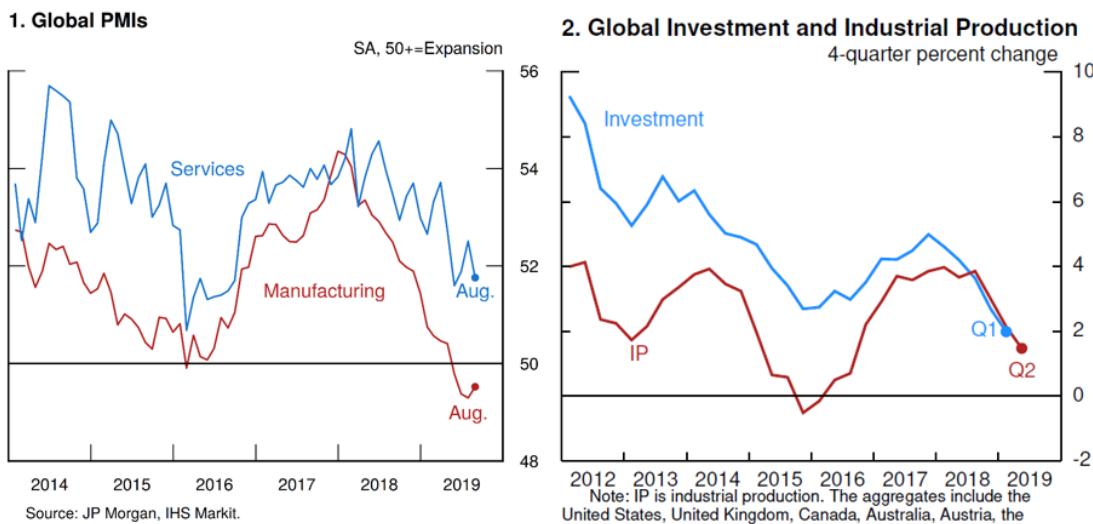


## Weakness in the Global Manufacturing Sector

Global manufacturing activity has been weakening since 2018 (red line in figure 1). Moreover, this weakness has become increasingly widespread, with manufacturing purchasing managers indexes (PMIs) indicating contractions (below 50) in the majority of countries for which we have data. In contrast, the service sector has performed relatively better (blue line in figure 1), with service PMIs indicating contractions in only a few countries. Because movements in the manufacturing PMI can be followed by more generalized downturns in economic activity, the manufacturing slowdown warrants close attention.<sup>1</sup> In this discussion, we present evidence that a global investment slowdown—perhaps triggered by the surge in trade policy uncertainty—is an important contributor to the weakness in the global manufacturing sector.<sup>2</sup>

The downturn in global manufacturing activity has coincided with a global investment slowdown. Both industrial production (IP) (red line in figure 2) and investment growth (blue line in figure 2) have trended down since 2018, with the latter reaching its lowest level since the Global Financial Crisis. This investment downturn has also been widespread, with more than three-fourths of the economies in our sample—among them China, Germany, and the United Kingdom—experiencing a deceleration. Moreover, as shown in figure 3, the contribution of capital goods (green bars) to growth of global IP has fallen markedly since 2017, which provides further evidence of the importance of investment in dragging down global manufacturing activity.

What accounts for this manufacturing and investment slowdown? A likely explanation is that trade tensions, although concentrated in the United States and China, have had wider international spillovers. For instance, recently imposed tariffs and uncertainty about future tariffs could be weighing on global manufacturing activity through supply chain connections, and



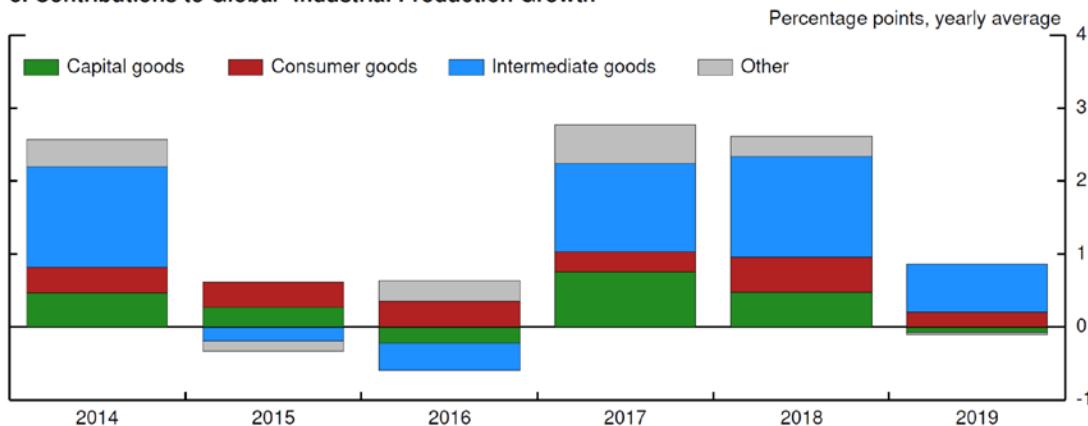
<sup>1</sup> For example, manufacturing PMIs tend to lead services PMIs.

<sup>2</sup> A recent memo by the Board staff finds that the direct effect of tariff increases accounts for about half of the recent deceleration in U.S. manufacturing industrial production. See Aaron Flaaen and Justin Pierce (2019), “Effects of Recent Tariffs on Manufacturing Output,” memorandum, Board of Governors of the Federal Reserve System, Division of Research and Statistics, August 26.

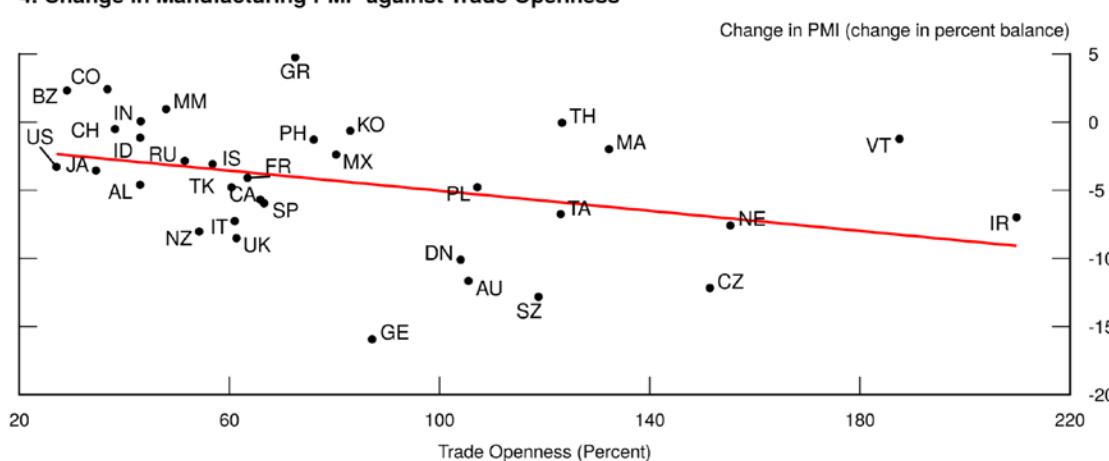
heightened uncertainty about future tariffs is likely depressing investment. Both investment and manufacturing started to turn down in 2018 when trade tensions intensified. Figure 4 shows that decreases in manufacturing PMIs have been larger in those countries with higher trade openness, consistent with the hypothesis that trade tensions are weighing on manufacturing activity and investment. The IEDO box “The Effects of Trade Policy Uncertainty on Global Economic Activity,” attempts to quantify the drag of trade policy uncertainty on global activity.

Besides trade tensions, other more idiosyncratic factors have likely contributed to the weakness of manufacturing as well. First, European auto production remains sluggish, as German manufacturers have failed to bounce back from the introduction of more stringent emission standards in the summer of 2018. Second, Chinese domestic demand has weakened, in part because of the country’s deleveraging campaign, leading to knock-on effects for its major trade partners. For example, weak global demand for electronic products, driven in large part by China, has caused a sharp slowdown in emerging Asia’s technology sector. Finally, it is possible that some still unidentified factor is weighing on global manufacturing.

### 3. Contributions to Global\* Industrial Production Growth



### 4. Change in Manufacturing PMI<sup>1</sup> against Trade Openness<sup>2</sup>



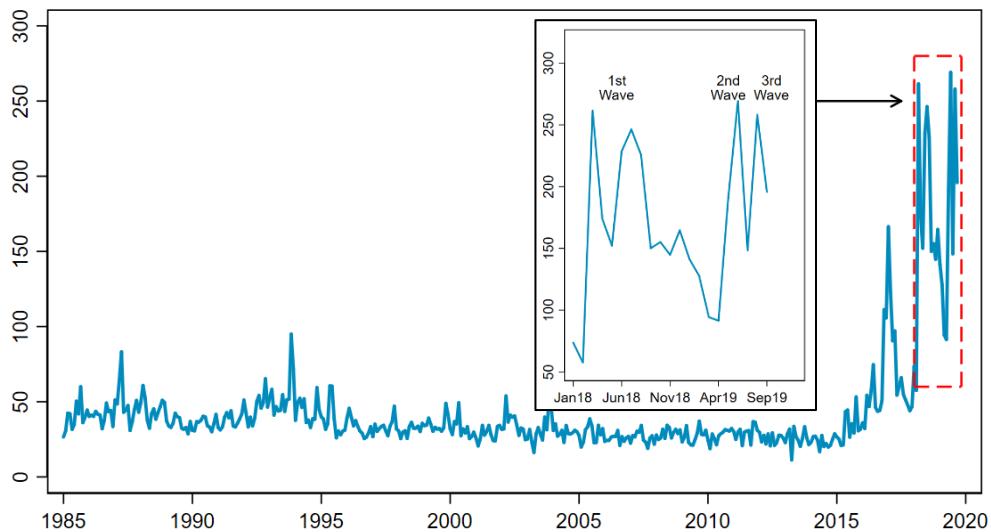
1. Change in manufacturing PMI is calculated by its average 2017 level subtracted from its most recent level.

2. Trade openness is measured by the sum of exports and imports, as a percentage of GDP.

Source: IHS Markit, World Bank.

This analysis represents an attempt to quantify the all-in effects of increased TPU on global economic activity. Our empirical model predicts material effects of trade tensions that will only begin to ease in the second half of 2020. That said, the confidence intervals around these estimates point to some degree of uncertainty, especially given the lack of historical experience with increases in TPU of the magnitude that we have seen recently. For the United States, the estimated adverse effects are somewhat larger than the drag we have built into the Tealbook baseline and so represent a downside risk to that baseline projection. For foreign economies, the estimated adverse effects are more in line with the downward revisions to our forecast since last year, hinting that trade tensions may keep weighing on the outlook going forward.

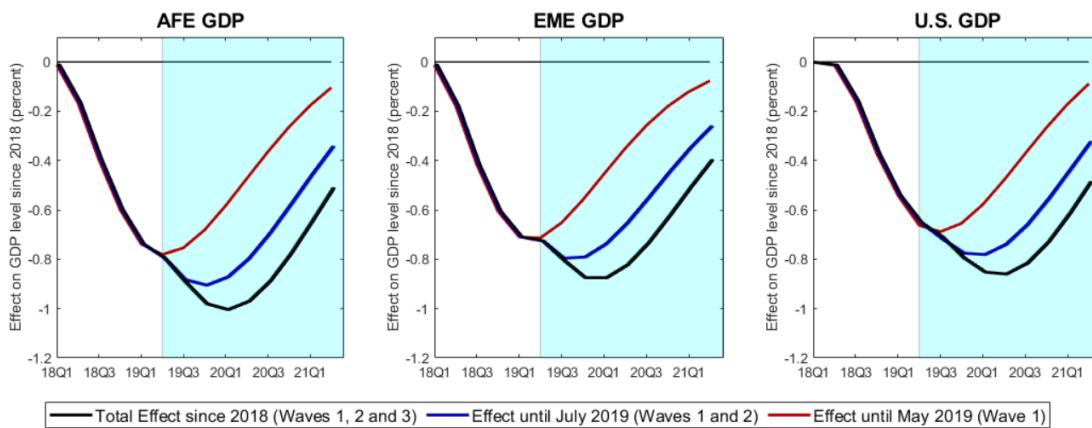
**Figure 1: Monthly Trade Policy Uncertainty Index**



Note: At an index value of 100, 1 percent of news articles contain references to trade policy uncertainty. The September 2019 data are preliminary and updated through September 4.

Source: Staff calculations based on Dario Caldara, Matteo Iacoviello, Patrick Molligo, Andrea Prestipino, and Andrea Raffo. 2019, “The Economic Effects of Trade Policy Uncertainty.” International Finance Discussion Paper 1256 (Washington: Board of Governors of the Federal Reserve System, September), <https://www.federalreserve.gov/econres/ifdp/files/ifdp1256.pdf>.

**Figure 2: VAR-Based Effects of the Recent Waves of Trade Policy Uncertainty**



Note: Variables are shown in percent deviation from baseline.

Source: Staff calculations.

## The Foreign GDP Outlook

Real GDP\*

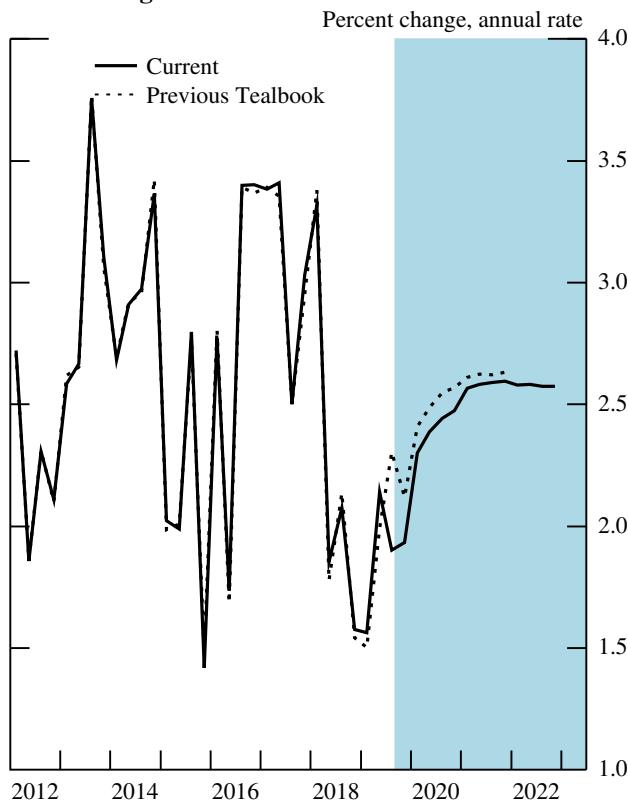
Percent change, annual rate

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

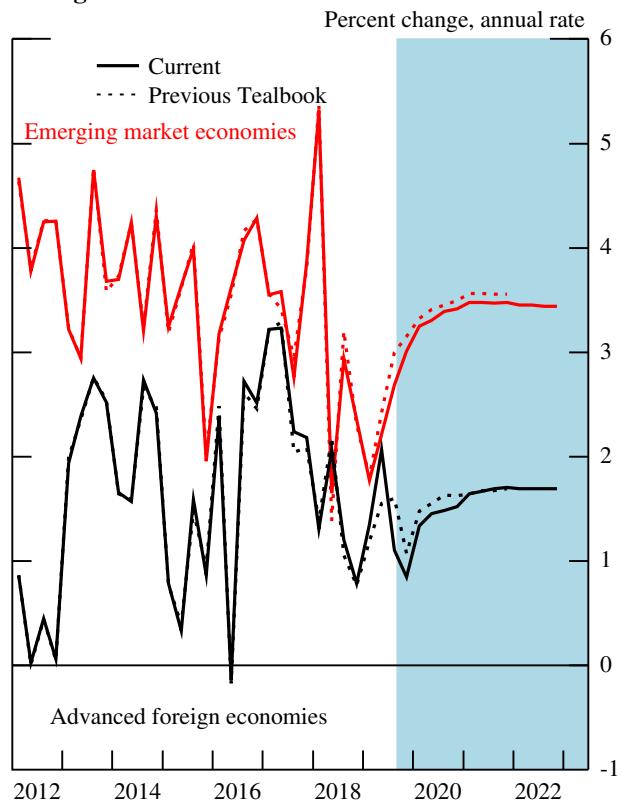
\* GDP aggregates weighted by shares of U.S. merchandise exports.

... indicates not applicable. This is the first time we have included a Tealbook forecast for 2022.

### Total Foreign GDP



### Foreign GDP



## The Foreign Inflation Outlook

Consumer Prices\*

Percent change, annual rate

	2018	2019				2020	2021	2022
		Q1	Q2	Q3	Q4			
1. Total Foreign <i>Previous Tealbook</i>	2.4	.8	3.3	2.3	2.3	2.3	2.3	2.3
	2.4	.8	3.3	2.5	2.7	2.3	2.3	...
2. Advanced Foreign Economies <i>Previous Tealbook</i>	1.7	.8	2.2	1.2	1.5	1.4	1.6	1.6
	1.7	.7	2.2	1.4	2.5	1.5	1.5	...
3. Canada	2.1	1.6	3.4	2.1	1.9	1.9	2.0	2.0
4. Euro Area	1.9	.2	2.1	.8	1.1	1.2	1.4	1.6
5. Japan	.8	.9	.3	.2	2.0	.7	1.0	1.1
6. United Kingdom	2.3	.9	2.7	2.6	2.1	2.0	2.0	1.9
7. Emerging Market Economies <i>Previous Tealbook</i>	2.9	.8	4.1	3.1	2.9	2.9	2.8	2.8
	2.9	.8	4.1	3.2	2.9	2.8	2.8	...
8. China	2.2	.6	4.3	3.9	2.6	2.5	2.5	2.5
9. Emerging Asia ex. China	1.9	.1	3.1	1.3	2.5	2.8	2.7	2.7
10. Mexico	4.8	1.1	4.5	3.5	3.2	3.2	3.2	3.2
11. Brazil	4.1	2.9	5.2	3.0	3.9	3.8	3.7	3.5

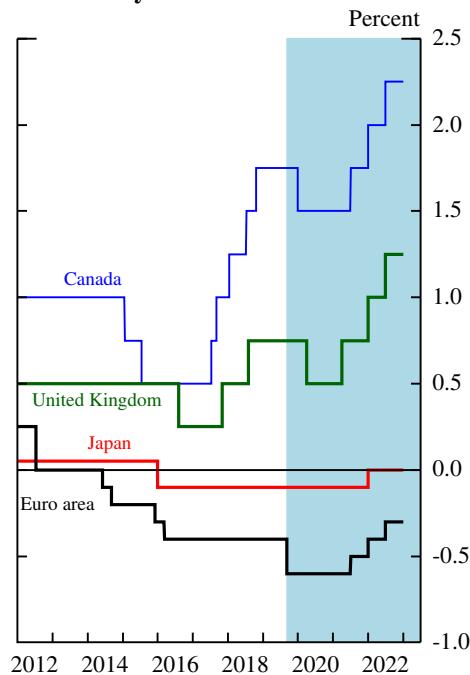
\* CPI aggregates weighted by shares of U.S. non-oil imports.

... indicates not applicable. This is the first time we have included a Tealbook forecast for 2022.

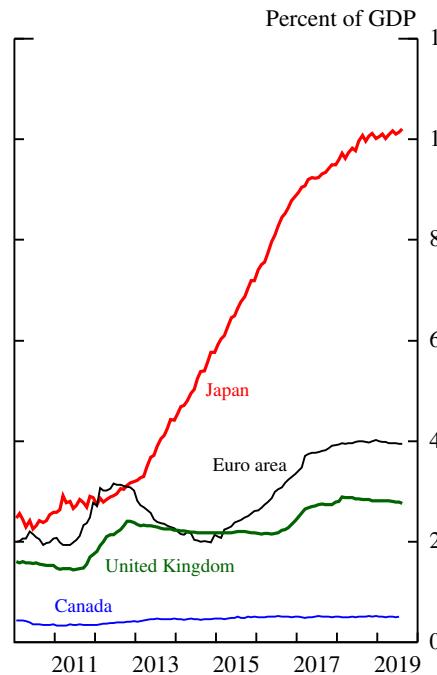
Int'l Econ Devel &amp; Outlook

## Foreign Monetary Policy

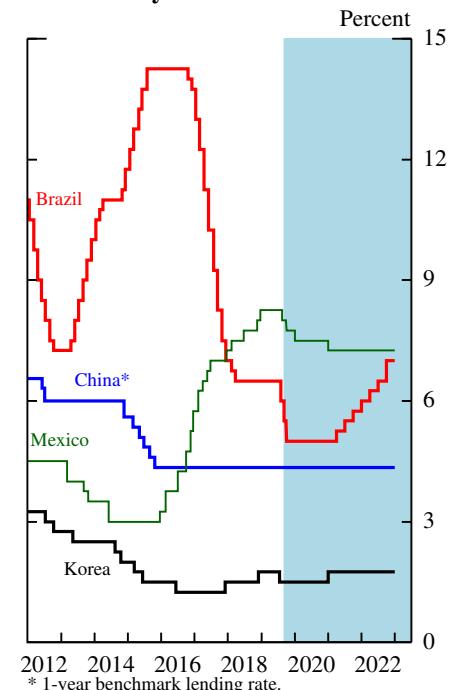
### AFE Policy Rates



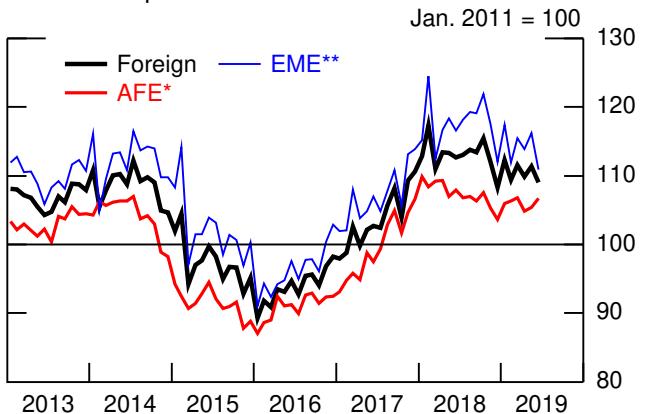
### AFE Central Bank Balance Sheets



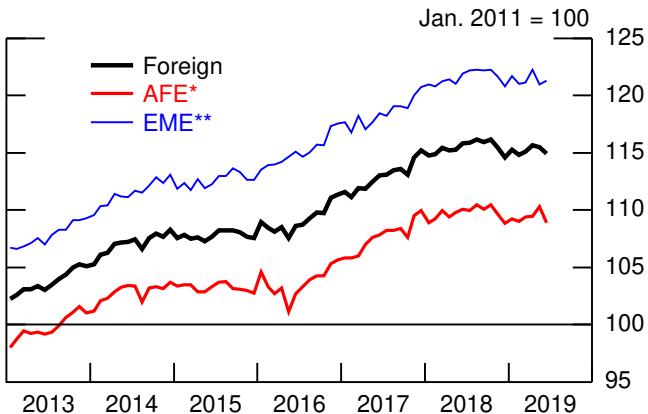
### EME Policy Rates



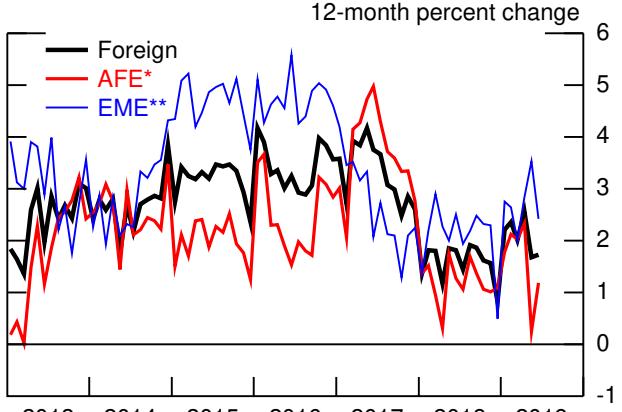
## Recent Foreign Indicators

**Nominal Exports**

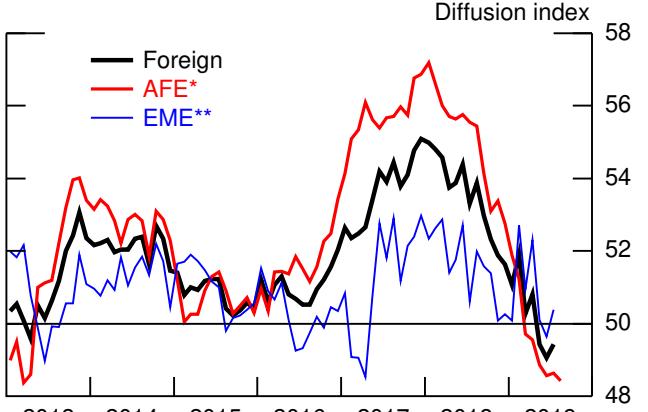
\* Includes Australia, Canada, euro area, Japan, Sweden, Switzerland, U.K.  
\*\* Includes Argentina, Brazil, Chile, China, Colombia, Hong Kong, India, Indonesia, Israel, Korea, Malaysia, Mexico, Singapore, Taiwan, Thailand.

**Industrial Production**

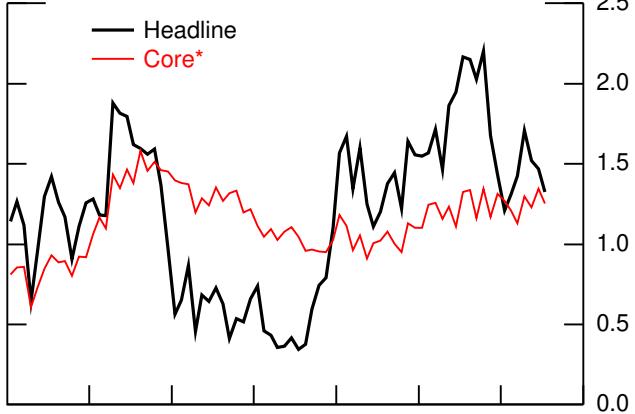
\* Includes Canada, euro area, Japan, Sweden, U.K.  
\*\* Includes Argentina, Brazil, Chile, China, Colombia, India, Indonesia, Israel, Korea, Malaysia, Mexico, Philippines, Russia, Singapore, Taiwan, Thailand.

**Retail Sales**

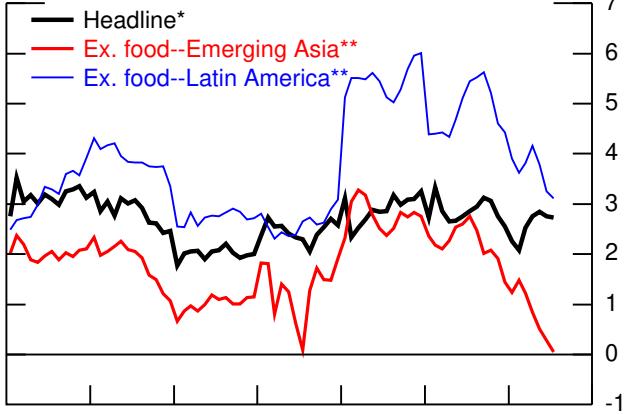
\* Includes Canada, euro area, Japan, Sweden, Switzerland, U.K.  
\*\* Includes Brazil, Chile, China, Korea, Mexico, Singapore, Taiwan.

**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**  
12-month percent change

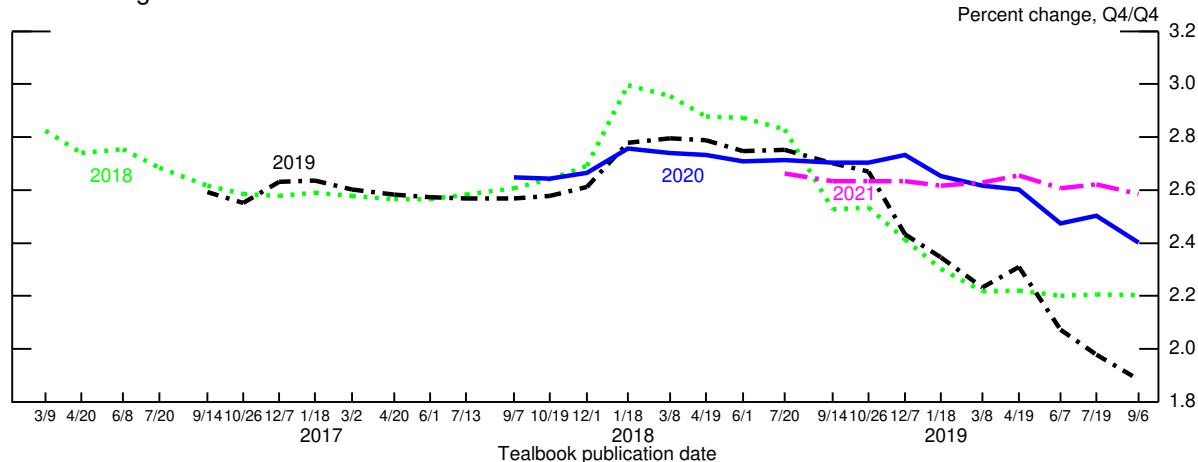
Note: Includes Canada, euro area, Japan, U.K.  
\* Excludes all food and energy; staff calculation.  
Source: Haver Analytics.

**Consumer Prices: Emerging Market Economies**  
12-month percent change

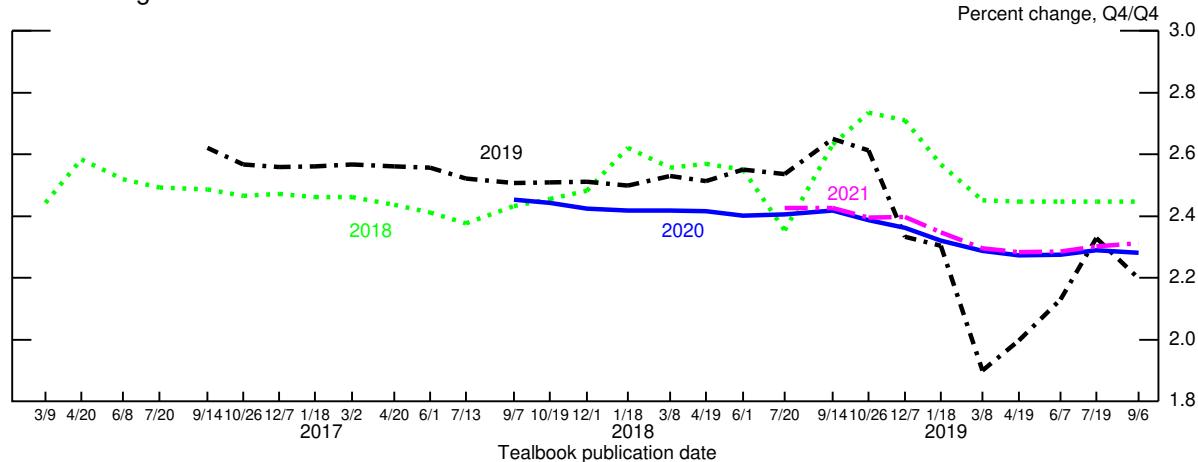
\* Includes Brazil, Chile, China, Colombia, Hong Kong, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Singapore, Taiwan, Thailand.  
\*\* Excludes all food; staff calculation. Latin America excludes Argentina and Venezuela.

## Evolution of Staff's International Forecast

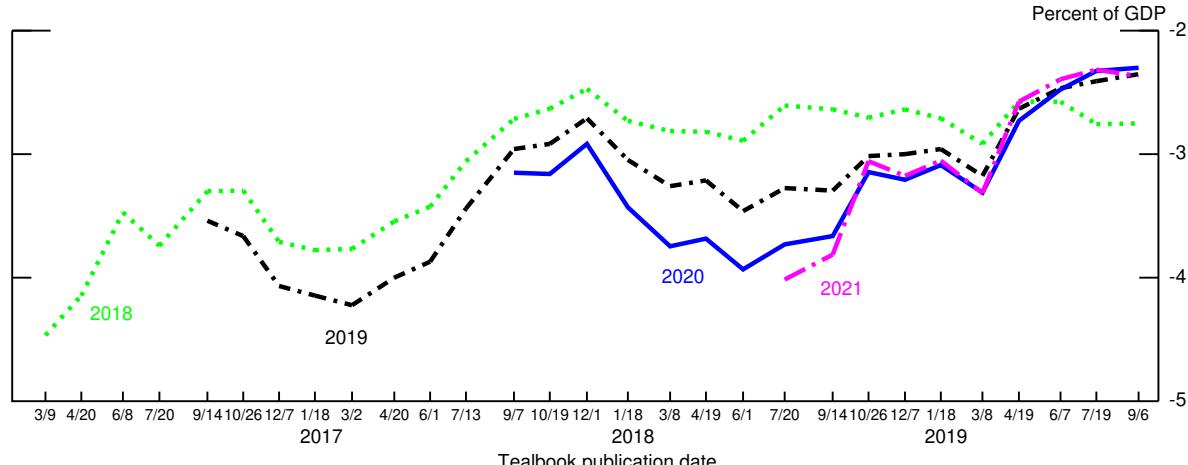
Total Foreign GDP



Total Foreign CPI

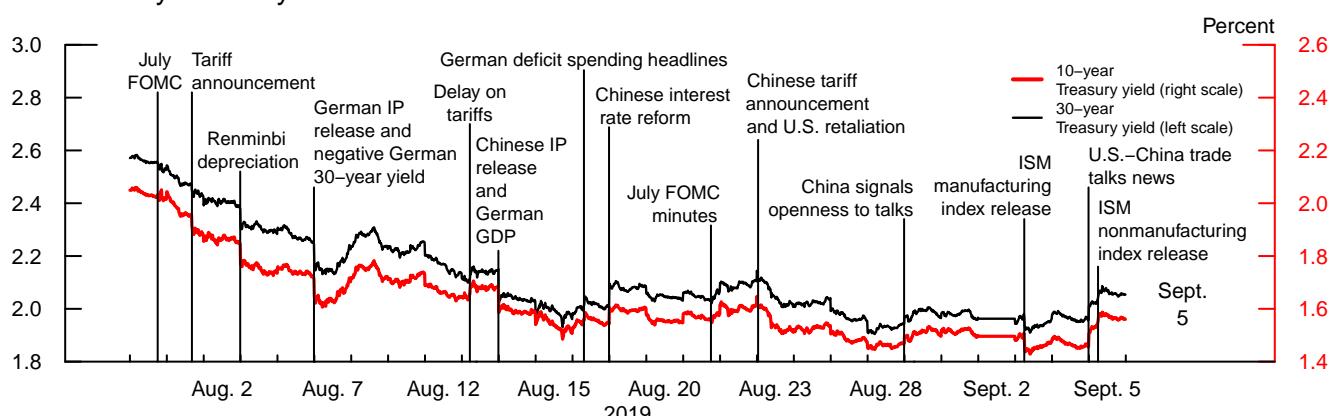


U.S. Current Account Balance



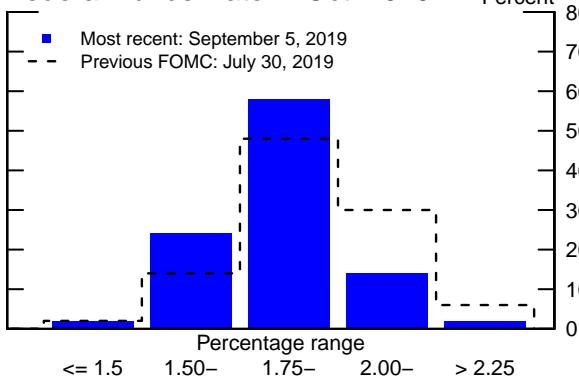
Int'l Econ Devel &amp; Outlook

## Intraday Treasury Yields



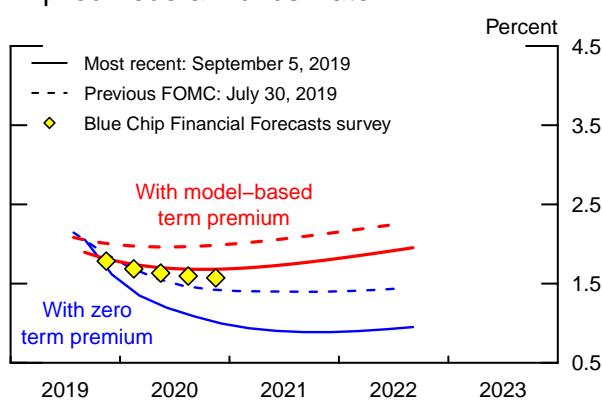
Note: Data are spaced at 5-minute intervals from 8:00 a.m. to 4:00 p.m.  
Source: Bloomberg.

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



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

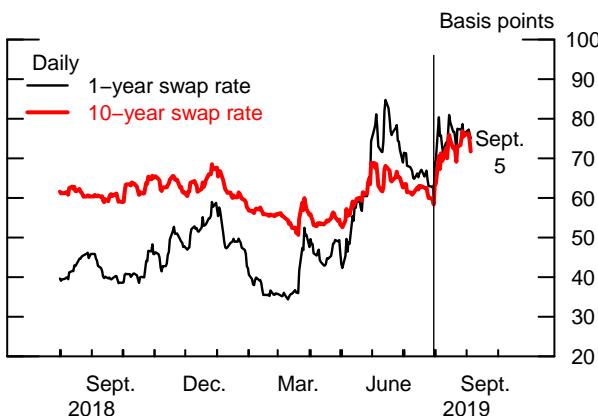
## Implied Federal Funds Rate



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. The Blue Chip path is the average of respondents' expectations for the federal funds rate in the survey published on September 1.

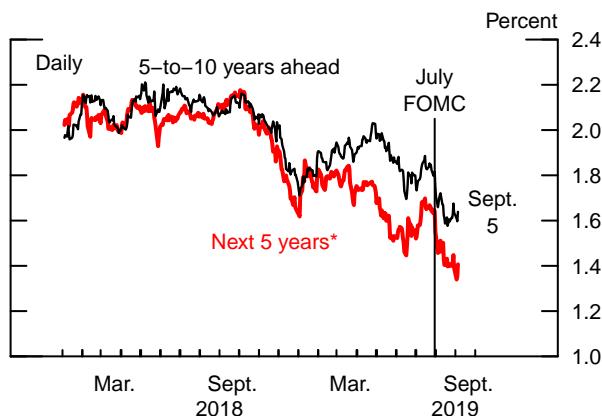
Source: Bloomberg; Wolters Kluwer Legal and Regulatory Solutions U.S.; Board staff calculations.

## 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.

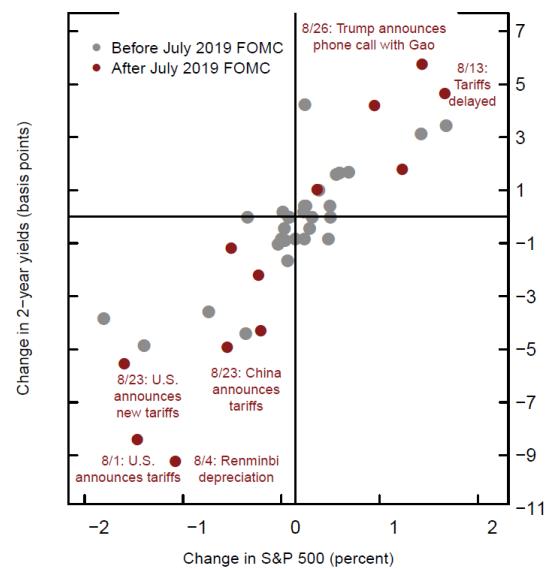
## Drivers of Recent Movements in Treasury Yields

Yields on nominal Treasury securities have declined dramatically, on net, across the curve since the July FOMC meeting. Our analysis suggests that the decline in short-term Treasury yields largely reflected heightened trade tensions between the United States and China that lowered investors' expectations for the near-term path of monetary policy. The declines in longer-term yields are not as closely linked to trade-related news. Instead, a larger share of the fall in long-term yields appears to be related to investors' concern about the downside risks to the foreign outlook. In addition, investor demand for long-term U.S. Treasury securities reportedly increased as the share of sovereign debt with negative yields has risen.

Yields on short-term U.S. Treasury securities responded to escalating trade tensions between the United States and China. As shown by the red dots in the lower-left quadrant of figure 1, declines in two-year Treasury yields immediately after adverse news on U.S.–China trade tensions were large. On net, taking into account negative and positive trade news that occurred in either daytime or after-hours trading, the change in the two-year Treasury yield in narrow windows after these announcements explains 18 basis points of the 28 basis point intermeeting decline (see figure 2). In addition, staff term structure models ascribe a majority of the decline of short-term Treasury yields over the period to declines in the expected path of short-term rates. Taken together, these results suggest that investors expect monetary policy to respond to the perceived drag on growth related to the U.S.–China trade tensions.

In contrast, the immediate response of longer-term yields to both negative and positive news about trade developments account, on net, for only 10 basis points of the total 53 basis point

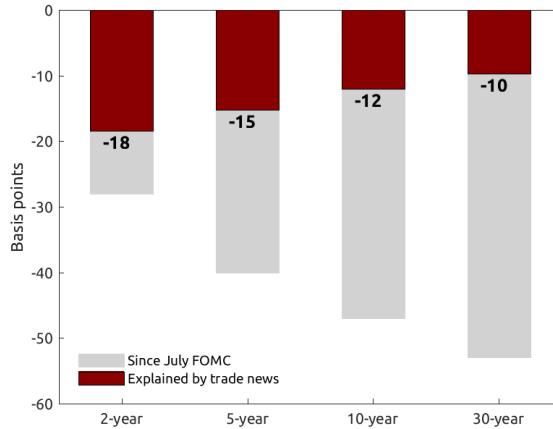
**Figure 1: Change in Treasury Yields and S&P 500 Immediately after Trade-Related News**



Note: The scatterplot presents the change in Treasury yields and the S&P 500 around a narrow window that brackets the release of news. The window considers quotes 30 minutes before and 2 hours after the release of the news. If the news occurred over a weekend, we use quotes between Friday at the end of the business day and 2 a.m. on Monday.

Source: Bloomberg; Board staff estimates.

**Figure 2: Change in Treasury Yields since the July FOMC Explained by the Immediate Reaction of Yields to Trade News**



Note: Red bars show the net contribution of changes in yields around a window that brackets the release of news about trade policy to the overall change in yields since the July FOMC (gray bars). The window considers quotes 30 minutes before and 2 hours after the release of the news. If the news occurred over a weekend, we use quotes between Friday at the end of the business day and 2 a.m. on Monday.

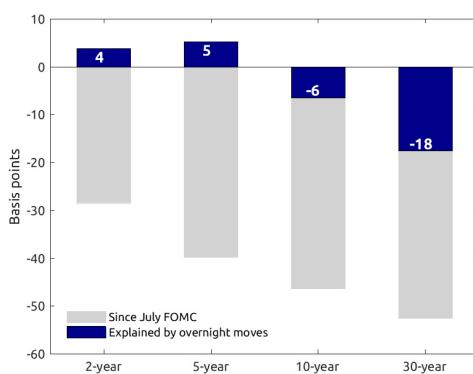
Source: Bloomberg; Board staff estimates.

decline in 30-year Treasury yields (see figure 2).<sup>1</sup> However, we can attribute 18 basis points of the decline to negative news emanating from abroad (which includes foreign economic data releases and some after-hours news related to U.S.–China trade tensions) (see figure 3).<sup>2</sup> This inference relies on the assumption that most of the news about foreign economic developments occurred after domestic trading hours. In stark contrast, overnight moves in the two-year Treasury yield were, on balance, slightly positive. These findings suggest that concerns about downside risks to the foreign growth outlook had a greater effect on long-term yields than short-term yields.

Long-term U.S. Treasury yields were likely also depressed by increasing demand for positive-yielding long-dated U.S. Treasury securities from investors globally. Over the intermeeting period, the share of euro-area sovereign debt with a negative yield and maturity greater than 10 years increased 17 percentage points and accounts for about 40 percent of the total outstanding sovereign debt with maturities greater than 10 years (not shown). Similarly, the duration of the global stock of debt with negative yields has moved up from 5.2 years to 6.3 years over the same period, the largest intermeeting increase in duration in the past few years (see figure 4).

Anecdotal reports support the reach-for-yield factor behind falling long-term yields. The demand for positive-yielding long-dated U.S. Treasury securities, notably from pensions and insurers, was reportedly very strong. In addition, foreign investors were reportedly increasingly willing to add such exposure without hedging the FX risk, while U.S. pensions were influenced by a mid-September deadline that allowed them to mitigate tax liabilities associated with portfolio rebalancing.<sup>3</sup>

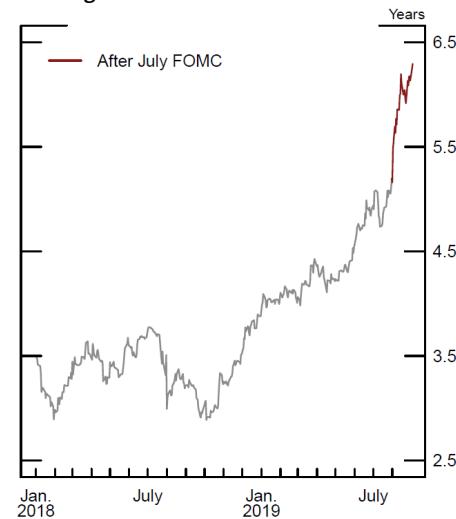
**Figure 3: Change in Treasury Yields since the July FOMC Explained by Changes during Overnight Hours**



Note: The blue bars show the net contribution of changes in yields during the overnight trading session to the overall change in yields since the July FOMC (gray bars). The overnight session is defined as changes in yields between 8 a.m. and 5 p.m. of the previous business day.

Source: Bloomberg; Board staff estimates.

**Figure 4: Modified Duration of the Global Stock of Debt with Negative Yield**



Source: Bloomberg.

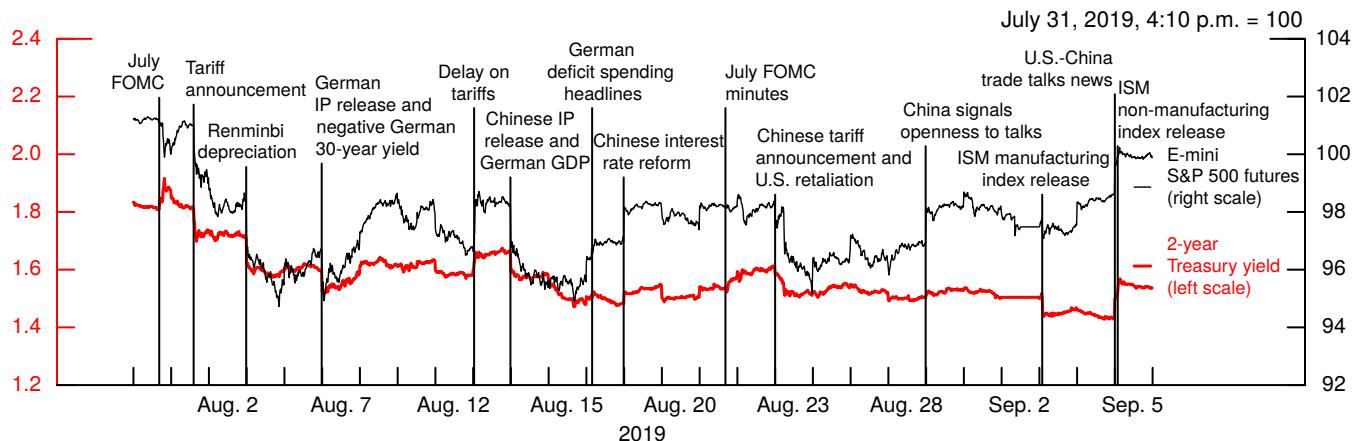
<sup>1</sup> Intermeeting negative trade-related news was associated with gross declines in the 30-year yield of roughly 27 basis points, based on the immediate response of yields, but positive news on trade that emerged mainly during the overnight trading session offset a large part of this decline.

<sup>2</sup> Overnight yield changes are the change in yields between 8 a.m. and 5 p.m. of the previous business day. For a historical perspective of the overnight vis-à-vis daytime contributions to long-term Treasury yield changes, see Don Kim (2016), “Evidence on the Increased Foreign Influence on the U.S. Yield Curve,” memorandum, Board of Governors of the Federal Reserve System, Division of Monetary Affairs, August 8.

<sup>3</sup> For more details about the demand from domestic pension funds, see the box “Will Pension Fund Demand for Long-Dated U.S. Treasury Securities Shift in Mid-September?” in the Financial Market Developments section of the September 2018 Tealbook A.

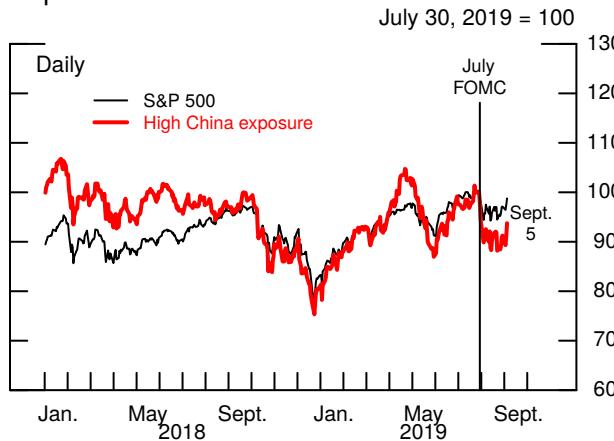
## Corporate Asset Market Developments

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



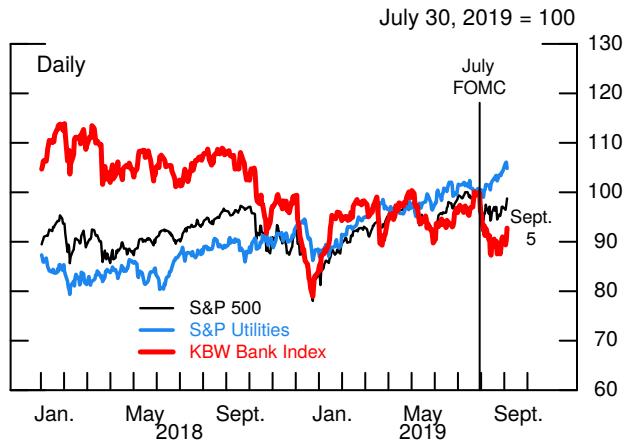
Note: Data are spaced at 5-minute intervals from 9:30 a.m. to 4:10 p.m.  
Source: Bloomberg.

### S&P 500 Index and China Exposure Portfolios



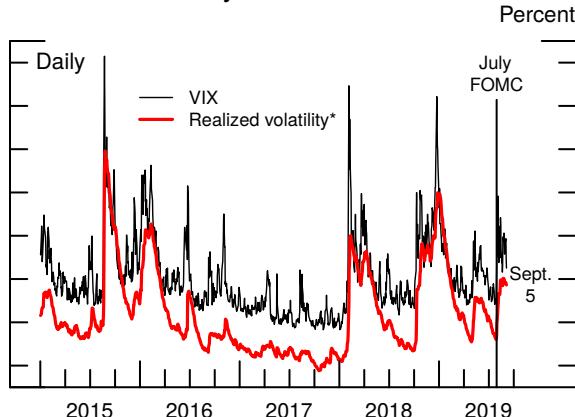
Note: China exposure is measured based on Board staff calculations of stock price sensitivity to the ASHR China A-Shares exchange-traded fund.  
Source: Bloomberg; Compustat; Yahoo Finance.

### Selected S&P 500 Stock Price Indexes



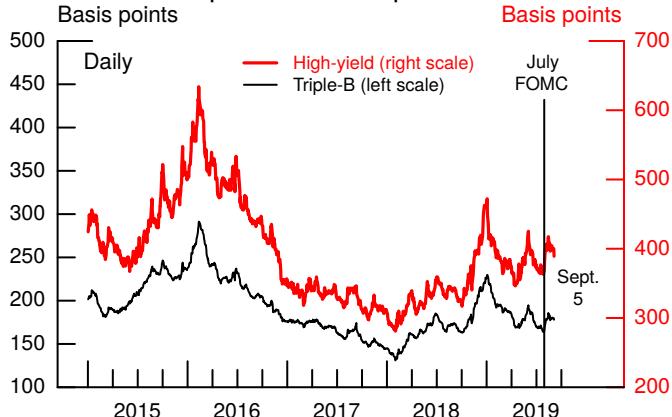
Source: Bloomberg.

### 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.

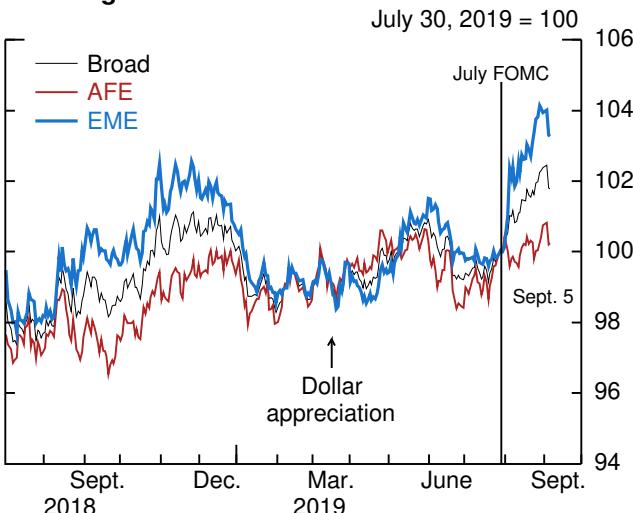
### 10-Year Corporate Bond Spreads



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

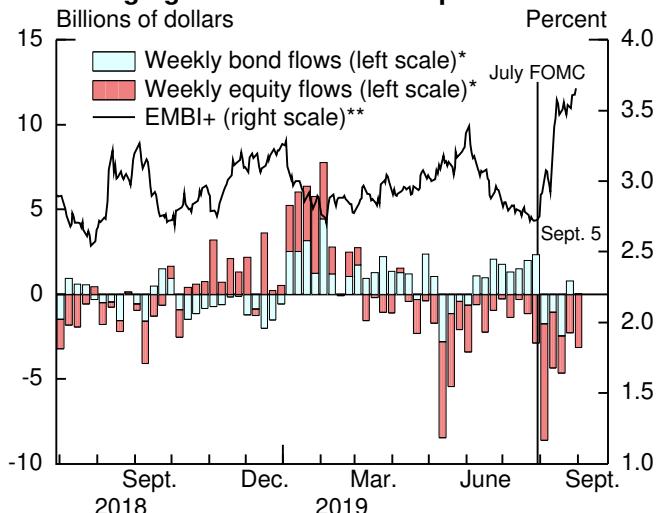
## Foreign Developments

### Exchange Rates



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

### Emerging Market Flows and Spreads



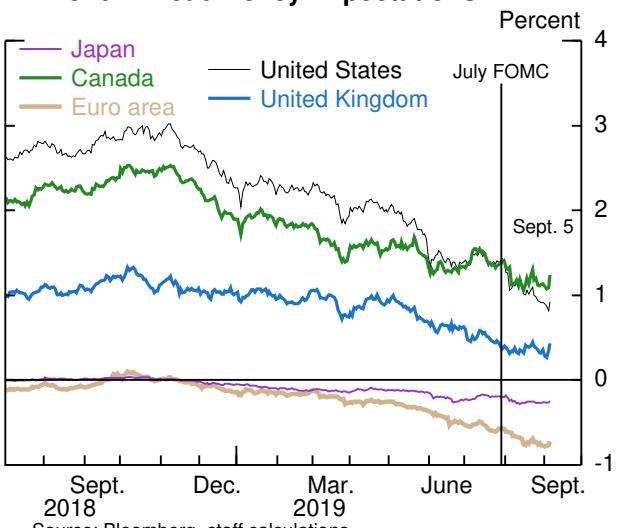
Note: EMBI+ refers to emerging market bond spreads to Treasury securities.

\* Average weekly flow by month.

\*\* Excluding Venezuela.

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

### 24-Month-Ahead Policy Expectations



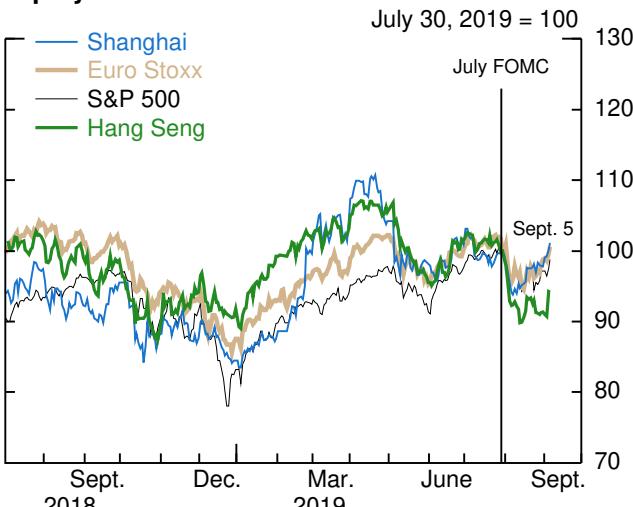
Source: Bloomberg, staff calculations.

### AFE and U.S. Sovereign Yields

	2-Year Change	10-Year Change	
United States	1.54	-.31	1.56
Germany	-.87	-.11	-.59
United Kingdom	.44	-.01	.6
Canada	1.45	-.07	1.27
Japan	-.29	-.08	-.26

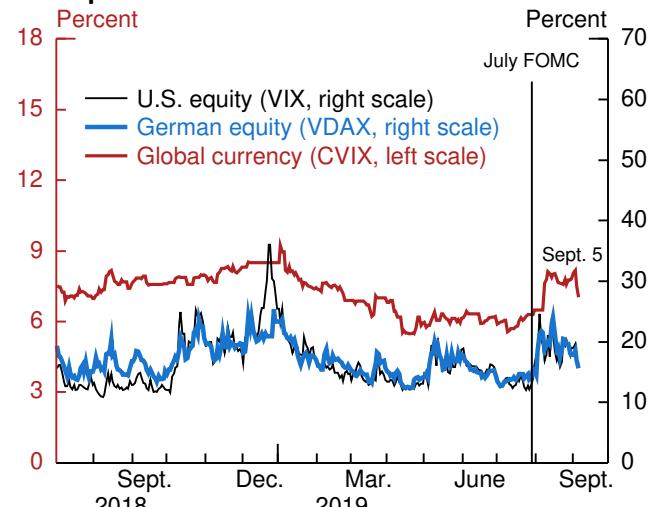
Source: Bloomberg. Data as of September 5.  
Changes are calculated from July 30.

### Equity Indexes



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

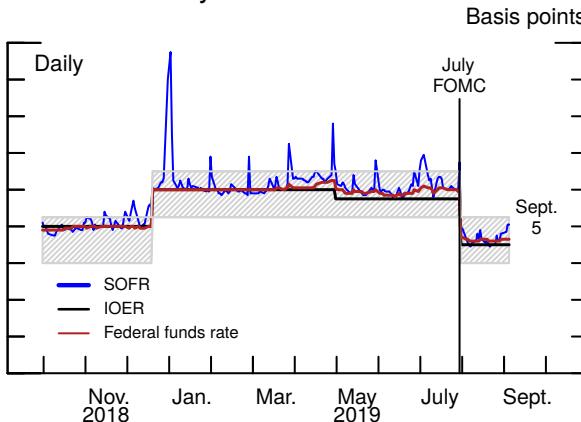
### Implied Volatilities



Source: Bloomberg.

## Short-Term Funding Markets

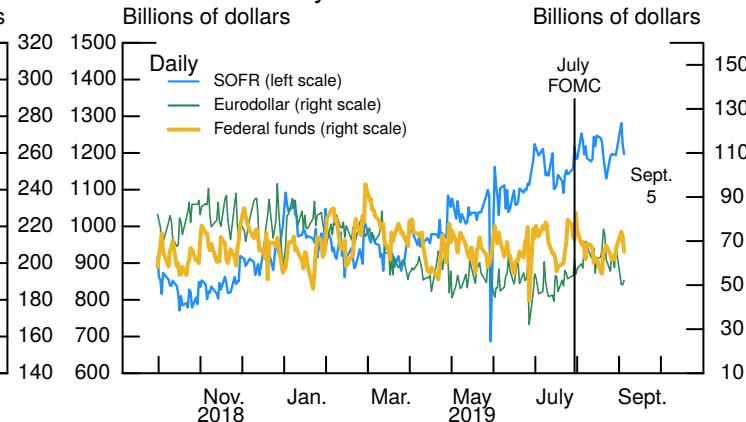
### Selected Money Market Rates



Note: Federal funds rate is a weighted median. Shaded area is the target range for the federal funds rate. SOFR is Secured Overnight Financing Rate; IOER is interest on excess reserves.

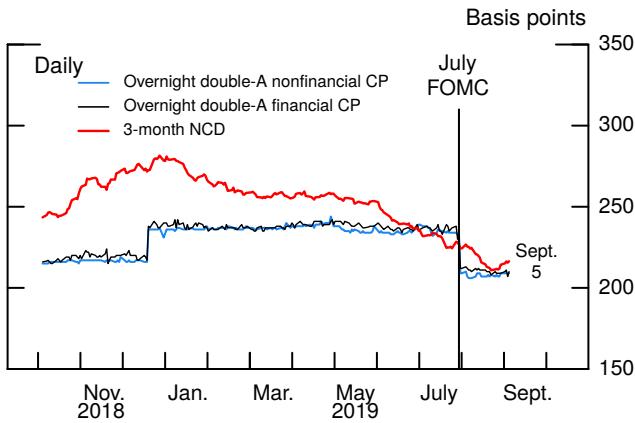
Source: Federal Reserve Bank of New York; Federal Reserve Board.

### Selected Money Market Volumes



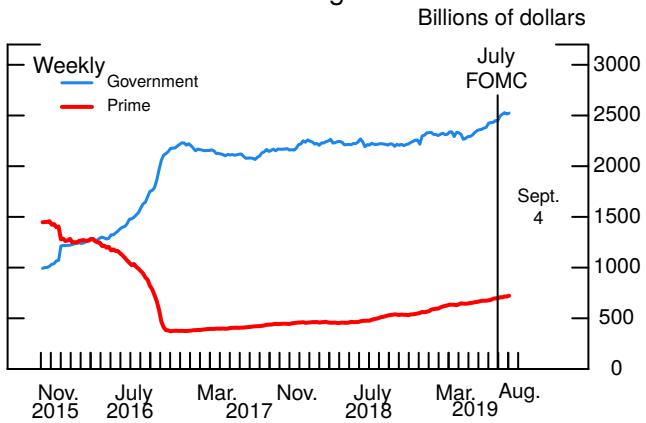
Note: SOFR is Secured Overnight Financing Rate.  
Source: Federal Reserve Bank of New York; Federal Reserve Board.

### CP and NCD Rates



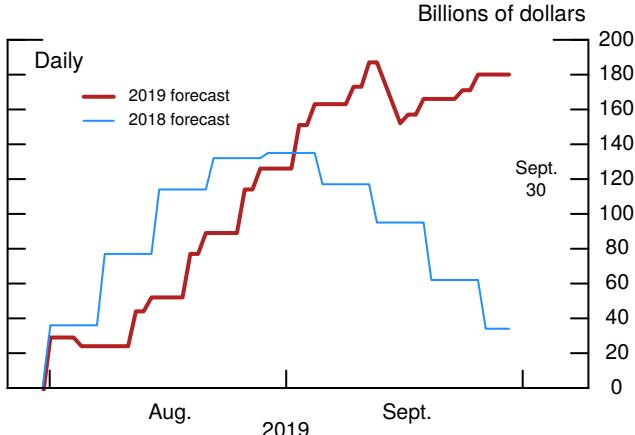
Note: Rates on negotiable certificates of deposit (NCDs) are computed as 5-day moving averages. CP is commercial paper.  
Source: Depository Trust & Clearing Corporation.

### MMF Assets under Management



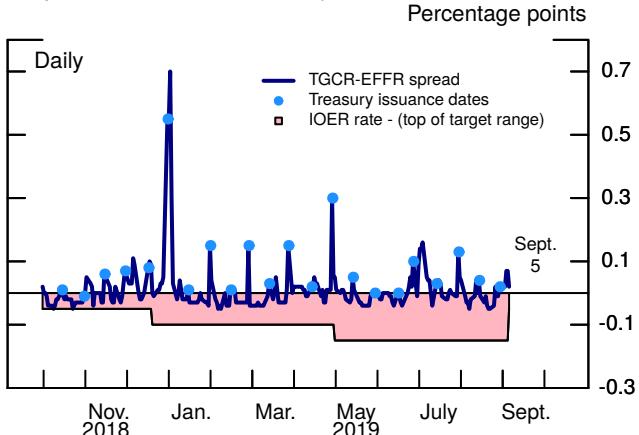
Note: MMF is money market fund.  
Source: Investment Company Institute.

### Cumulative Net Bill Issuance

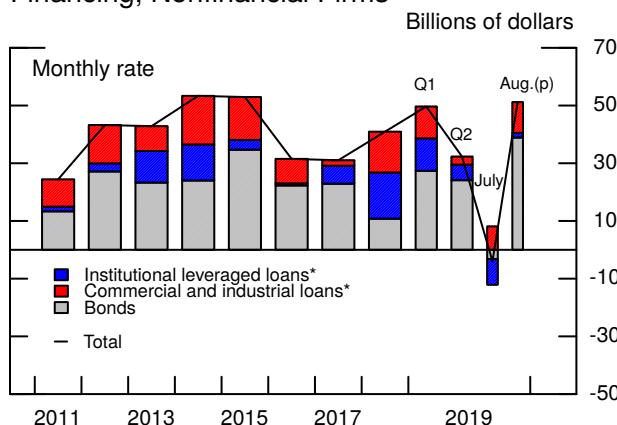


Source: Treasury auction announcements and staff forecast.

### Repo Rates and Treasury Issuance



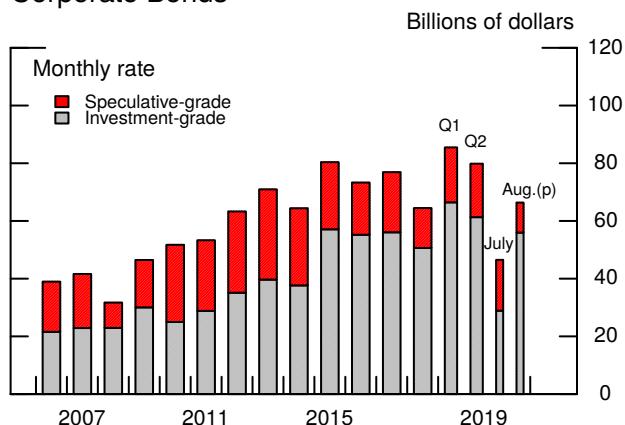
Note: EFFR is the Effective Federal Funds Rate; TGCR is the Tri-Party General Collateral Rate; Repo is repurchase agreement; IOER is interest on excess reserves.  
Source: Federal Reserve Bank of New York.

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

\* Period-end basis.

p Preliminary.

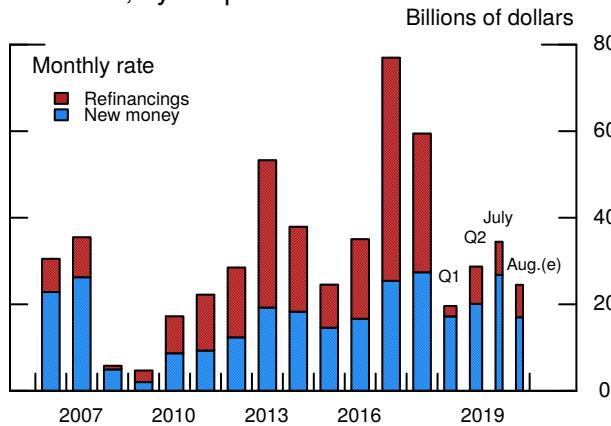
Source: Mergent Fixed Income Securities Database; Thomson Reuters LPC; Federal Reserve Board.

**Gross Issuance of Nonfinancial Corporate Bonds**

Note: Bonds are categorized by Moody's, Standard &amp; Poor's, and Fitch.

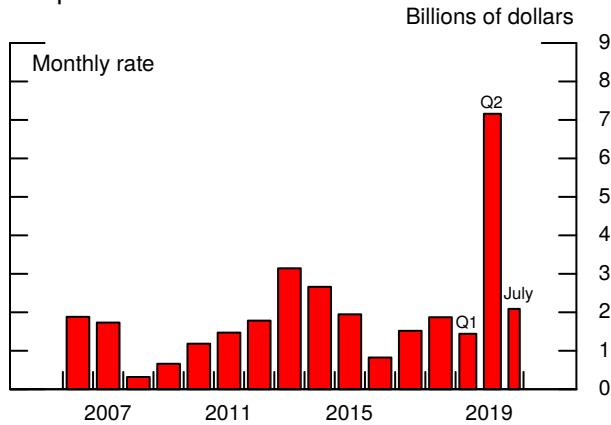
p Preliminary.

Source: Mergent Fixed Income Securities Database.

**Institutional Leveraged Loan Gross Issuance, by Purpose**

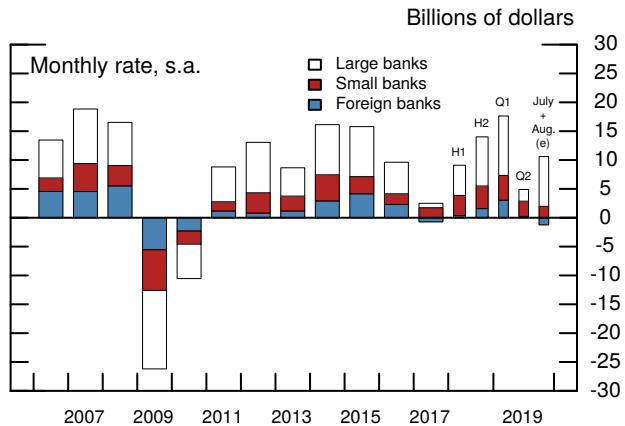
e Estimate.

Source: Thomson Reuters LPC.

**IPO Issuance by Nonfinancial Corporations**

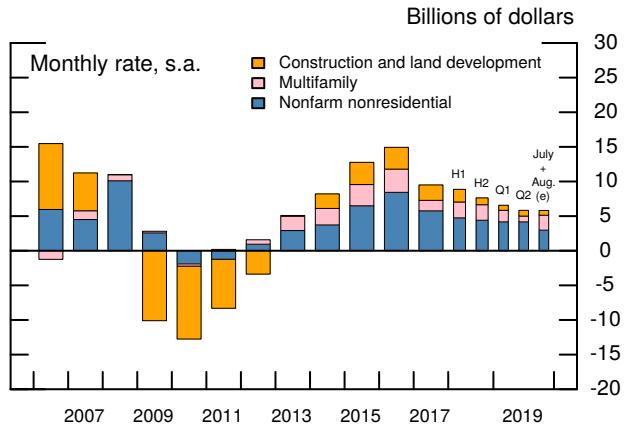
Note: IPO is initial public offering.

Source: Securities Data Company.

**Commercial and Industrial Loans**

e Estimate.

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.

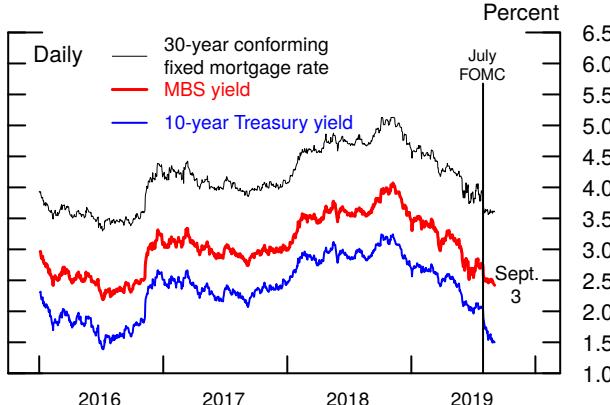
**Commercial Real Estate Loans**

e Estimate.

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.

## Household Finance

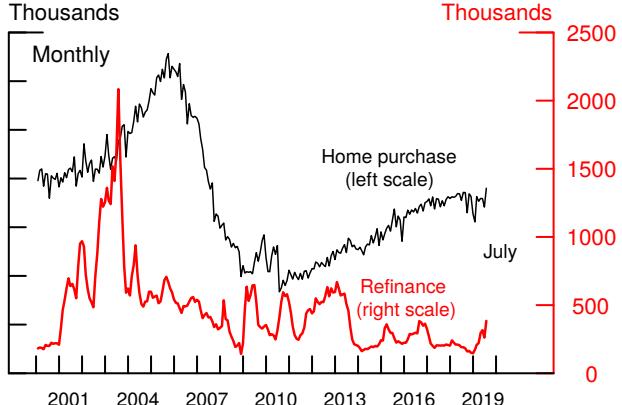
### Mortgage Rate and MBS Yield



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.

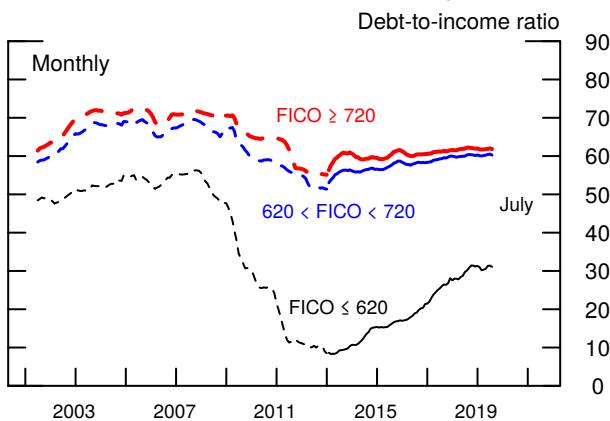
Source: For MBS yield, Barclays; for mortgage rate, Loansifter; for Treasury yield, Federal Reserve Bank of New York and Board staff calculations.

### Purchase and Refinance Originations



Note: The data are seasonally adjusted by Federal Reserve Board staff. Source: For values before 2019, data reported under the Home Mortgage Disclosure Act of 1975; for values in 2019, Board staff estimates.

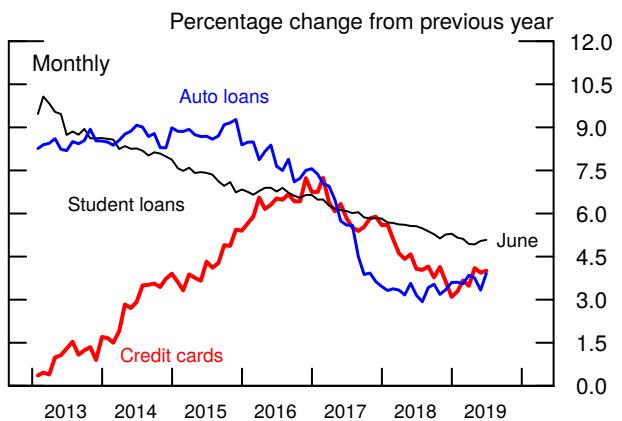
### Maximum Debt-to-Income Ratio, by Credit Score



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

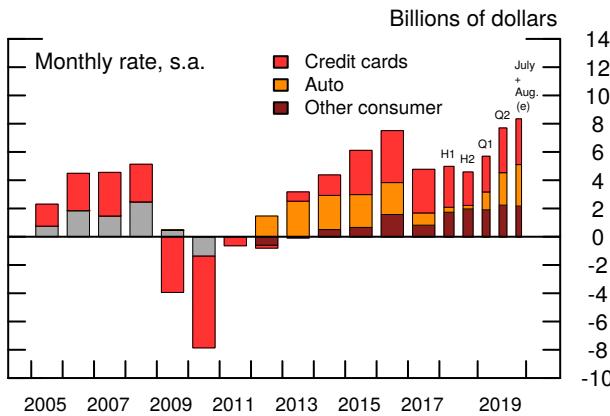
Source: For frontiers shown with dashed lines, McDowell and CoreLogic; for frontiers shown with solid lines, Optimal Blue.

### Consumer Credit



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

### Consumer Loans at Commercial Banks

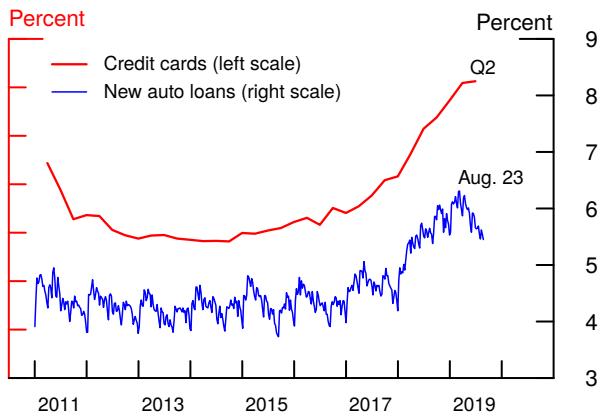


Note: Before 2012, data on auto and other consumer loans were not separately available. The combined series is depicted here by the gray bars. Yearly averages are Q4 to Q4, half-years are based on Q4 and Q2 average levels, and quarterly and monthly annual rates use corresponding average levels.

e Estimate.

Source: 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 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.

## 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.”

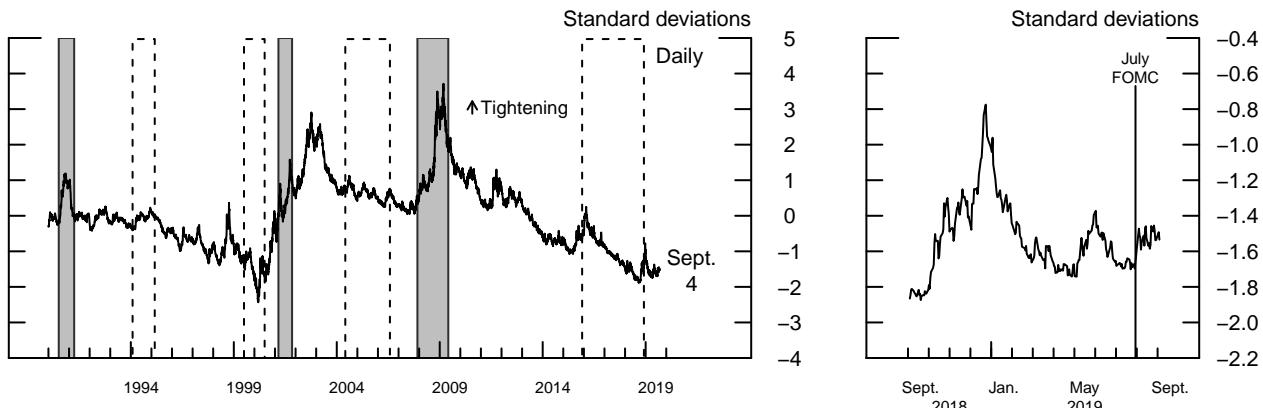
#### Overview of Selected FCIs

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

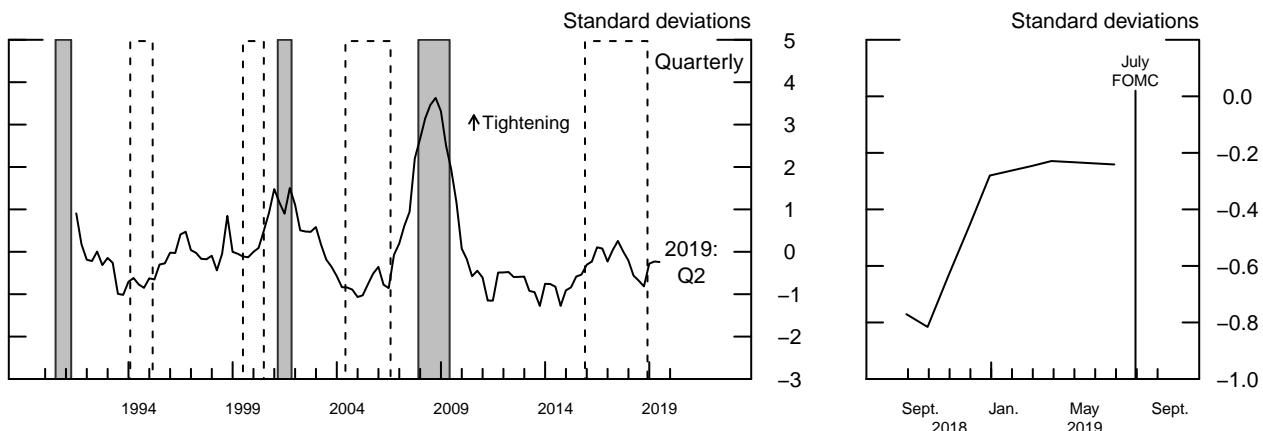
### Staff FCI for Nonfinancial Corporations



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.

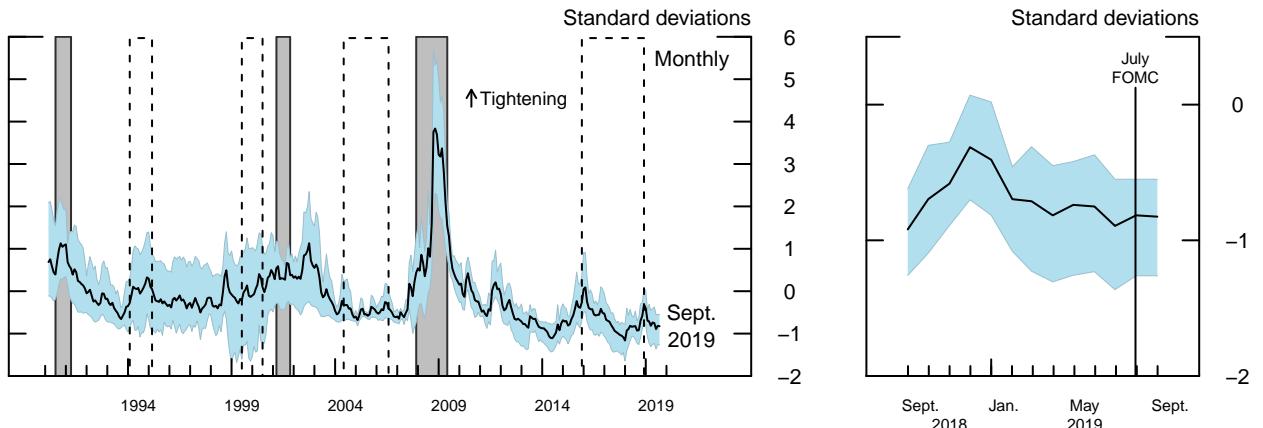
### SLOOS Bank Lending Standards Index



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.

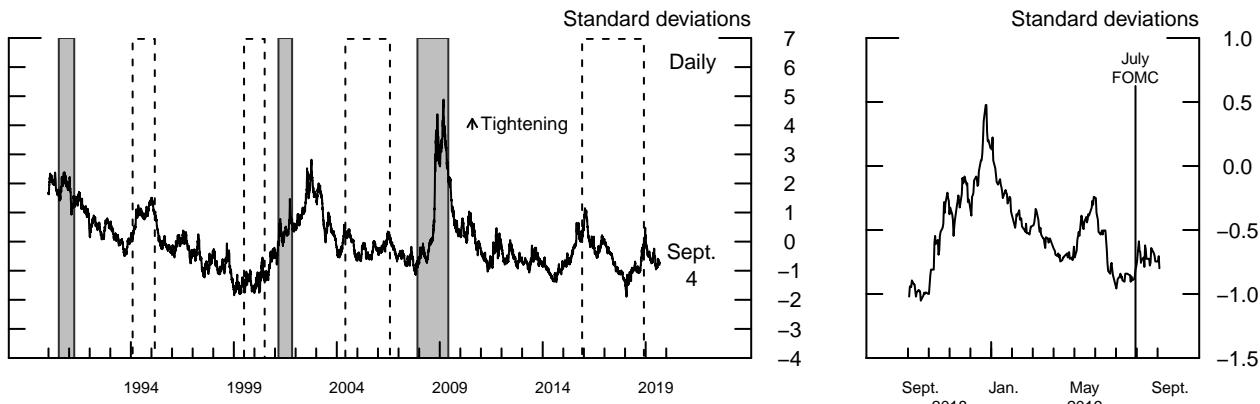
### Mean and Range of External FCIs



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.

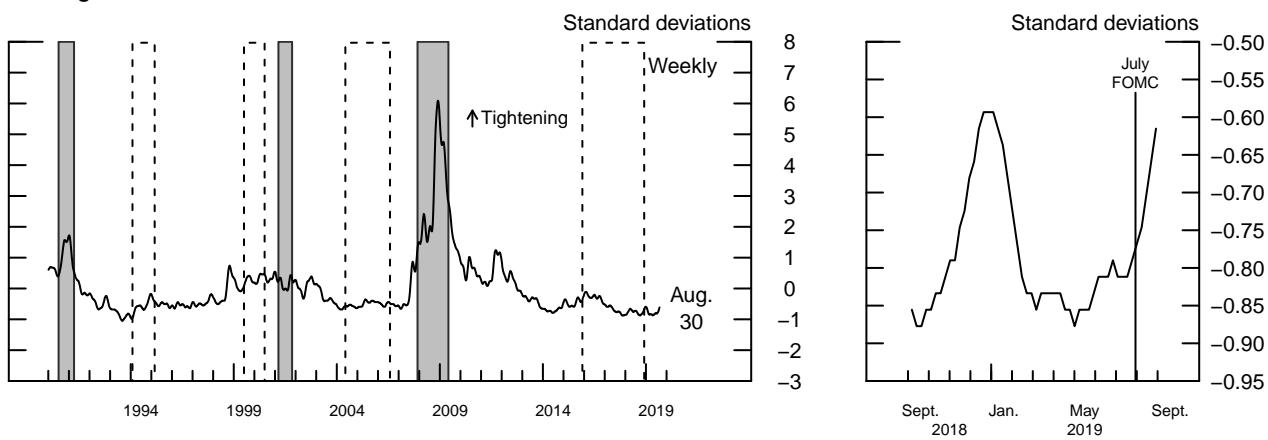
Source: Bloomberg; Federal Reserve Banks of Chicago, St. Louis, and Kansas City.

**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**

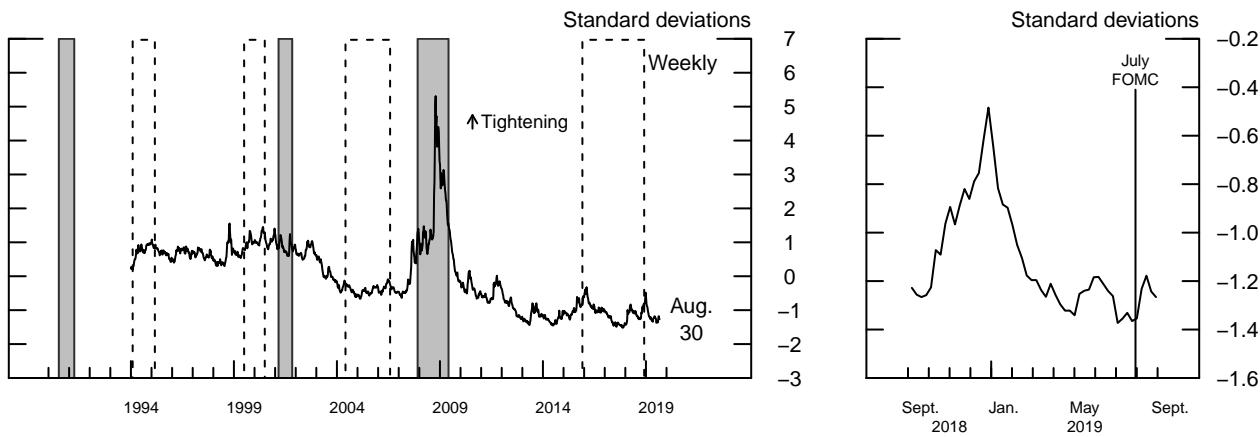
Note: The index is a weighted average of 5 financial variables: the federal funds rate, the 10-year Treasury yield, the triple-B yield spreads to Treasury, the S&P price-to-earnings ratio, and the broad value of the U.S. dollar. Weights are pinned down by the contribution of each financial variable on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

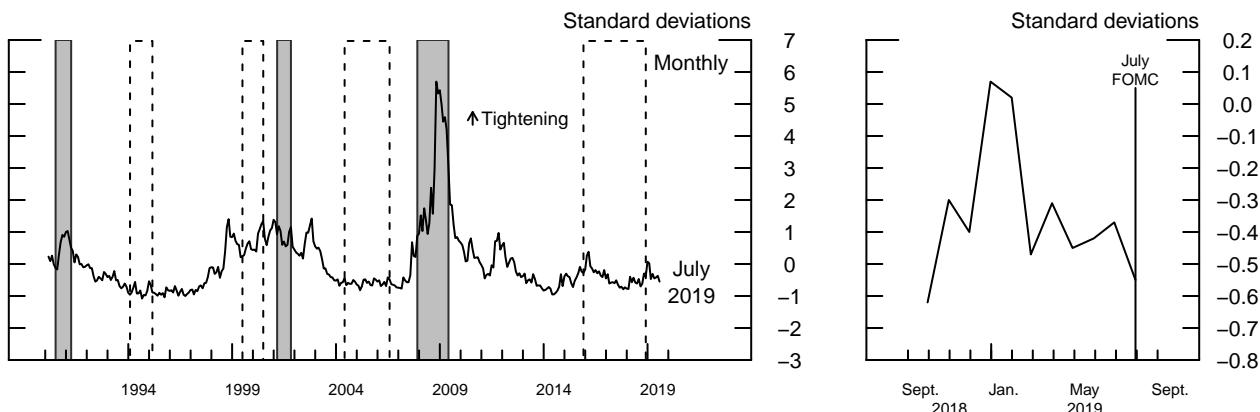
Note: The index is the principal component of 18 variables, including short- and long-term Treasury yields, corporate yields, money market and corporate bond spreads, bond and stock market volatility indicators, breakeven inflation rate, and the S&P 500 index.

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	.04	.05	.05	.08
Previous Tealbook	.09	.05	.02	.05
<i>Between 1 3/4 and 2 1/4 percent</i>				
Current Tealbook	.24	.27	.38	.25
Previous Tealbook	.28	.27	.41	.25
<i>Less than 1 percent</i>				
Current Tealbook	.17	.13	.00	.14
Previous Tealbook	.07	.13	.02	.19

### Probability of Unemployment Events

(4 quarters ahead)

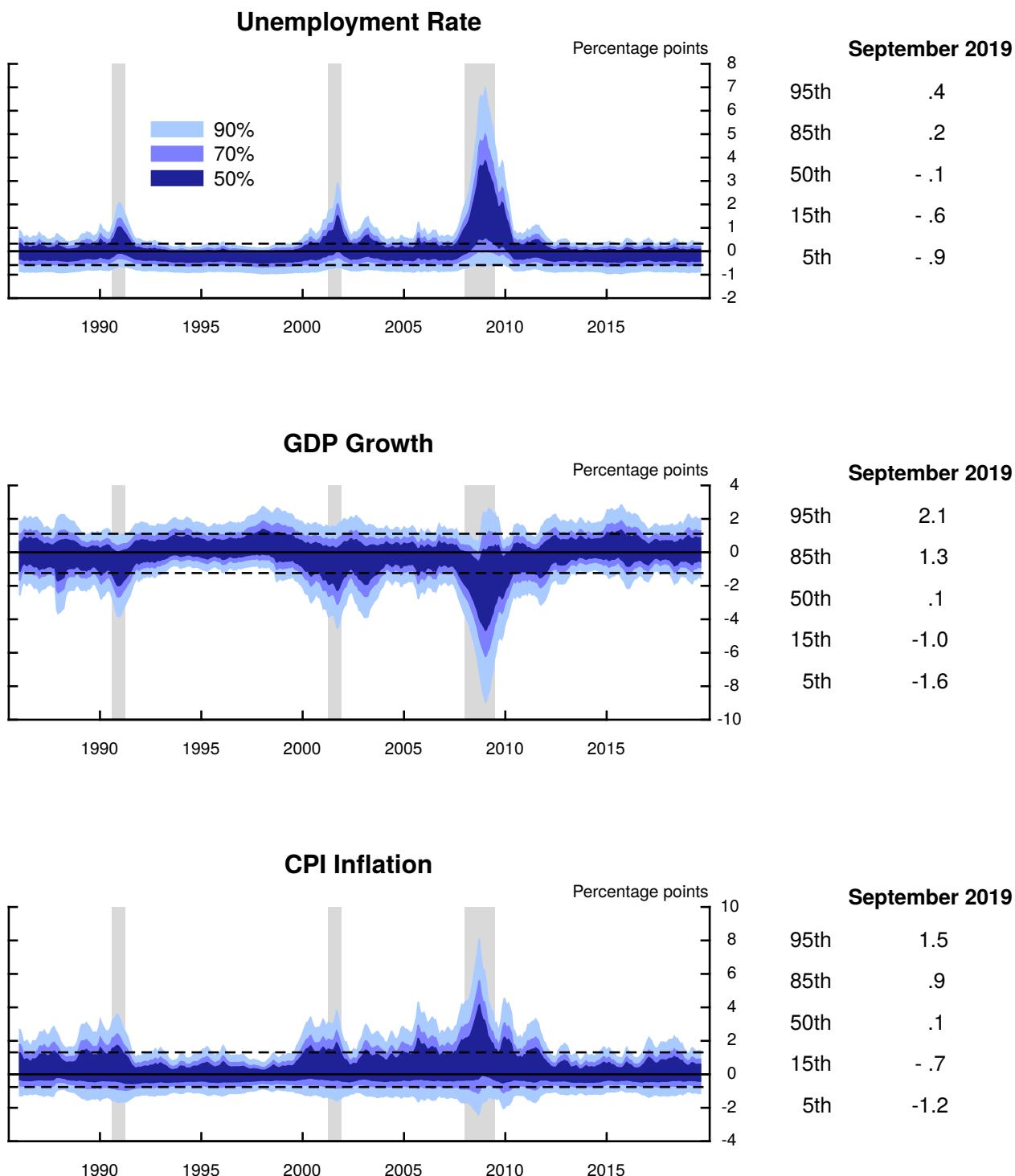
Probability that the unemployment rate will . . .	Staff	FRB/US	EDO	BVAR
<i>Increase by 1 percentage point</i>				
Current Tealbook	.02	.05	.23	.02
Previous Tealbook	.01	.03	.14	.04
<i>Decrease by 1 percentage point</i>				
Current Tealbook	.04	.01	.00	.15
Previous Tealbook	.09	.03	.02	.05

### Probability of Recession Over Next 4 Quarters

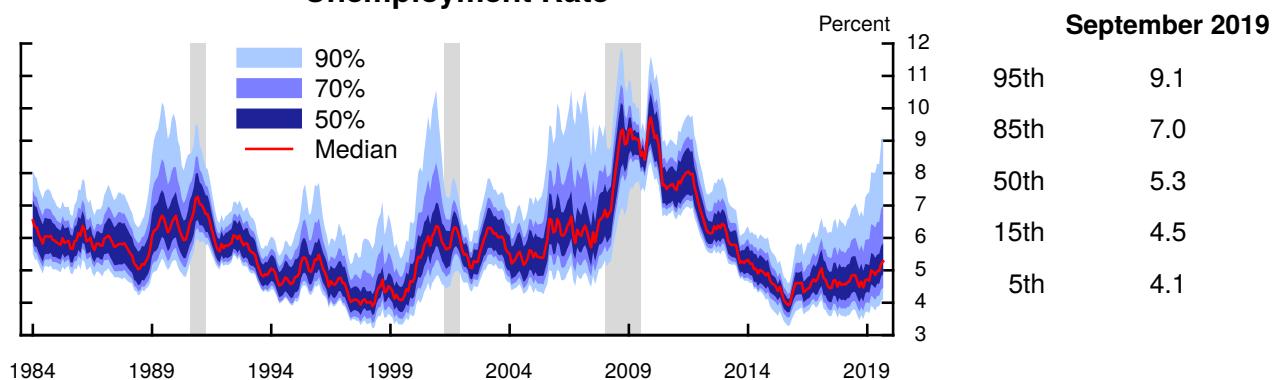
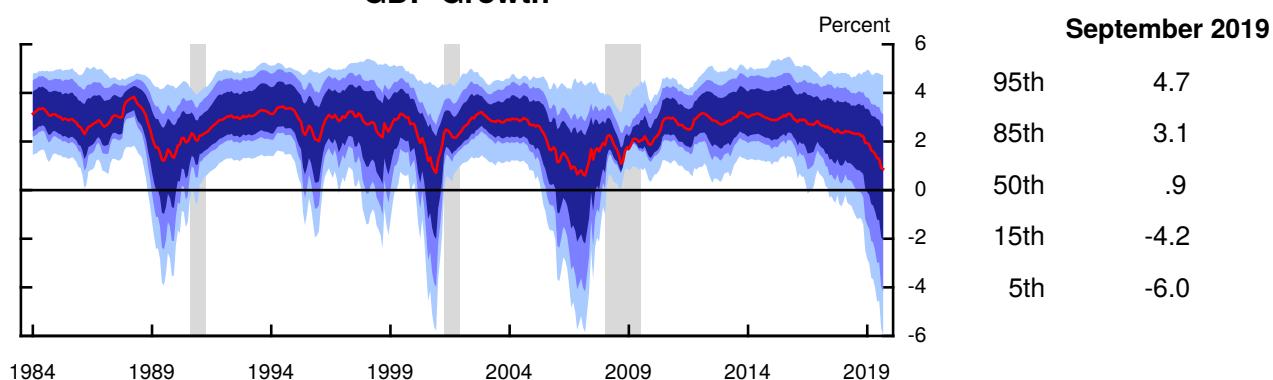
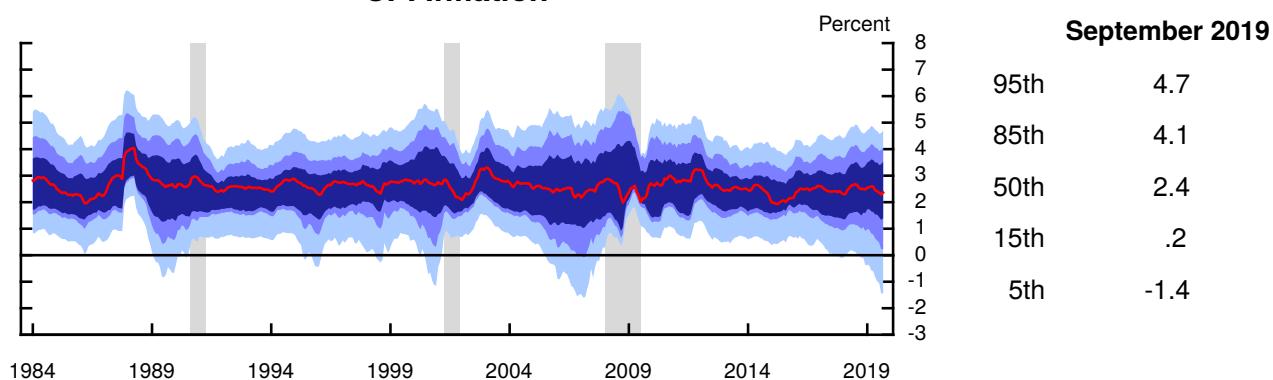
Probability of transitioning into or remaining in a recession	Staff	FRB/US	MAF	Term Spread	Unconditional
Current Tealbook	.07	.08	.45	.66	.23
Previous Tealbook	.07	.09	.36	.56	.23

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

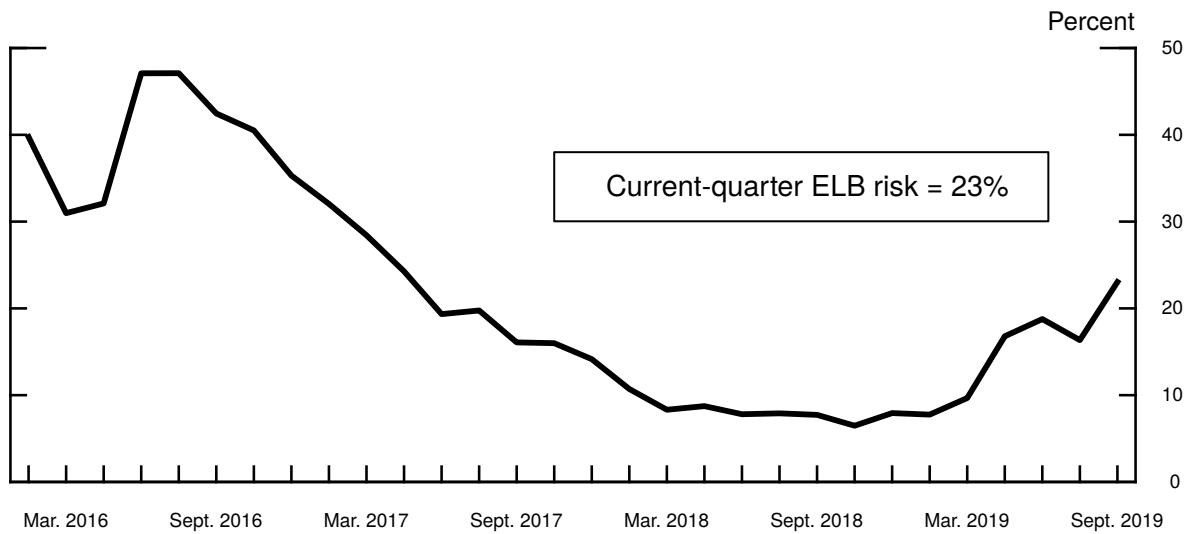


Note: The exhibit shows estimates of quantiles of the distribution of errors for four-quarter-ahead staff forecasts. The estimates are conditioned on indicators of real activity, inflation, financial market strain, and the volatility of high-frequency macroeconomic indicators. The tables show selected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

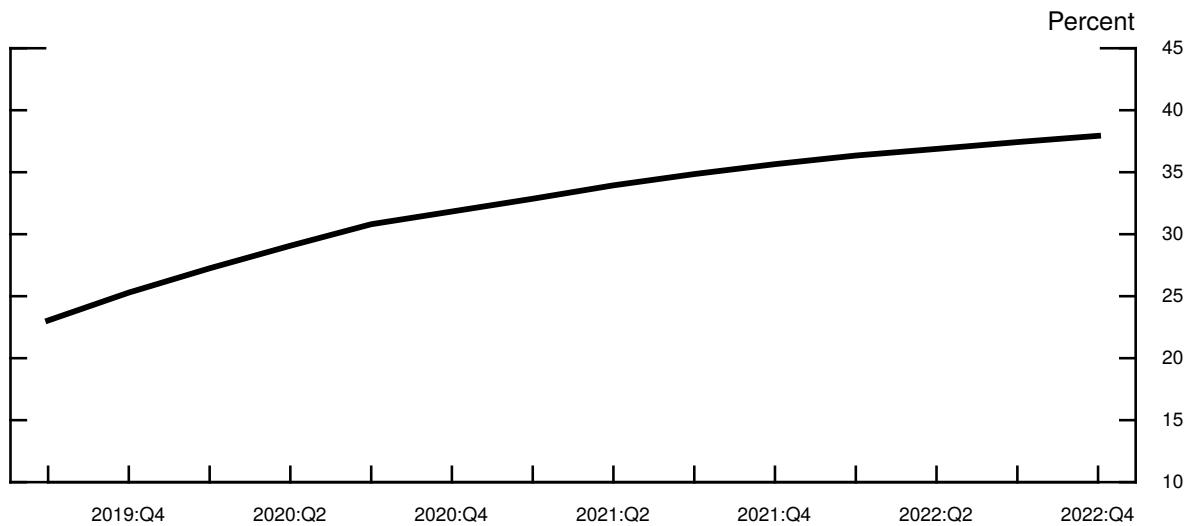
**Conditional Distributions of Macroeconomic Variables 2 Years Ahead****Unemployment Rate****GDP Growth****CPI Inflation**

## 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	1.8	2.0	1.8	1.7	1.5	1.5
No-deal Brexit	1.7	1.6	1.6	1.7	1.6	1.5
Escalation of trade tensions	.4	1.0	1.8	2.0	1.8	1.6
Recession with financial amplification	.8	-1.2	.1	2.1	2.4	2.5
Lower long-run equilibrium FF rate	1.4	1.5	1.4	1.5	1.5	1.7
Stronger aggregate demand	3.5	2.9	2.4	2.1	1.8	1.6
Stronger aggregate supply	2.4	2.8	2.8	2.7	2.5	2.3
<i>Unemployment rate<sup>1</sup></i>						
Tealbook baseline and extension	3.7	3.6	3.6	3.6	3.8	4.0
No-deal Brexit	3.7	3.7	3.8	3.8	3.9	4.1
Escalation of trade tensions	3.8	4.0	4.1	4.0	4.0	4.0
Recession with financial amplification	4.1	5.8	6.8	6.7	5.9	4.8
Lower long-run equilibrium FF rate	3.8	3.9	4.0	4.2	4.3	4.3
Stronger aggregate demand	3.5	3.1	2.9	2.9	3.0	3.4
Stronger aggregate supply	3.7	3.6	3.5	3.4	3.3	3.2
<i>Total PCE prices</i>						
Tealbook baseline and extension	1.6	1.8	1.8	1.8	1.9	1.9
No-deal Brexit	1.5	1.6	1.7	1.8	1.8	1.9
Escalation of trade tensions	3.4	1.4	1.7	1.9	2.1	2.1
Recession with financial amplification	1.6	1.6	1.5	1.5	1.5	1.6
Lower long-run equilibrium FF rate	1.6	1.8	1.8	1.8	1.8	1.8
Stronger aggregate demand	1.6	1.8	1.9	1.9	2.0	2.1
Stronger aggregate supply	1.6	1.7	1.7	1.6	1.7	1.8
<i>Core PCE prices</i>						
Tealbook baseline and extension	2.1	1.8	1.8	1.8	1.9	1.9
No-deal Brexit	2.0	1.6	1.7	1.8	1.8	1.9
Escalation of trade tensions	3.9	1.5	1.7	1.9	2.0	2.1
Recession with financial amplification	2.1	1.7	1.5	1.5	1.5	1.6
Lower long-run equilibrium FF rate	2.1	1.8	1.8	1.8	1.8	1.8
Stronger aggregate demand	2.1	1.8	1.9	1.9	2.0	2.1
Stronger aggregate supply	2.1	1.7	1.7	1.6	1.7	1.8
<i>Federal funds rate<sup>1</sup></i>						
Tealbook baseline and extension	2.2	2.4	2.5	2.5	2.5	2.5
No-deal Brexit	2.2	2.3	2.2	2.2	2.2	2.4
Escalation of trade tensions	2.1	1.7	1.7	1.9	2.2	2.6
Recession with financial amplification	1.8	.1	.1	.1	.2	1.2
Lower long-run equilibrium FF rate	2.3	2.3	2.1	1.9	1.7	1.4
Stronger aggregate demand	2.3	2.6	2.7	2.9	3.0	3.1
Stronger aggregate supply	2.1	2.1	2.1	2.1	2.2	2.3

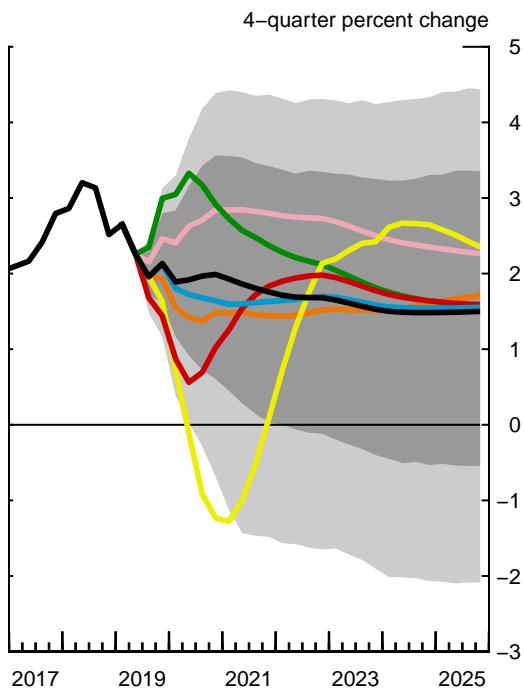
1. Percent, average for the final quarter of the period.

## Forecast Confidence Intervals and Alternative Scenarios

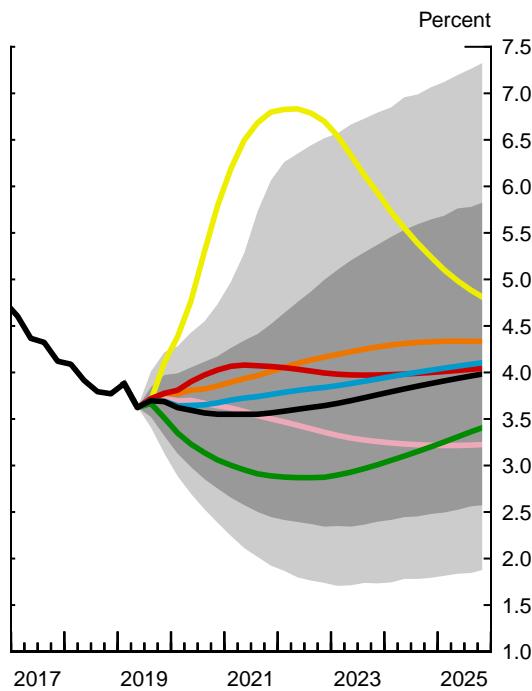
Confidence Intervals Based on FRB/US Stochastic Simulations\*

- Tealbook baseline and extension
- Recession with financial amplification
- Stronger aggregate demand
- No-deal Brexit
- Lower long-run equilibrium FF rate
- Stronger aggregate supply
- Escalation of trade tensions

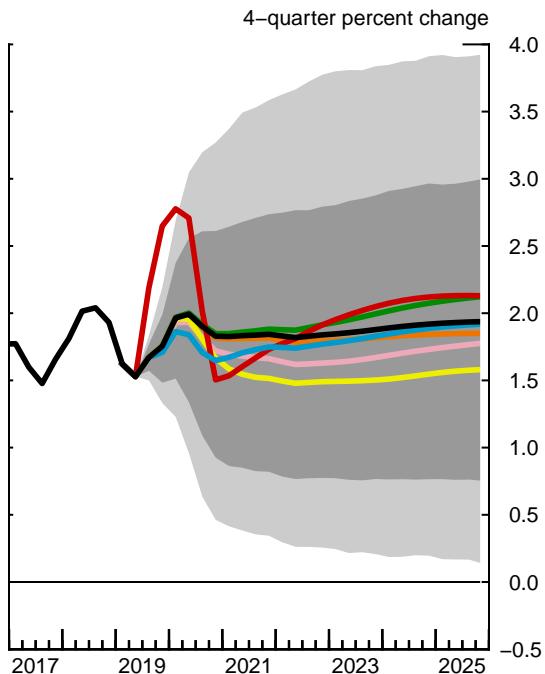
Real GDP



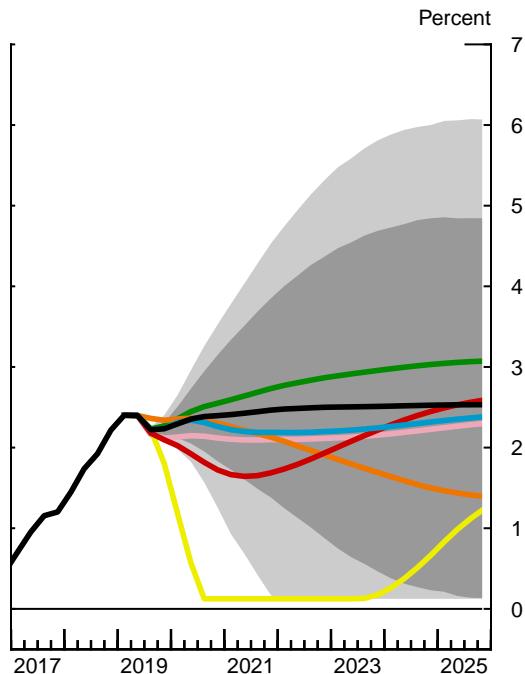
Unemployment Rate



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)

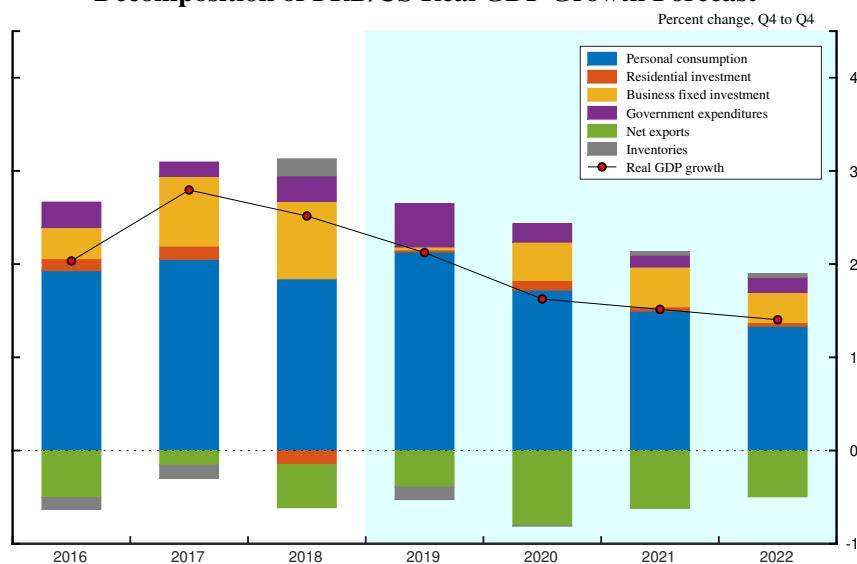
Measure and projection	2019		2020		2021		2022	
	Previous Tealbook	Current Tealbook						
<i>Real GDP</i>								
Staff	2.3	2.1	2.1	2.0	1.8	1.8	1.6	1.7
FRB/US	2.1	2.1	1.5	1.6	1.6	1.5	n.a.	1.4
EDO <sup>1</sup>	2.5	2.3	2.1	1.6	2.3	1.8	2.7	2.4
<i>Unemployment rate<sup>2</sup></i>								
Staff	3.7	3.7	3.6	3.6	3.6	3.6	3.7	3.6
FRB/US	3.8	3.7	4.0	4.0	4.2	4.3	n.a.	4.5
EDO <sup>1</sup>	4.0	3.9	4.3	4.4	4.6	4.8	4.8	5.1
<i>Total PCE prices</i>								
Staff	1.7	1.5	1.8	1.8	1.8	1.8	1.9	1.8
FRB/US	1.5	1.5	1.8	2.0	1.9	2.0	n.a.	2.0
EDO <sup>1</sup>	1.7	1.6	1.9	2.5	2.0	2.5	2.1	2.3
<i>Core PCE prices</i>								
Staff	1.9	1.8	1.9	1.8	1.9	1.8	1.9	1.8
FRB/US	1.8	1.8	2.0	2.1	2.0	2.1	n.a.	2.0
EDO <sup>1</sup>	1.7	1.8	1.9	2.5	2.0	2.5	2.1	2.4
<i>Federal funds rate<sup>2</sup></i>								
Staff	2.4	2.2	2.6	2.4	2.7	2.5	2.7	2.5
FRB/US	2.4	2.4	2.5	2.6	2.5	2.6	n.a.	2.6
EDO <sup>1</sup>	2.8	2.7	3.2	3.6	3.6	4.0	3.9	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.

n.a. Not available.

### 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

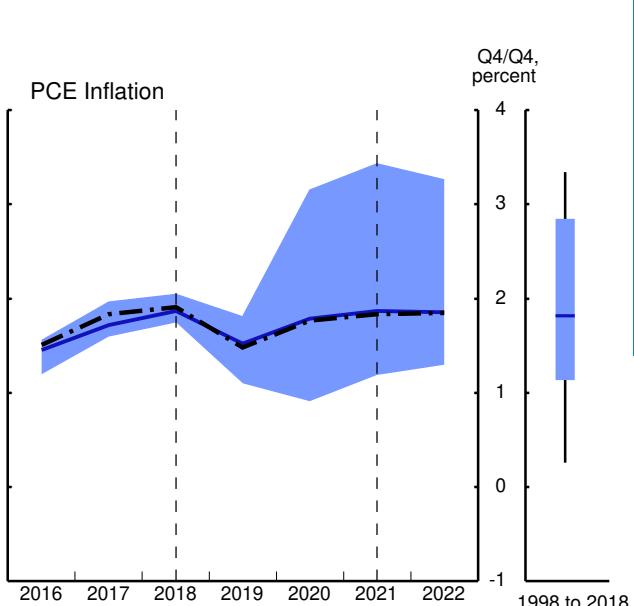
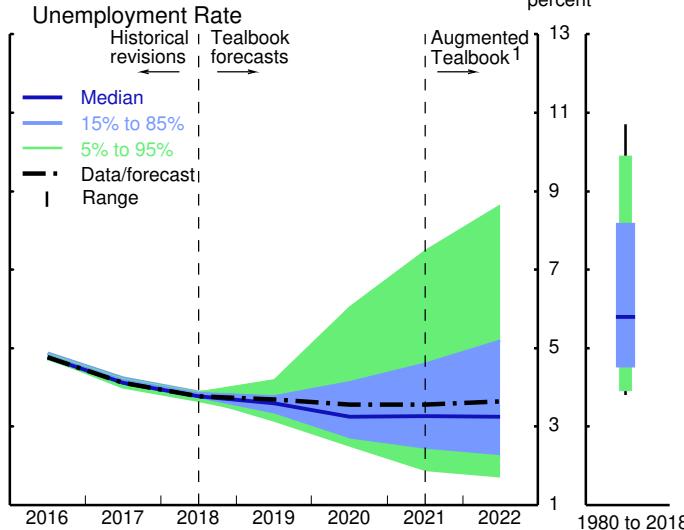
Measure	2019	2020	2021	2022	2023	2024	2025
<i>Real GDP</i> (percent change, Q4 to Q4)							
Projection	2.1	2.0	1.8	1.7	1.5	1.5	1.5
Confidence interval							
Tealbook forecast errors	1.4–3.4	.2–3.5	-.7–3.2	-1.1–3.0	...	...	...
FRB/US stochastic simulations	1.6–2.8	.6–3.6	.0–3.4	-.1–3.3	-.4–3.3	-.5–3.3	-.5–3.4
<i>Civilian unemployment rate</i> (percent, Q4)							
Projection	3.7	3.6	3.6	3.6	3.8	3.9	4.0
Confidence interval							
Tealbook forecast errors	3.3–3.8	2.7–4.2	2.4–4.6	2.2–5.2	...	...	...
FRB/US stochastic simulations	3.3–4.0	2.8–4.2	2.4–4.5	2.3–5.0	2.4–5.4	2.5–5.6	2.6–5.8
<i>PCE prices, total</i> (percent change, Q4 to Q4)							
Projection	1.5	1.8	1.8	1.8	1.9	1.9	1.9
Confidence interval							
Tealbook forecast errors	1.1–1.8	.9–3.2	1.2–3.4	1.3–3.3	...	...	...
FRB/US stochastic simulations	1.1–1.8	.8–2.7	.7–2.8	.7–2.9	.7–3.0	.7–3.1	.7–3.1
<i>PCE prices excluding food and energy</i> (percent change, Q4 to Q4)							
Projection	1.8	1.8	1.8	1.8	1.9	1.9	1.9
Confidence interval							
Tealbook forecast errors	1.6–2.0	1.3–2.4	1.1–2.7	...	...	...	...
FRB/US stochastic simulations	1.5–2.0	.9–2.6	.8–2.7	.8–2.8	.8–2.9	.8–3.0	.8–3.0
<i>Federal funds rate</i> (percent, Q4)							
Projection	2.2	2.4	2.5	2.5	2.5	2.5	2.5
Confidence interval							
FRB/US stochastic simulations	2.2–2.3	1.8–3.1	1.4–3.9	.9–4.4	.5–4.7	.2–4.8	.1–4.8

Note: Shocks underlying FRB/US stochastic simulations are randomly drawn from the 1969–2018 set of model equation residuals. Intervals derived from Tealbook forecast errors are based on projections made from 1980 to 2018 for real GDP and unemployment and from 1998 to 2018 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.

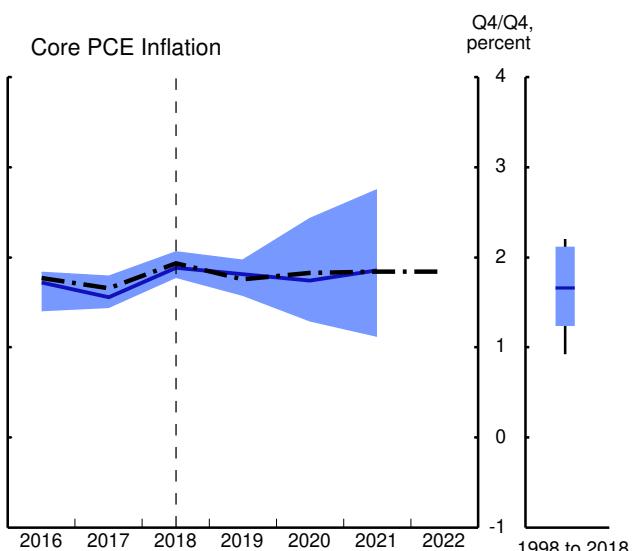
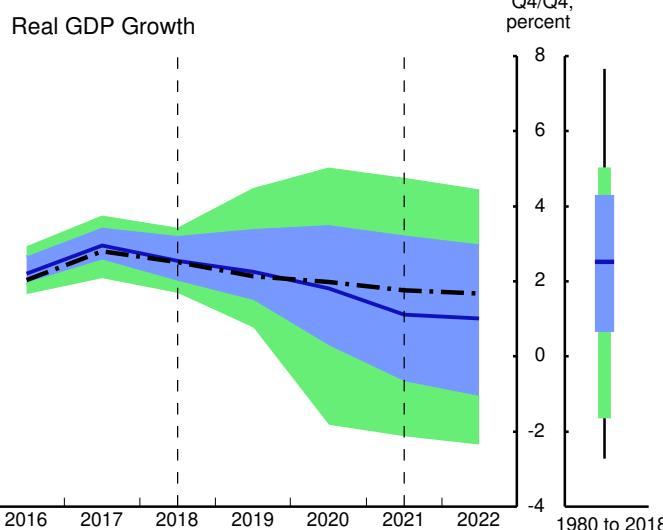
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## Prediction Intervals Derived from Historical Tealbook Forecast Errors

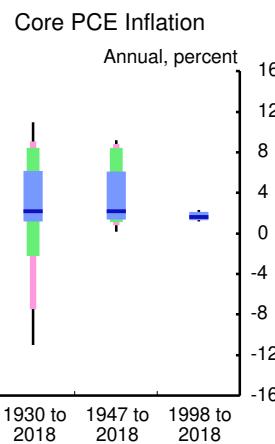
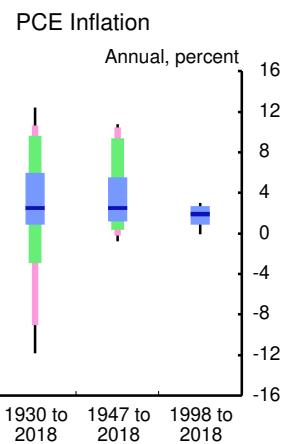
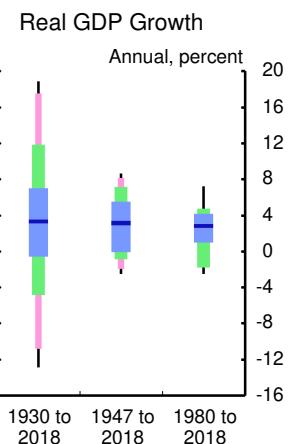
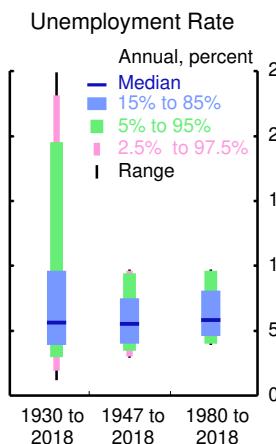
### Forecast Error Percentiles



Risks & Uncertainty



### Historical Distributions



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

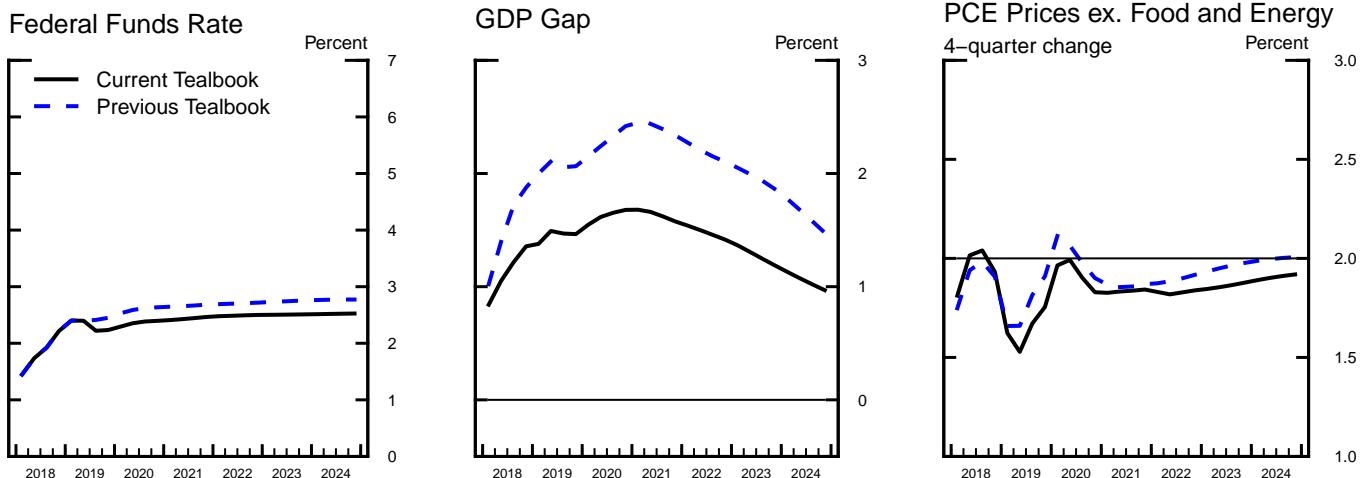
1. Augmented Tealbook prediction intervals use 2- and 3-year-ahead forecast errors from Blue Chip, CBO, and CEA to extend the Tealbook prediction intervals through 2022.

## 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>2.42</b>	<b>2.65</b>	
<i>Previous Tealbook projection</i>	2.55	2.88	
Taylor (1993) rule	<b>2.84</b>	<b>3.19</b>	
<i>Previous Tealbook projection</i>	3.37	3.71	
First-difference rule	<b>2.26</b>	<b>2.28</b>	
<i>Previous Tealbook projection</i>	2.35	2.47	
Flexible price-level targeting rule	<b>1.91</b>	<b>1.69</b>	
<i>Previous Tealbook projection</i>	2.00	1.85	
<i>Addendum:</i>			
Tealbook baseline	<b>2.23</b>	<b>2.29</b>	

### Key Elements of the Staff Projection



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

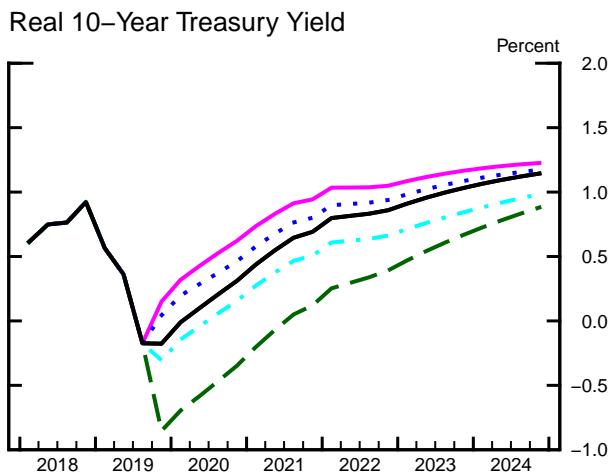
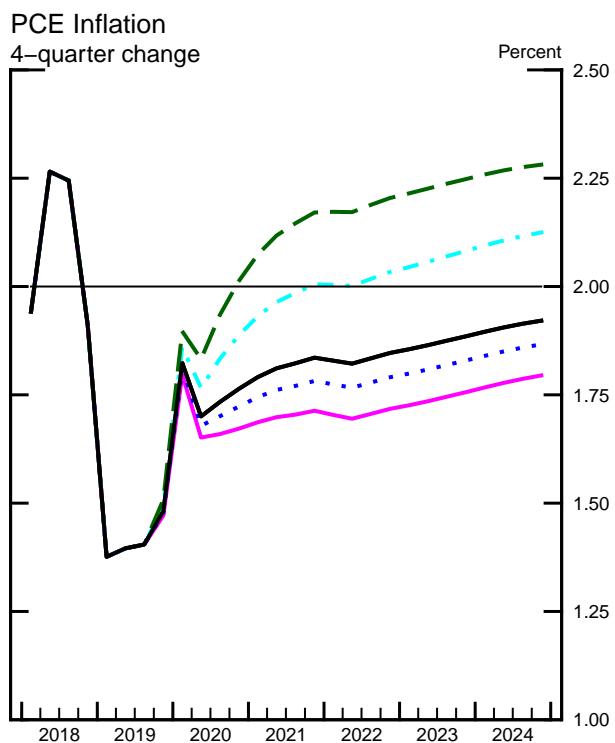
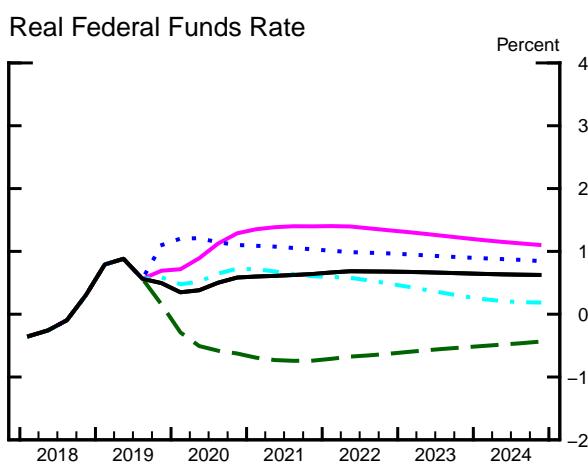
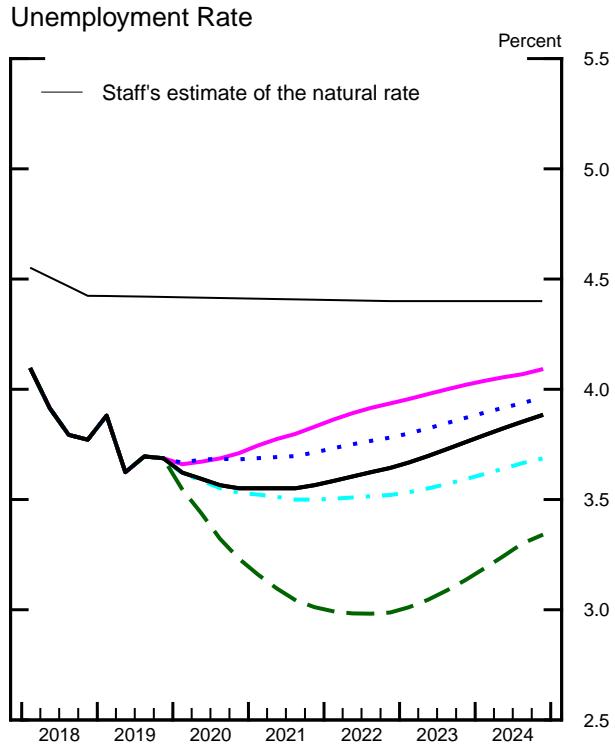
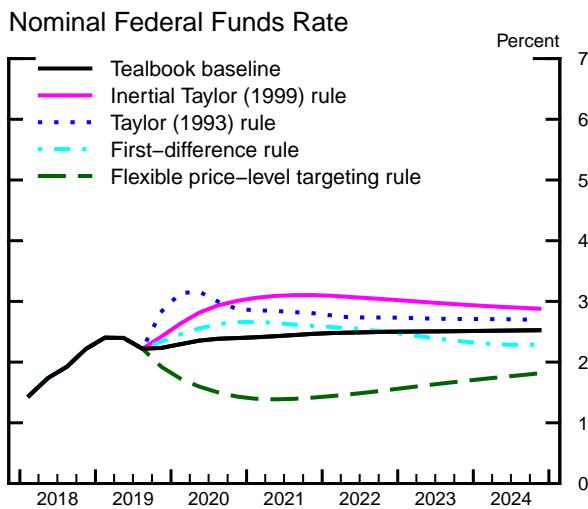
	(Percent)	Current Value	Previous Tealbook
Tealbook baseline			
FRB/US $r^*$		1.40	1.97
Average projected real federal funds rate		.56	.71
SEP-consistent baseline			
FRB/US $r^*$		.65	
Average projected real federal funds rate		.38	

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 June 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

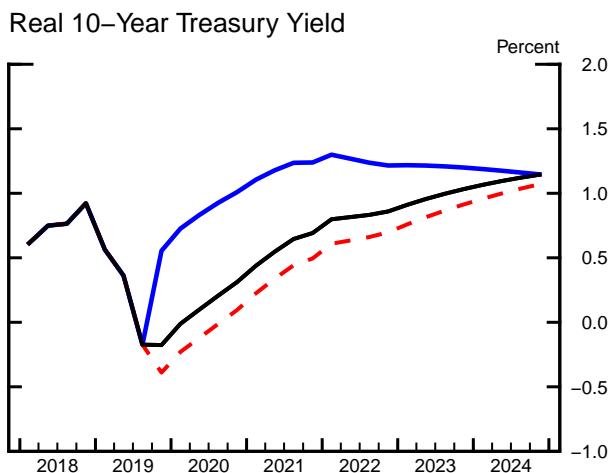
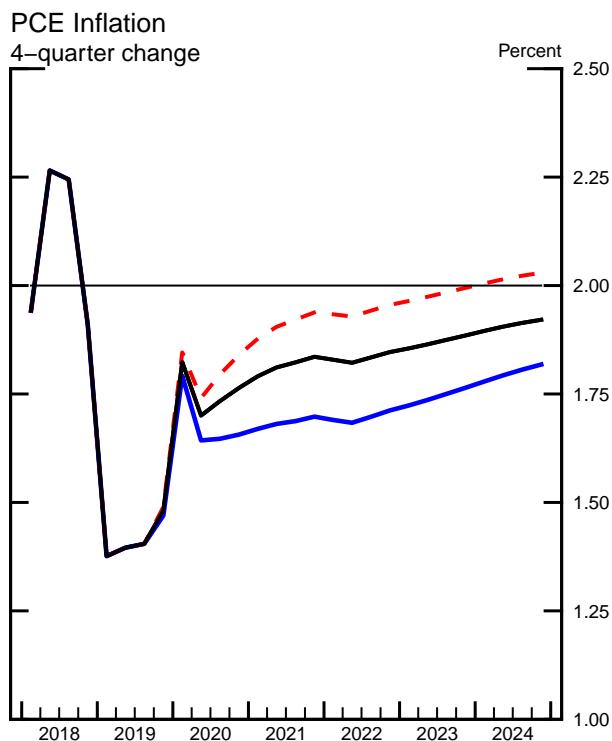
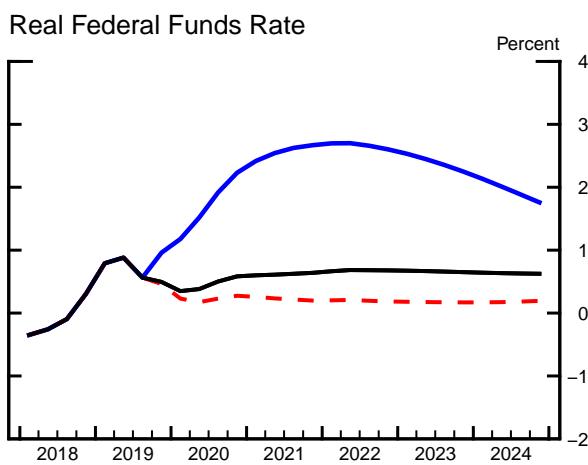
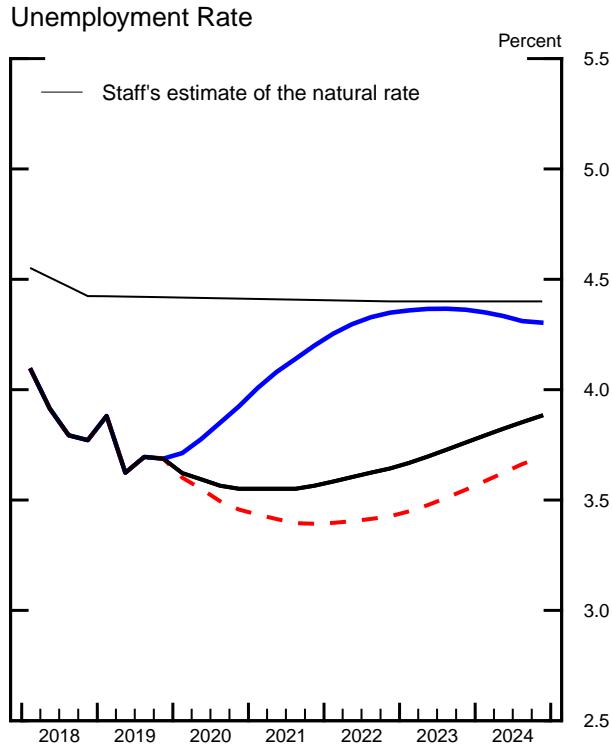
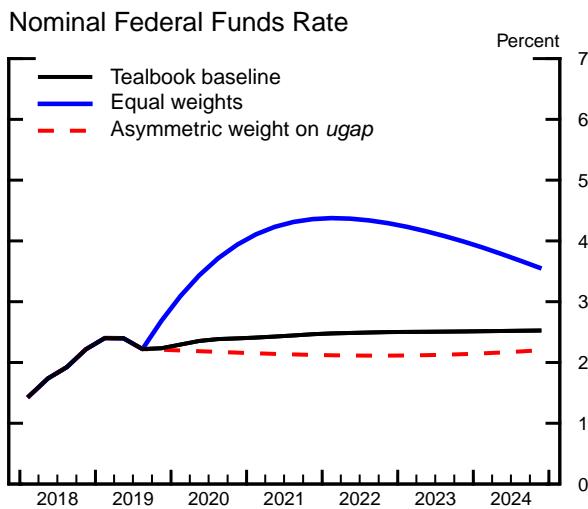
## Monetary Policy Strategies



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

## Optimal Control Simulations under Commitment

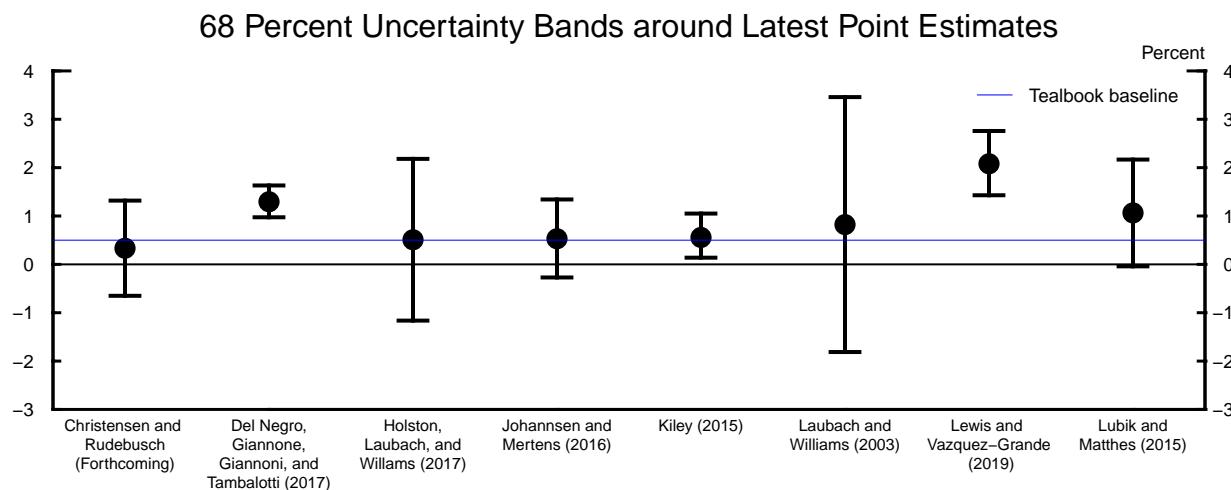
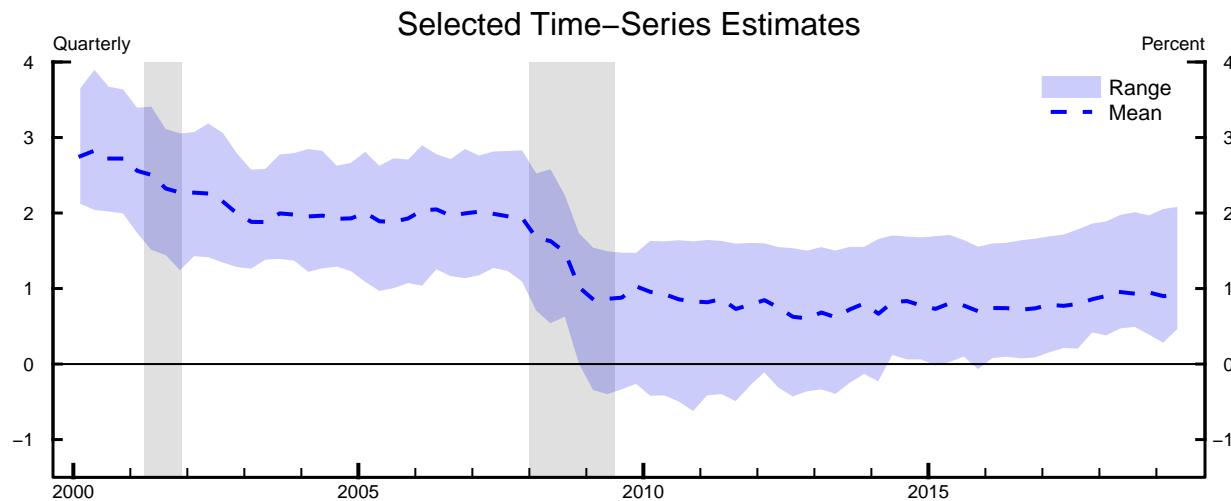
## Monetary Policy Strategies



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

## Estimates of the Equilibrium Real Federal Funds Rate in the Longer Run

Monetary Policy Strategies



### Longer-Run Values from Selected Forecasters

	<u>Release Date</u>	<u>Percent</u>
Tealbook baseline	Sept. 2019	.50
Median SEP	June 2019	.50
Median Survey of Primary Dealers	July 2019	.50
Median Blue Chip (6-to-10-year)	Mar. 2019	.74
Congressional Budget Office (10-year)	Aug. 2019	.74

The latest time-series estimates are for 2019:Q2. The shaded vertical areas in the top panel are NBER recessions. See the technical appendix for sources.

**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	2.9	2.9
Taylor (1993)	2.8	2.9	2.8	2.7	2.7	2.7
First-difference	2.3	2.7	2.6	2.5	2.3	2.3
Flexible price-level targeting	1.9	1.4	1.4	1.5	1.7	1.8
Extended Tealbook baseline	2.2	2.4	2.5	2.5	2.5	2.5
<i>Real GDP</i>						
Inertial Taylor (1999)	2.1	1.6	1.5	1.6	1.6	1.6
Taylor (1993)	2.1	1.7	1.7	1.7	1.6	1.5
First-difference	2.1	2.1	1.9	1.8	1.6	1.6
Flexible price-level targeting	2.1	2.7	2.3	1.9	1.5	1.4
Extended Tealbook baseline	2.1	2.0	1.8	1.7	1.5	1.5
<i>Unemployment rate<sup>1</sup></i>						
Inertial Taylor (1999)	3.7	3.7	3.8	3.9	4.0	4.1
Taylor (1993)	3.7	3.7	3.7	3.8	3.9	4.0
First-difference	3.7	3.5	3.5	3.5	3.6	3.7
Flexible price-level targeting	3.7	3.2	3.0	3.0	3.1	3.3
Extended Tealbook baseline	3.7	3.6	3.6	3.6	3.8	3.9
<i>Total PCE prices</i>						
Inertial Taylor (1999)	1.5	1.7	1.7	1.7	1.8	1.8
Taylor (1993)	1.5	1.7	1.8	1.8	1.8	1.9
First-difference	1.5	1.9	2.0	2.0	2.1	2.1
Flexible price-level targeting	1.5	2.0	2.2	2.2	2.2	2.3
Extended Tealbook baseline	1.5	1.8	1.8	1.8	1.9	1.9
<i>Core PCE prices</i>						
Inertial Taylor (1999)	1.7	1.7	1.7	1.7	1.7	1.8
Taylor (1993)	1.8	1.8	1.8	1.8	1.8	1.9
First-difference	1.8	2.0	2.0	2.0	2.1	2.1
Flexible price-level targeting	1.8	2.1	2.2	2.2	2.2	2.3
Extended Tealbook baseline	1.8	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	3.1	3.1
Taylor (1993)	2.2	2.8	3.1	3.2	3.0	2.9	2.9	2.8
First-difference	2.2	2.3	2.5	2.6	2.6	2.7	2.7	2.6
Flexible price-level targeting	2.2	1.9	1.7	1.6	1.5	1.4	1.4	1.4
Extended Tealbook baseline	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.4
<i>Real GDP</i>								
Inertial Taylor (1999)	2.0	2.1	1.8	1.8	1.7	1.6	1.6	1.5
Taylor (1993)	2.0	2.1	1.8	1.8	1.7	1.7	1.7	1.7
First-difference	2.0	2.1	1.9	2.0	2.0	2.1	2.0	2.0
Flexible price-level targeting	2.0	2.1	2.1	2.3	2.5	2.7	2.6	2.5
Extended Tealbook baseline	2.0	2.1	1.9	1.9	2.0	2.0	1.9	1.9
<i>Unemployment rate<sup>1</sup></i>								
Inertial Taylor (1999)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.8
Taylor (1993)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
First-difference	3.7	3.7	3.6	3.6	3.6	3.5	3.5	3.5
Flexible price-level targeting	3.7	3.7	3.5	3.4	3.3	3.2	3.2	3.1
Extended Tealbook baseline	3.7	3.7	3.6	3.6	3.6	3.6	3.6	3.6
<i>Total PCE prices</i>								
Inertial Taylor (1999)	1.4	1.5	1.8	1.7	1.7	1.7	1.7	1.7
Taylor (1993)	1.4	1.5	1.8	1.7	1.7	1.7	1.7	1.8
First-difference	1.4	1.5	1.9	1.8	1.8	1.9	1.9	2.0
Flexible price-level targeting	1.4	1.5	1.9	1.8	1.9	2.0	2.1	2.1
Extended Tealbook baseline	1.4	1.5	1.8	1.7	1.7	1.8	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	1.8	2.0	2.0	1.9	1.8	1.8	1.8
First-difference	1.7	1.8	2.0	2.1	2.0	2.0	2.0	2.0
Flexible price-level targeting	1.7	1.8	2.0	2.1	2.1	2.1	2.1	2.1
Extended Tealbook baseline	1.7	1.8	2.0	2.0	1.9	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	4.3	4.0	3.6
Asymmetric weight on <i>ugap</i>	2.2	2.2	2.1	2.1	2.1	2.2
Extended Tealbook baseline	2.2	2.4	2.5	2.5	2.5	2.5
<i>Real GDP</i>						
Equal weights	2.1	1.2	1.2	1.5	1.7	1.8
Asymmetric weight on <i>ugap</i>	2.1	2.2	1.9	1.8	1.5	1.4
Extended Tealbook baseline	2.1	2.0	1.8	1.7	1.5	1.5
<i>Unemployment rate<sup>1</sup></i>						
Equal weights	3.7	3.9	4.2	4.3	4.4	4.3
Asymmetric weight on <i>ugap</i>	3.7	3.5	3.4	3.4	3.5	3.7
Extended Tealbook baseline	3.7	3.6	3.6	3.6	3.8	3.9
<i>Total PCE prices</i>						
Equal weights	1.5	1.7	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	1.5	1.8	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>	1.8	1.9	1.9	1.9	2.0	2.0
Extended Tealbook baseline	1.8	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	3.1	3.4	3.7	3.9	4.1	4.2
Asymmetric weight on ugap	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1
Extended Tealbook baseline	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.4
<i>Real GDP</i>								
Equal weights	2.0	2.1	1.7	1.5	1.4	1.2	1.1	1.1
Asymmetric weight on ugap	2.0	2.1	1.9	2.0	2.1	2.2	2.1	2.1
Extended Tealbook baseline	2.0	2.1	1.9	1.9	2.0	2.0	1.9	1.9
<i>Unemployment rate<sup>1</sup></i>								
Equal weights	3.7	3.7	3.7	3.8	3.8	3.9	4.0	4.1
Asymmetric weight on ugap	3.7	3.7	3.6	3.6	3.5	3.5	3.4	3.4
Extended Tealbook baseline	3.7	3.7	3.6	3.6	3.6	3.6	3.6	3.6
<i>Total PCE prices</i>								
Equal weights	1.4	1.5	1.8	1.6	1.6	1.7	1.7	1.7
Asymmetric weight on ugap	1.4	1.5	1.8	1.7	1.8	1.8	1.9	1.9
Extended Tealbook baseline	1.4	1.5	1.8	1.7	1.7	1.8	1.8	1.8
<i>Core PCE prices</i>								
Equal weights	1.7	1.7	1.9	1.9	1.8	1.7	1.7	1.7
Asymmetric weight on ugap	1.7	1.8	2.0	2.0	2.0	1.9	1.9	1.9
Extended Tealbook baseline	1.7	1.8	2.0	2.0	1.9	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>	
	07/19/19	09/06/19	07/19/19	09/06/19	07/19/19	09/06/19	07/19/19	09/06/19	07/19/19	09/06/19
<i>Quarterly</i>										
2019:Q1	3.8	3.9	3.1	3.1	.5	.4	1.2	1.1	3.9	3.9
Q2	4.8	4.4	2.5	1.9	2.6	2.3	2.1	1.7	3.6	3.6
Q3	4.0	4.1	1.6	1.7	1.9	1.6	2.2	2.1	3.7	3.7
Q4	3.7	3.7	1.8	1.8	1.8	1.6	2.1	2.1	3.7	3.7
2020:Q1	4.1	4.0	2.1	2.1	1.9	1.8	2.0	1.9	3.6	3.6
Q2	4.4	4.2	2.1	2.0	1.8	1.8	1.9	1.9	3.6	3.6
Q3	4.2	3.9	2.1	1.9	1.8	1.8	1.9	1.8	3.6	3.6
Q4	4.1	3.8	2.1	1.9	1.8	1.8	1.8	1.8	3.6	3.6
2021:Q1	3.9	3.8	2.0	1.9	1.8	1.9	1.9	1.9	3.6	3.6
Q2	4.0	3.9	1.8	1.8	1.8	1.9	1.9	1.9	3.6	3.6
Q3	3.7	3.7	1.7	1.7	1.8	1.8	1.9	1.8	3.6	3.6
Q4	3.6	3.6	1.7	1.7	1.9	1.8	1.9	1.8	3.6	3.6
<i>Two-quarter<sup>2</sup></i>										
2019:Q2	4.3	4.2	2.8	2.5	1.6	1.3	1.7	1.4	-.2	-.2
Q4	3.8	3.9	1.7	1.8	1.8	1.6	2.2	2.1	.1	.1
2020:Q2	4.2	4.1	2.1	2.1	1.9	1.8	2.0	1.9	-.1	-.1
Q4	4.2	3.8	2.1	1.9	1.8	1.8	1.8	1.8	.0	.0
2021:Q2	4.0	3.9	1.9	1.8	1.8	1.9	1.9	1.9	.0	.0
Q4	3.6	3.6	1.7	1.7	1.9	1.8	1.9	1.8	.0	.0
<i>Four-quarter<sup>3</sup></i>										
2018:Q4	5.2	4.9	3.0	2.5	1.9	1.9	1.9	1.9	-.3	-.3
2019:Q4	4.0	4.0	2.3	2.1	1.7	1.5	1.9	1.8	-.1	-.1
2020:Q4	4.2	4.0	2.1	2.0	1.8	1.8	1.9	1.8	-.1	-.1
2021:Q4	3.8	3.7	1.8	1.8	1.8	1.8	1.9	1.8	.0	.0
2022:Q4	3.6	3.7	1.6	1.7	1.9	1.8	1.9	1.8	.0	.0
<i>Annual</i>										
2018	5.2	5.4	2.9	2.9	2.0	2.1	1.9	1.9	3.9	3.9
2019	4.4	4.1	2.6	2.2	1.6	1.4	1.8	1.6	3.7	3.7
2020	4.1	4.0	2.0	1.9	1.9	1.8	2.0	1.9	3.6	3.6
2021	4.0	3.8	2.0	1.8	1.8	1.8	1.9	1.8	3.6	3.6
2022	3.6	3.7	1.6	1.7	1.9	1.8	1.9	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	1.9	1.7	1.8	2.1	2.0	1.9	1.9	1.9	1.8	1.7	1.7	2.1	2.0	1.8	1.7
<i>Previous Tealbook</i>	2.5	1.6	1.8	2.1	2.1	2.1	2.1	2.0	1.8	1.7	1.7	2.3	2.1	1.8	1.6
Final sales	2.9	1.8	2.2	2.4	2.2	1.7	2.2	2.0	1.9	1.5	1.5	2.4	2.1	1.7	1.6
<i>Previous Tealbook</i>	3.4	1.8	2.3	2.7	2.3	1.8	2.2	2.0	1.9	1.6	1.6	2.5	2.2	1.8	1.6
Priv. dom. final purch.	3.3	2.2	2.2	2.3	2.4	2.2	2.4	2.2	2.1	1.8	1.7	2.3	2.3	2.0	1.7
<i>Previous Tealbook</i>	3.1	2.2	2.2	2.5	2.4	2.3	2.3	2.1	2.0	1.9	1.8	2.2	2.4	2.0	1.8
Personal cons. expend.	4.7	3.2	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.8	2.4	2.3	2.2
<i>Previous Tealbook</i>	4.1	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.5	2.4	2.3	2.2
Durables	13.0	6.2	3.8	1.9	1.8	1.8	1.7	1.7	1.7	1.7	1.7	5.7	1.8	1.7	1.7
Nondurables	6.8	5.2	2.8	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	4.2	2.5	2.4	2.3
Services	2.8	2.2	1.9	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.0	2.4	2.3	2.3
Residential investment	-3.1	1.9	6.3	11.5	7.4	2.4	.2	-2.3	-4.1	-4.7	-4.8	1.0	5.3	-4.0	-4.7
<i>Previous Tealbook</i>	-2.6	4.3	7.3	9.7	4.8	-.1	-2.6	-3.7	-3.8	-3.5	-3.4	1.6	2.8	-3.6	-3.4
Nonres. priv. fixed invest.	-1.4	-3.0	.9	-.8	1.0	1.3	3.1	3.2	3.2	1.2	.9	.2	1.2	2.1	.8
<i>Previous Tealbook</i>	.0	.0	-.2	.8	1.6	2.1	3.0	2.8	2.4	1.5	1.1	1.1	1.9	1.9	.8
Equipment & intangibles	2.0	-2.7	.9	.0	1.8	2.4	4.3	4.4	4.5	1.9	1.6	1.1	2.1	3.1	1.6
<i>Previous Tealbook</i>	2.6	.0	.5	2.0	2.6	3.3	4.0	3.6	3.3	2.2	1.8	1.9	3.0	2.7	1.6
Nonres. structures	-12.4	-3.9	.8	-3.4	-1.8	-2.5	-1.1	-1.1	-1.3	-1.4	-1.7	-3.1	-2.2	-1.4	-2.2
<i>Previous Tealbook</i>	-8.3	.1	-2.2	-3.3	-2.0	-1.8	-.3	-.1	-.7	-1.0	-1.4	-1.6	-1.9	-.8	-2.3
Net exports <sup>2</sup>	-981	-998	-995	-986	-997	-1016	-1011	-1011	-1016	-1028	-1039	-979	-1003	-1023	-1052
<i>Previous Tealbook<sup>2</sup></i>	-923	-938	-929	-914	-922	-939	-933	-931	-936	-948	-956	-924	-927	-943	-965
Exports	-5.6	-1.1	2.4	3.5	1.4	1.8	2.2	2.7	3.2	3.4	3.5	-.1	2.2	3.2	3.5
Imports	.1	1.1	1.4	1.5	2.3	3.4	1.1	1.8	2.9	3.8	3.7	.3	2.1	3.1	3.2
Gov't. cons. & invest.	4.6	1.4	1.5	1.5	2.1	.5	.3	.4	.9	.8	.9	2.6	1.1	.7	.9
<i>Previous Tealbook</i>	6.2	1.1	1.2	1.3	2.1	.6	.9	.6	1.1	.9	1.0	2.8	1.2	.9	.9
Federal	8.1	3.6	3.6	2.2	3.7	-.5	-.8	-.7	.6	.4	.5	4.3	1.2	.2	.7
Defense	3.1	3.5	4.9	1.9	1.2	.9	.2	.1	.3	.5	.0	4.8	1.0	.2	.7
Nonddefense	16.0	3.6	1.7	2.6	7.5	-2.4	-2.2	-2.0	.9	.2	1.3	3.7	1.3	.1	.6
State & local	2.4	.1	.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.5	1.1	1.1	1.1
Change in priv. inventories <sup>2</sup>	68	64	40	24	14	28	12	4	-4	6	17	72	20	6	40
<i>Previous Tealbook<sup>2</sup></i>	79	69	46	18	11	31	26	26	25	29	31	79	22	28	29

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 2.7	1.9 2.0	2.0 1.9	2.8 2.5	2.5 3.0	2.1 2.3	2.0 2.1	1.8 1.8	1.7 1.6
Final sales <i>Previous Tealbook</i>	2.0 2.0	3.2 3.0	1.8 1.9	2.2 2.1	2.9 2.6	2.2 2.6	2.4 2.5	2.1 2.2	1.7 1.8	1.6 1.6
Priv. dom. final purch. <i>Previous Tealbook</i>	2.6 2.6	4.5 4.3	2.5 2.7	2.8 2.7	3.4 3.3	2.8 3.0	2.3 2.2	2.3 2.4	2.0 2.0	1.7 1.8
Personal cons. expend. <i>Previous Tealbook</i>	1.9 1.9	3.8 3.8	2.9 3.0	2.8 2.8	2.9 2.7	2.6 2.6	2.8 2.5	2.4 2.4	2.3 2.3	2.2 2.2
Durables	5.0	9.2	5.8	7.3	7.7	3.8	5.7	1.8	1.7	1.7
Nondurables	2.8	3.2	2.8	1.8	3.7	2.5	4.2	2.5	2.4	2.3
Services	1.1	3.2	2.5	2.4	2.0	2.5	2.0	2.4	2.3	2.3
Residential investment <i>Previous Tealbook</i>	7.1 7.1	7.7 7.8	9.1 8.9	3.9 4.5	4.2 3.8	-4.4 -3.3	1.0 1.6	5.3 2.8	-4.0 -3.6	-4.7 -3.4
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	5.4 5.4	6.9 6.4	-.9 -.7	2.4 1.8	5.4 6.3	5.9 7.0	.2 1.1	1.2 1.9	2.1 1.9	.8 .8
Equipment & intangibles <i>Previous Tealbook</i>	5.1 5.1	6.1 5.6	2.3 2.6	1.9 1.6	6.6 7.3	6.8 7.6	1.1 1.9	2.1 3.0	3.1 2.7	1.6 1.6
Nonres. structures <i>Previous Tealbook</i>	6.7 6.7	9.3 8.8	-10.9 -10.7	4.3 2.5	1.5 2.9	2.6 4.9	-3.1 -1.6	-2.2 -1.9	-1.4 -.8	-2.2 -2.3
Net exports <sup>1</sup> <i>Previous Tealbook<sup>1</sup></i>	-533 -533	-577 -578	-722 -725	-784 -786	-850 -859	-920 -912	-979 -924	-1003 -927	-1023 -943	-1052 -965
Exports	6.0	2.9	-1.5	1.1	5.5	.4	-.1	2.2	3.2	3.5
Imports	3.0	6.5	3.2	3.4	5.6	3.2	.3	2.1	3.1	3.2
Gov't. cons. & invest. <i>Previous Tealbook</i>	-2.4 -2.4	.3 .2	2.3 2.2	1.5 .9	.8 .1	1.5 1.5	2.6 2.8	1.1 1.2	.7 .9	.9 .9
Federal	-6.1	-1.1	1.1	.1	1.7	2.7	4.3	1.2	.2	.7
Defense	-6.5	-3.4	-.4	-.8	1.9	4.0	4.8	1.0	.2	.7
Nondefense	-5.5	2.7	3.4	1.5	1.4	.7	3.7	1.3	.1	.6
State & local	.2	1.2	3.0	2.3	.4	.9	1.5	1.1	1.1	1.1
Change in priv. inventories <sup>1</sup> <i>Previous Tealbook<sup>1</sup></i>	109 109	86 87	132 129	23 23	32 23	48 45	72 79	20 22	6 28	40 29

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

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

Class II FOMC – Restricted (FR)

Authorized for Public Release

September 6, 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 2.2	2.4 2.3	1.8 1.8	1.8 1.9	2.1 2.2	2.0 2.0	1.9 1.9	1.9 1.9	2.1 2.1	2.0 2.0	1.9 1.9	1.9 1.8	1.9 2.0	1.9 2.0	2.0 2.0
PCE chain-wt. price index <i>Previous Tealbook</i>	2.3 2.6	1.6 1.9	1.6 1.8	1.8 1.9	1.8 1.8	1.8 1.8	1.8 1.8	1.9 1.8	1.9 1.8	1.8 1.8	1.8 1.9	1.5 1.7	1.8 1.8	1.8 1.8	1.8 1.9
Energy <i>Previous Tealbook</i>	18.4 18.4	-8.6 -5.5	-9.6 -8.1	-2.5 -2.5	-1.0 -1.5	-.2 -.9	-.1 -.7	.4 -.2	.5 -.2	.5 .0	.7 .2	-5.0 -3.8	-1.0 -1.4	.5 .0	1.0 .5
Food <i>Previous Tealbook</i>	.6 .6	1.1 2.5	2.7 2.7	2.4 2.6	2.4 2.6	2.4 2.6	2.4 2.6	2.4 2.6	2.4 2.6	2.4 2.6	1.8 2.2	2.4 2.6	2.4 2.6	2.4 2.6	
Ex. food & energy <i>Previous Tealbook</i>	1.7 2.1	2.1 2.2	2.1 2.1	1.9 2.0	1.9 1.9	1.8 1.9	1.8 1.8	1.9 1.9	1.9 1.9	1.8 1.9	1.8 1.9	1.8 1.9	1.8 1.9	1.8 1.9	
Ex. food & energy, market based <i>Previous Tealbook</i>	1.4 1.5	2.0 2.1	1.9 2.0	1.8 1.9	1.7 1.8	1.6 1.7	1.6 1.7	1.7 1.7	1.7 1.7	1.7 1.7	1.7 1.7	1.7 1.8	1.7 1.8	1.7 1.7	
CPI <i>Previous Tealbook</i>	2.9 2.9	1.8 2.0	1.6 1.8	2.0 2.1	2.1 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 1.9	2.1 2.1	2.2 2.2	2.3 2.3
Ex. food & energy <i>Previous Tealbook</i>	1.8 1.8	2.9 2.6	2.4 2.6	2.3 2.4	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 2.3
ECI, hourly compensation <sup>2</sup> <i>Previous Tealbook<sup>2</sup></i>	2.1 2.8	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 2.8	2.7 2.8	2.6 2.7	2.6 2.7	2.6 2.8	2.7 2.7	2.7 2.7	2.6 2.7
Business sector															
Output per hour <i>Previous Tealbook</i>	2.1 3.5	-.1 -1.0	.3 .3	1.3 1.1	1.2 1.1	1.4 1.5	1.3 1.4	1.2 1.2	1.2 1.2	1.2 1.1	1.3 1.2	1.5 1.6	1.3 1.3	1.2 1.2	1.4 1.1
Compensation per hour <i>Previous Tealbook</i>	5.2 3.6	3.5 3.0	3.1 3.9	3.6 3.7	3.6 3.7	3.6 3.7	3.6 3.6	3.6 3.6	3.6 3.6	3.5 3.6	3.5 3.6	5.3 3.1	3.6 3.6	3.5 3.6	3.4 3.6
Unit labor costs <i>Previous Tealbook</i>	3.0 .1	3.6 4.1	2.8 3.6	2.3 2.5	2.4 2.5	2.2 2.2	2.3 2.2	2.3 2.4	2.3 2.4	2.3 2.5	2.2 2.4	3.7 1.5	2.3 2.3	2.3 2.4	2.0 2.4
Core goods imports chain-wt. price index <sup>3</sup> <i>Previous Tealbook<sup>3</sup></i>	-.7 -.5	-1.2 .9	-.8 1.4	.1 1.1	.9 1.0	.9 .7	1.1 .8	1.2 .8	1.1 .8	1.0 .8	.9 .8	-1.1 .3	.7 .9	1.0 .8	.9 .8

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 1.6	.9 .9	1.5 1.5	2.0 2.0	2.3 2.1	1.9 1.8	1.9 2.0	1.9 2.0	2.0 2.0
PCE chain-wt. price index <i>Previous Tealbook</i>	1.2 1.2	1.1 1.2	.3 .3	1.5 1.6	1.8 1.8	1.9 1.9	1.5 1.7	1.8 1.8	1.8 1.8	1.8 1.9
Energy <i>Previous Tealbook</i>	-2.9 -2.9	-7.1 -6.9	-16.4 -16.4	2.0 2.1	8.0 8.1	3.9 3.5	-5.0 -3.8	-1.0 -1.4	.5 .0	1.0 .5
Food <i>Previous Tealbook</i>	.7 .7	2.8 2.8	.3 .3	-1.8 -1.8	.7 .7	.5 .5	1.8 2.2	2.4 2.6	2.4 2.6	2.4 2.6
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 1.6	1.9 1.9	1.8 1.9	1.8 1.9	1.8 1.9	1.8 1.9
Ex. food & energy, market based <i>Previous Tealbook</i>	1.1 1.1	1.1 1.2	1.1 1.1	1.4 1.5	1.2 1.2	1.7 1.7	1.7 1.8	1.7 1.8	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 1.9	2.1 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	2.4 2.3	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 2.8	2.7 2.7	2.7 2.7	2.6 2.7
Business sector										
Output per hour <i>Previous Tealbook</i>	1.8 1.8	.3 .2	.6 .7	1.4 1.1	1.1 .8	1.1 1.8	1.5 1.6	1.3 1.3	1.2 1.2	1.4 1.1
Compensation per hour <i>Previous Tealbook</i>	-.2 -.3	3.0 2.8	2.3 2.5	2.2 2.1	3.7 3.1	2.1 2.2	5.3 3.1	3.6 3.6	3.5 3.6	3.4 3.6
Unit labor costs <i>Previous Tealbook</i>	-2.0 -2.0	2.7 2.7	1.7 1.8	.8 1.0	2.6 2.3	1.0 .5	3.7 1.5	2.3 2.3	2.3 2.4	2.0 2.4
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 -4.4	-.9 -.7	.9 1.1	.2 .5	-1.1 .3	.7 .9	1.0 .8	.9 .8

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 September 6, 2019
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
<i>Employment and production</i>																
Nonfarm payroll employment <sup>2</sup>	152	144	127	146	193	14	108	103	93	83	73	149	115	88	65	
Unemployment rate <sup>3</sup>	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	
<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>	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	
Employment-to-Population Ratio <sup>3</sup>	60.6	60.8	60.6	60.5	60.5	60.5	60.5	60.5	60.4	60.4	60.3	60.6	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	1.5	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	
<i>Previous Tealbook<sup>4</sup></i>	2.1	2.1	2.1	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.3	2.1	2.4	2.3	2.1	
Industrial production <sup>5</sup>	-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	
<i>Previous Tealbook<sup>5</sup></i>	-1.2	2.1	.7	.6	1.8	2.0	1.0	1.3	1.1	1.0	.9	-.1	1.3	1.1	.7	
Manufacturing industr. prod. <sup>5</sup>	-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	
<i>Previous Tealbook<sup>5</sup></i>	-2.2	1.4	.1	.2	1.4	1.9	1.2	1.0	1.1	1.1	.9	-.7	1.2	1.1	.7	
Capacity utilization rate - mfg. <sup>3</sup>	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	
<i>Previous Tealbook<sup>3</sup></i>	75.7	75.7	75.4	75.4	75.5	75.7	75.8	76.0	76.1	76.3	76.4	75.4	75.8	76.4	76.8	
Housing starts <sup>6</sup>	1.3	1.2	1.3	1.3	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	
Light motor vehicle sales <sup>6</sup>	17.0	16.9	16.9	16.9	16.9	16.9	16.9	16.8	16.8	16.8	16.8	16.9	16.9	16.8	16.8	
<i>Income and saving</i>																
Nominal GDP <sup>5</sup>	4.4	4.1	3.7	4.0	4.2	3.9	3.8	3.8	3.9	3.7	3.6	4.0	4.0	3.7	3.7	
Real disposable pers. income <sup>5</sup>	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	
<i>Previous Tealbook<sup>5</sup></i>	2.4	2.2	2.0	2.7	1.7	1.3	2.1	3.0	1.6	1.4	1.7	2.2	2.0	1.9	1.5	
Personal saving rate <sup>3</sup>	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	
<i>Previous Tealbook<sup>3</sup></i>	6.3	6.3	6.2	6.2	6.1	5.8	5.8	5.9	5.7	5.5	5.4	6.2	5.8	5.4	4.8	
Corporate profits <sup>7</sup>	22.8	-3.4	-1.9	2.1	3.2	3.5	-.9	.0	2.9	2.2	1.2	-.1	1.9	1.6	3.8	
Profit share of GNP <sup>3</sup>	9.8	9.6	9.5	9.4	9.4	9.4	9.3	9.2	9.2	9.2	9.1	9.5	9.3	9.1	9.1	
Gross national saving rate <sup>3</sup>	18.2	18.2	17.9	17.9	17.9	17.9	17.8	17.8	17.8	17.7	17.6	17.9	17.8	17.6	17.3	
Net national saving rate <sup>3</sup>	3.2	3.0	2.6	2.6	2.6	2.6	2.5	2.4	2.3	2.2	2.0	2.6	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	149	115	88	65
Unemployment rate <sup>2</sup>	7.0	5.7	5.0	4.8	4.1	3.8	3.7	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	4.6	4.6	4.6	4.6	4.6
Employment-to-Population Ratio <sup>2</sup>	58.5	59.3	59.4	59.8	60.2	60.6	60.6	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	1.4
<i>Previous Tealbook</i> <sup>3</sup>	-3.0	-1.0	-.4	.1	.9	1.9	2.1	2.4	2.3	2.1
Industrial production	2.3	3.4	-3.4	-.3	3.6	4.0	-.5	1.2	1.1	.8
<i>Previous Tealbook</i>	2.3	3.4	-3.4	-.3	3.6	4.0	-.1	1.3	1.1	.7
Manufacturing industr. prod.	1.1	1.4	-1.7	.3	2.5	2.2	-1.0	1.0	1.0	.8
<i>Previous Tealbook</i>	1.1	1.4	-1.7	.3	2.5	2.2	-.7	1.2	1.1	.7
Capacity utilization rate - mfg. <sup>2</sup>	74.5	75.8	74.9	74.2	75.8	77.0	75.2	75.4	75.9	76.4
<i>Previous Tealbook</i> <sup>2</sup>	74.5	75.8	74.9	74.2	75.8	77.0	75.4	75.8	76.4	76.8
Housing starts <sup>4</sup>	.9	1.0	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.2
Light motor vehicle sales <sup>4</sup>	15.5	16.5	17.4	17.5	17.1	17.2	16.9	16.9	16.8	16.8
<i>Income and saving</i>										
Nominal GDP	4.4	4.5	2.8	3.5	4.9	4.9	4.0	4.0	3.7	3.7
Real disposable pers. income	-2.5	5.3	3.0	1.6	3.4	3.9	3.1	1.8	1.7	1.7
<i>Previous Tealbook</i>	-2.5	5.2	3.1	1.6	2.8	3.0	2.2	2.0	1.9	1.5
Personal saving rate <sup>2</sup>	6.3	7.5	7.5	6.5	6.8	7.8	8.0	7.5	7.0	6.6
<i>Previous Tealbook</i> <sup>2</sup>	6.3	7.4	7.4	6.4	6.3	6.5	6.2	5.8	5.4	4.8
Corporate profits <sup>5</sup>	3.9	6.7	-10.8	3.3	-.6	4.2	-.1	1.9	1.6	3.8
Profit share of GNP <sup>2</sup>	11.8	12.1	10.5	10.5	9.9	9.9	9.5	9.3	9.1	9.1
Gross national saving rate <sup>2</sup>	19.2	20.3	19.6	18.1	18.0	17.9	17.9	17.8	17.6	17.3
Net national saving rate <sup>2</sup>	4.0	5.3	4.5	2.7	2.7	2.4	2.6	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	3,459	3,708	3,855	4,018	1,102	851	804	794
Outlays	3,982	4,109	4,430	4,635	4,840	5,166	1,158	1,074	1,161	1,186
Surplus/deficit	-665	-779	-970	-927	-985	-1,148	-56	-223	-357	-391
Surplus/deficit	-3.5	-3.8	-4.6	-4.2	-4.3	-4.8	-1.1	-4.2	-6.7	-7.2
<i>Previous Tealbook</i>	-3.5	-3.9	-4.5	-4.3	-4.6	-4.9	-1.1	-4.1	-6.6	-7.2
Primary surplus/deficit	-2.1	-2.2	-2.8	-2.5	-2.5	-2.9	1.2	-3.1	-4.7	-5.5
Net interest	1.4	1.6	1.7	1.7	1.8	1.9	2.2	1.2	2.0	1.8
Cyclically adjusted surplus/deficit	-3.5	-4.2	-5.2	-4.9	-5.1	-5.6	-1.7	-4.9	-7.4	-8.0
Federal debt held by public	76.0	77.5	78.1	79.0	78.8	81.1	77.0	78.1	79.0	79.4
<b>Government in the NIPA<sup>2</sup></b>										
Purchases	.8	1.5	2.6	1.1	.7	.9	4.6	1.5	1.5	1.5
Consumption	.6	1.6	2.3	.8	.4	.6	3.9	2.3	1.5	1.2
Investment	2.0	1.5	5.0	2.3	2.0	2.0	6.9	2.2	1.3	2.7
State and local construction	-1.8	-1.5	4.1	1.0	1.0	1.0	12.3	-5.0	-5.0	1.0
Real disposable personal income	3.5	3.9	3.1	1.8	1.7	1.7	2.5	3.2	2.2	2.5
Contribution from transfers <sup>3</sup>	.2	.4	1.0	.5	.6	.8	.7	.3	.4	.9
Contribution from taxes <sup>3</sup>	-.9	.4	-1.0	-.5	-.5	-.5	-1.2	.3	-.2	-.5
<b>Government employment</b>										
Federal	-2	0	3	0	1	1	5	12	-7	23
State and local	9	8	8	9	9	9	2	14	9	9
<b>Fiscal indicators<sup>2</sup></b>										
Fiscal effect (FE) <sup>4</sup>	.2	.4	.9	.5	.4	.4	1.3	.6	.5	.6
Discretionary policy actions (FI)	.3	.6	.7	.4	.1	.2	1.1	.5	.5	.5
<i>Previous Tealbook</i>	.2	.6	.7	.4	.2	.2	1.3	.4	.4	.4
Federal purchases	.1	.2	.3	.1	.0	.0	.5	.2	.2	.1
State and local purchases	.0	.1	.2	.1	.1	.1	.3	.0	.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	.1	.3	.2	.4	.2	.1	.1

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	1.6	2.1	1.9	1.9	2.3	2.4	2.4	2.5	2.6	2.6	2.6	2.6
<i>Previous Tealbook</i>	1.5	2.0	2.3	2.1	2.4	2.5	2.5	2.6	2.6	2.6	2.6	2.6
Advanced foreign economies	1.4	2.1	1.1	.8	1.3	1.5	1.5	1.5	1.6	1.7	1.7	1.7
Canada	.5	3.7	1.2	1.3	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.8
Japan	2.8	1.8	1.8	-2.3	.8	1.0	.7	.7	.8	.8	.7	.7
United Kingdom	2.0	-.8	.4	.9	1.0	.9	.9	1.0	1.6	1.6	1.6	1.6
Euro area	1.7	.8	.8	1.0	1.2	1.4	1.5	1.6	1.7	1.8	1.8	1.7
Germany	1.5	-.3	.4	1.0	1.2	1.3	1.3	1.4	1.5	1.6	1.5	1.5
Emerging market economies	1.8	2.2	2.7	3.0	3.3	3.3	3.4	3.4	3.5	3.5	3.5	3.5
Asia	4.3	3.6	3.9	4.2	4.3	4.3	4.3	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	5.6	5.7	5.7	5.6	5.6	5.6	5.7	5.7	5.7	5.7	5.7
Latin America	-.8	.6	1.4	1.7	2.1	2.2	2.4	2.4	2.6	2.6	2.6	2.6
Mexico	-1.0	.1	1.4	1.6	2.0	2.1	2.3	2.3	2.5	2.5	2.5	2.5
Brazil	-.3	1.8	.8	2.3	2.0	2.3	2.5	2.6	2.8	2.8	2.8	2.8
<b>Consumer prices<sup>2</sup></b>												
Total foreign	.8	3.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3
<i>Previous Tealbook</i>	.8	3.3	2.5	2.7	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Advanced foreign economies	.8	2.2	1.2	1.5	1.3	1.3	1.5	1.5	1.6	1.6	1.6	1.6
Canada	1.6	3.4	2.1	1.9	1.8	1.9	2.0	2.0	2.0	2.0	2.0	2.0
Japan	.9	.3	.2	2.0	.4	.4	.8	1.0	1.0	1.0	1.0	1.0
United Kingdom	.9	2.7	2.6	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Euro area	.2	2.1	.8	1.1	1.2	1.2	1.3	1.4	1.4	1.4	1.4	1.5
Germany	-.1	2.5	1.2	1.6	1.7	1.7	1.8	1.9	2.0	2.1	2.1	2.1
Emerging market economies	.8	4.1	3.1	2.9	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8
Asia	.4	3.9	2.9	2.5	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Korea	-3.3	2.7	-.5	1.7	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1
China	.6	4.3	3.9	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Latin America	1.7	4.9	3.9	3.7	3.6	3.5	3.4	3.4	3.4	3.3	3.3	3.3
Mexico	1.1	4.5	3.5	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Brazil	2.9	5.2	3.0	3.9	3.8	3.8	3.8	3.8	3.7	3.7	3.7	3.7

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	1.9	2.4	2.6	2.6
<i>Previous Tealbook</i>	3.0	3.0	2.1	2.8	3.0	2.2	2.0	2.5	2.6	2.6
Advanced foreign economies	2.4	2.1	.9	1.9	2.7	1.3	1.3	1.4	1.7	1.7
Canada	3.4	2.8	-.4	1.8	2.9	1.6	1.7	1.6	1.8	1.8
Japan	2.8	-.4	1.0	1.2	2.4	.3	1.0	.8	.8	.8
United Kingdom	2.6	3.1	2.2	1.7	1.6	1.4	.6	.9	1.6	1.6
Euro area	.7	1.6	2.0	2.1	3.0	1.2	1.1	1.4	1.8	1.7
Germany	1.5	2.3	1.3	1.9	3.4	.6	.7	1.3	1.5	1.6
Emerging market economies	3.6	3.9	3.2	3.8	3.4	3.1	2.4	3.3	3.5	3.4
Asia	5.4	5.1	4.6	5.1	5.2	4.4	4.0	4.3	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	6.1	5.6	5.7	5.6
Latin America	1.7	2.8	1.9	2.5	1.7	1.4	.7	2.3	2.6	2.6
Mexico	1.2	3.4	2.8	3.3	1.5	1.6	.5	2.2	2.5	2.5
Brazil	2.6	-.2	-5.5	-2.3	2.2	1.1	1.1	2.3	2.8	2.8
<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	2.3	2.3	2.3	2.3
Advanced foreign economies	1.0	1.2	.5	.9	1.5	1.7	1.4	1.4	1.6	1.6
Canada	1.0	2.0	1.3	1.4	1.8	2.1	2.2	1.9	2.0	2.0
Japan	1.4	2.6	.1	.3	.6	.8	.8	.7	1.0	1.1
United Kingdom	2.1	.9	.1	1.2	3.0	2.3	2.1	2.0	2.0	1.9
Euro area	.8	.2	.3	.7	1.4	1.9	1.1	1.2	1.4	1.6
Germany	1.4	.4	.5	1.0	1.6	2.2	1.3	1.8	2.1	2.0
Emerging market economies	3.4	2.6	2.0	2.6	3.2	2.9	2.7	2.9	2.8	2.8
Asia	3.2	1.8	1.5	2.1	2.0	2.1	2.4	2.6	2.6	2.6
Korea	1.1	1.0	.9	1.4	1.4	1.8	.1	2.0	2.1	2.1
China	2.9	1.5	1.4	2.1	1.8	2.2	2.8	2.5	2.5	2.5
Latin America	4.0	4.7	3.2	4.0	6.4	5.1	3.6	3.5	3.3	3.3
Mexico	3.6	4.2	2.3	3.3	6.6	4.8	3.1	3.2	3.2	3.2
Brazil	5.8	6.5	10.4	7.1	2.8	4.1	3.8	3.8	3.7	3.5

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												
<i>Quarterly Data</i>												
	2019				Projected-2020				2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>Billions of dollars, s.a.a.r.</i>												
<b>U.S. current account balance</b>	<b>-529.1</b>	<b>-482.7</b>	<b>-501.1</b>	<b>-511.7</b>	<b>-501.1</b>	<b>-496.1</b>	<b>-518.4</b>	<b>-520.9</b>	<b>-524.5</b>	<b>-516.6</b>	<b>-533.4</b>	<b>-556.5</b>
<i>Previous Tealbook</i>	-521.6	-508.0	-523.9	-523.1	-517.5	-512.0	-533.4	-526.8	-539.7	-527.1	-539.2	-543.8
Current account as percent of GDP	-2.5	-2.3	-2.3	-2.4	-2.3	-2.2	-2.3	-2.3	-2.3	-2.2	-2.3	-2.4
<i>Previous Tealbook</i>	-2.5	-2.4	-2.4	-2.4	-2.4	-2.3	-2.4	-2.3	-2.4	-2.3	-2.3	-2.3
Net goods & services	-625.9	-653.3	-638.4	-624.1	-613.3	-610.7	-621.3	-617.4	-618.6	-613.0	-619.1	-629.7
Investment income, net	257.5	317.7	291.1	273.5	271.5	261.7	256.7	257.6	253.4	243.5	239.5	234.3
Direct, net	326.3	380.7	357.7	354.1	361.4	363.0	366.5	376.6	381.7	381.3	387.9	392.9
Portfolio, net	-68.7	-63.0	-66.7	-80.6	-89.9	-101.3	-109.8	-119.0	-128.2	-137.9	-148.4	-158.6
Other income and transfers, net	-160.7	-147.1	-153.8	-161.1	-159.3	-147.1	-153.8	-161.1	-159.3	-147.1	-153.8	-161.1
<i>Annual Data</i>												
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022		
<i>Billions of dollars</i>												
<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>-506.1</b>	<b>-509.1</b>	<b>-532.7</b>	<b>-561.1</b>		
<i>Previous Tealbook</i>	-348.8	-365.2	-407.8	-428.3	-439.6	-491.0	-519.1	-522.4	-537.4	-540.6		
Current account as percent of GDP	-2.1	-2.1	-2.2	-2.3	-2.3	-2.4	-2.4	-2.3	-2.3	-2.3		
<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	-635.4	-615.7	-620.1	-633.4		
Investment income, net	215.4	228.9	214.7	211.1	238.7	266.9	285.0	261.9	242.7	227.5		
Direct, net	283.3	284.2	284.6	278.0	304.0	330.3	354.7	366.9	386.0	409.3		
Portfolio, net	-67.9	-55.3	-70.0	-66.9	-65.3	-63.4	-69.7	-105.0	-143.3	-181.8		
Other income and transfers, net	-103.1	-104.6	-123.9	-136.4	-128.2	-130.2	-155.7	-155.3	-155.3	-155.3		

**Prefatory Note**

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

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

Class I FOMC – Restricted Controlled (FR)

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# Report to the FOMC on Economic Conditions and Monetary Policy



## Book B Monetary Policy Alternatives

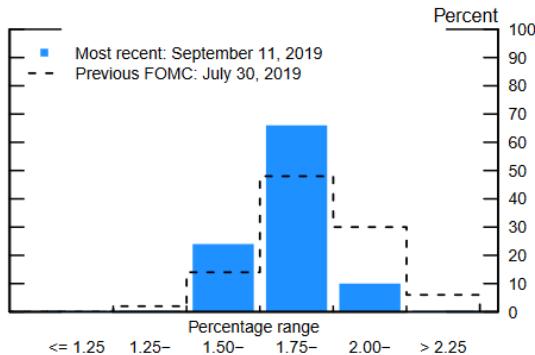
September 12, 2019

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

red-shaded region showing a range of three such model estimates) indicates a somewhat smaller decline in the 5-to-10-year-ahead expectation for the federal funds rate to between 2.8 and 3.0 percent. These smaller moves are consistent with a term premium at those horizons that has moved deeper into negative territory. The model-based projections lie fairly close to the longer-run forecasts from the Blue Chip and Desk surveys (the yellow and green diamonds, respectively).

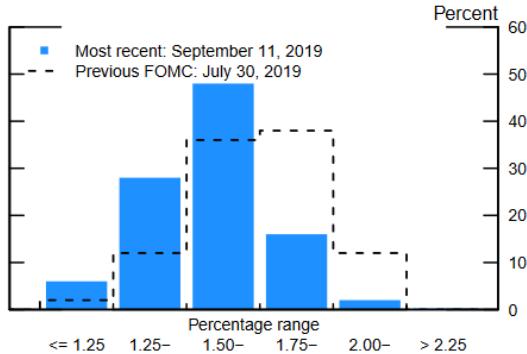
**Figure 1: Market-Implied Probability Distribution of the Federal Funds Rate in October 2019**



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

Source: CME Group, Board staff calculations.

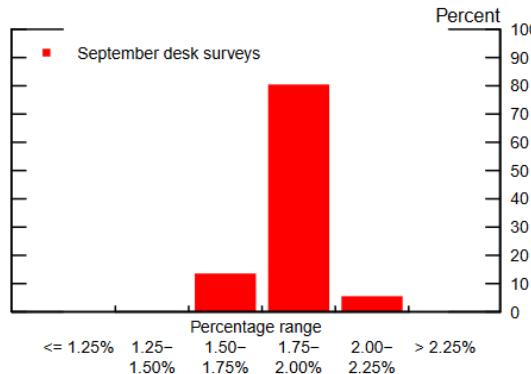
**Figure 3: Market-Implied Probability Distribution of the Federal Funds Rate in January 2020**



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.

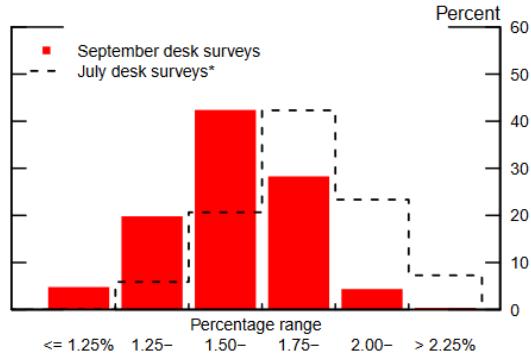
**Figure 2: Desk Surveys Average Probability Distribution of the Federal Funds Rate, Post-September FOMC**



Note: Probabilities are the averages of the probabilities assigned by respondents to different ranges of the federal funds rate at the end of 2019.

Source: FRBNY

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

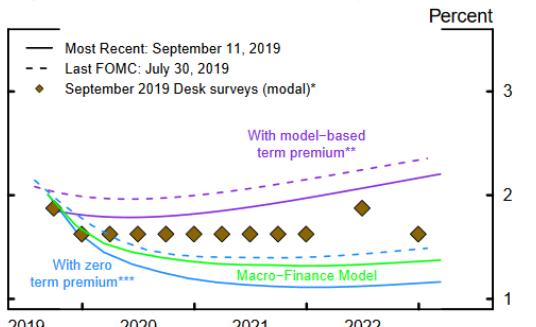


Note: Probabilities are the averages of the probabilities assigned by respondents to different ranges of the federal funds rate following the September FOMC meeting.

\* The July desk surveys asked for the probability of the target rate or range falling in the range of 1.50 percent or less. For comparison with the more granular September surveys, this probability is here solely attributed to the 1.25-1.50 percent range.

Source: FRBNY

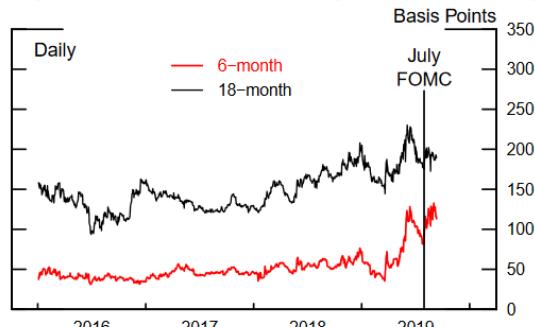
Figure 5: Federal Funds Rate Projections



\* 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.

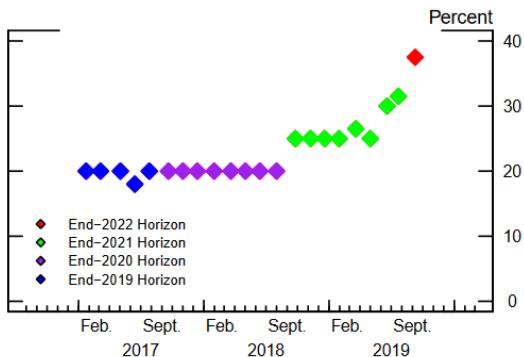
Figure 6: Measures of Monetary Policy Uncertainty



Note: Computed as the width of the 90-percent confidence interval of the market-implied federal funds rate distribution at each horizon. The distribution is estimated from Eurodollar futures options, accounting for the difference in the volatilities of LIBOR and the federal funds rate.

Source: CME; Federal Reserve Board staff estimates.

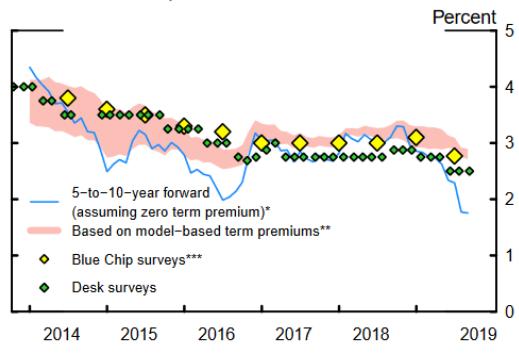
Figure 7: Probability of Returning to the Zero Lower Bound\*



\* 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 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 Priebsch (2019).

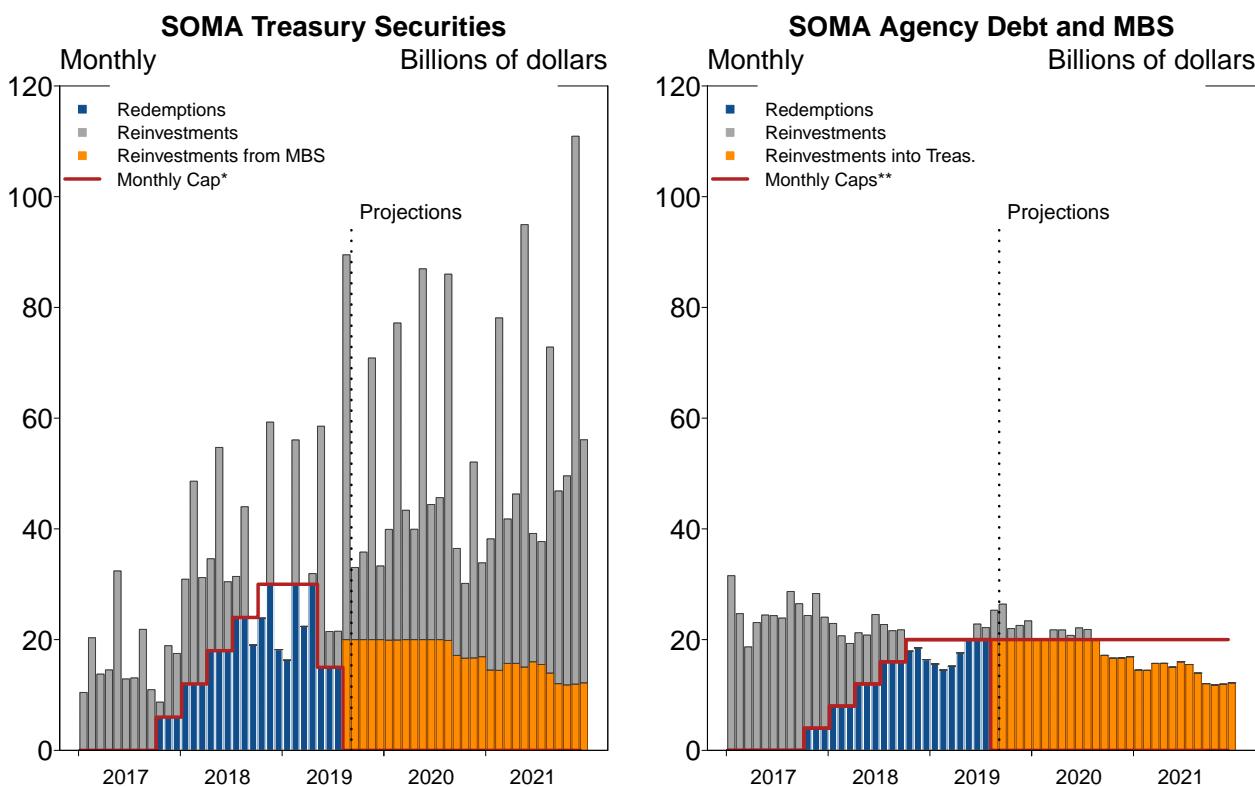
\*\*\* Most recent long-run survey value is from the June 2019 Blue Chip survey.

Note: Forward rates and term structure model estimates for September 2019 are based on values through September 11.

Source: Blue Chip; FRBNY; Federal Reserve Board staff estimates.

## SOMA Reinvestments

	Reinvestments from Agency Securities:						
	Rollovers of Treasury Securities:		to Treasury Securities		to Agency MBS		
Date	Period	Since Oct 2017	Period	Since Aug 2019	Period	Since Oct 2017	
2019:Q3	89.0	391.2	40.0	40.0	13.9	169.1	
2019:Q4	79.9	471.2	60.0	100.0	7.9	177.0	
2019	246.9	471.2	100.0	100.0	24.7	177.0	
2020	388.9	860.1	227.0	327.0	8.2	185.2	
2021***	543.6	1403.7	168.8	495.8	0.0	185.2	



\* Starting in August 2019, all principal payments from maturing Treasury securities are reinvested into Treasury securities.

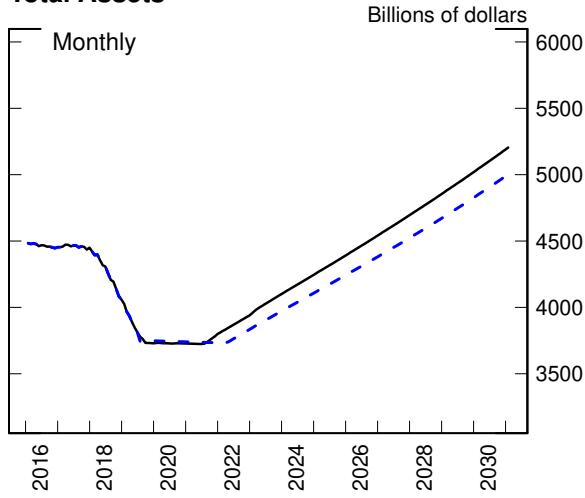
\*\* Starting in August 2019, principal payments from holdings of agency securities below \$20 billion per month are reinvested into Treasury securities, while those above are reinvested into agency MBS.

\*\*\* Reserves are projected to reach \$1 trillion in July 2021. After this date, all principal payments received from all security holdings are reinvested into Treasury securities.

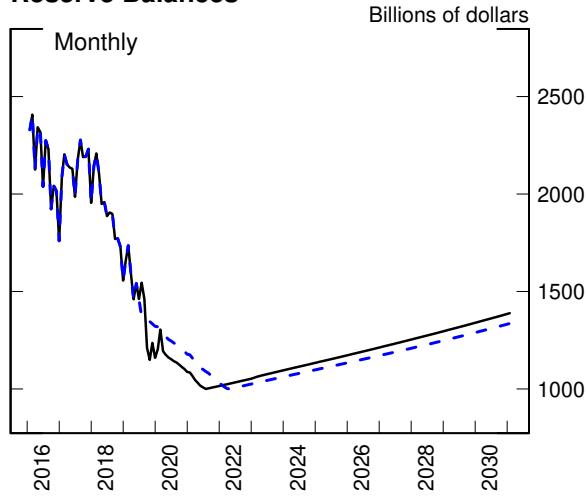
## Total Assets and Selected Balance Sheet Items

— September Tealbook baseline      - - July Tealbook – Earlier End to Runoff

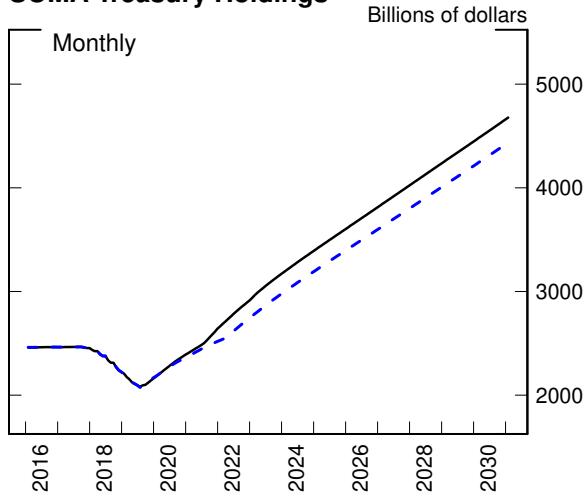
### Total Assets



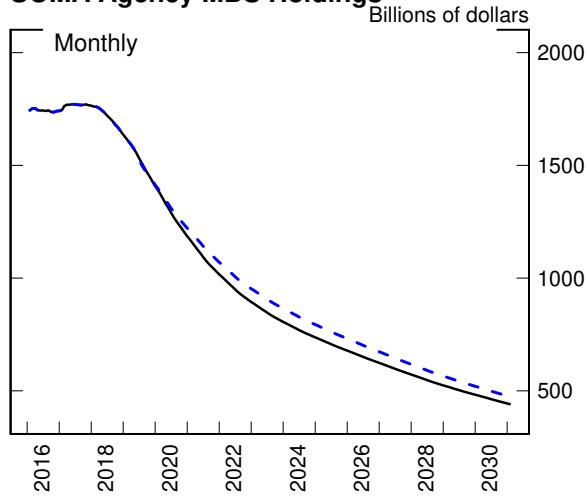
### Reserve Balances



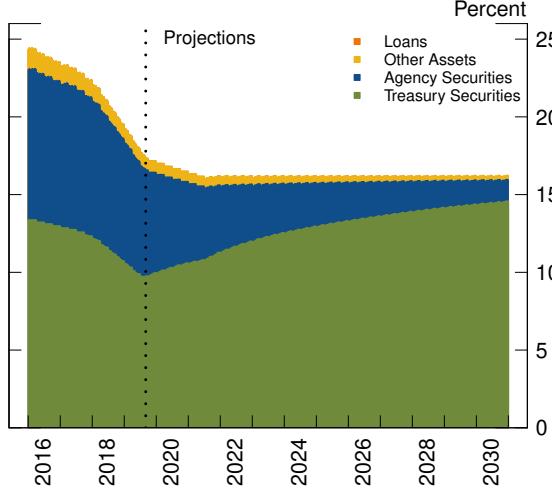
### SOMA Treasury Holdings



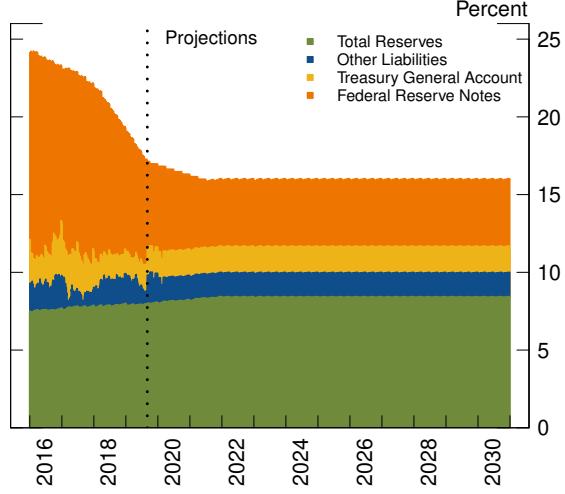
### SOMA Agency MBS Holdings



### Assets as a Percent of GDP



### Liabilities as a Percent of GDP



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

	Historical*			Projections				
	Aug 2014	Sep 2017	Aug 2019	Dec 2019	Dec 2020	Dec 2022	Dec 2025	Dec 2030
Total assets	4,416	4,460	3,761	3,729	3,728	3,939	4,390	5,189
<b>Selected assets</b>								
Loans and other credit extensions**	2	6	1	0	0	0	0	0
Securities held outright	4,157	4,240	3,587	3,571	3,579	3,810	4,282	5,106
U.S. Treasury securities	2,437	2,465	2,095	2,161	2,391	2,913	3,601	4,659
Agency debt securities	42	7	2	2	2	2	2	2
Agency mortgage-backed securities	1,678	1,768	1,490	1,408	1,186	894	678	444
Unamortized premiums	209	162	128	123	113	91	68	41
Unamortized discounts	-19	-14	-13	-12	-11	-8	-6	-4
Total other assets	66	66	58	46	46	46	46	46
Total liabilities	4,360	4,419	3,722	3,690	3,688	3,896	4,340	5,126
<b>Selected liabilities</b>								
Federal Reserve notes in circulation	1,249	1,533	1,714	1,752	1,860	2,048	2,282	2,695
Reverse repurchase agreements	277	432	297	299	311	334	372	440
Deposits with Federal Reserve Banks	2,825	2,447	1,704	1,634	1,512	1,509	1,681	1,986
Reserve balances held by depository institutions	2,762	2,190	1,461	1,160	1,087	1,052	1,172	1,385
U.S. Treasury, General Account	49	176	177	409	356	383	427	504
Other deposits	15	82	66	66	69	74	82	97
Earnings remittances due to the U.S. Treasury	3	2	2	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.

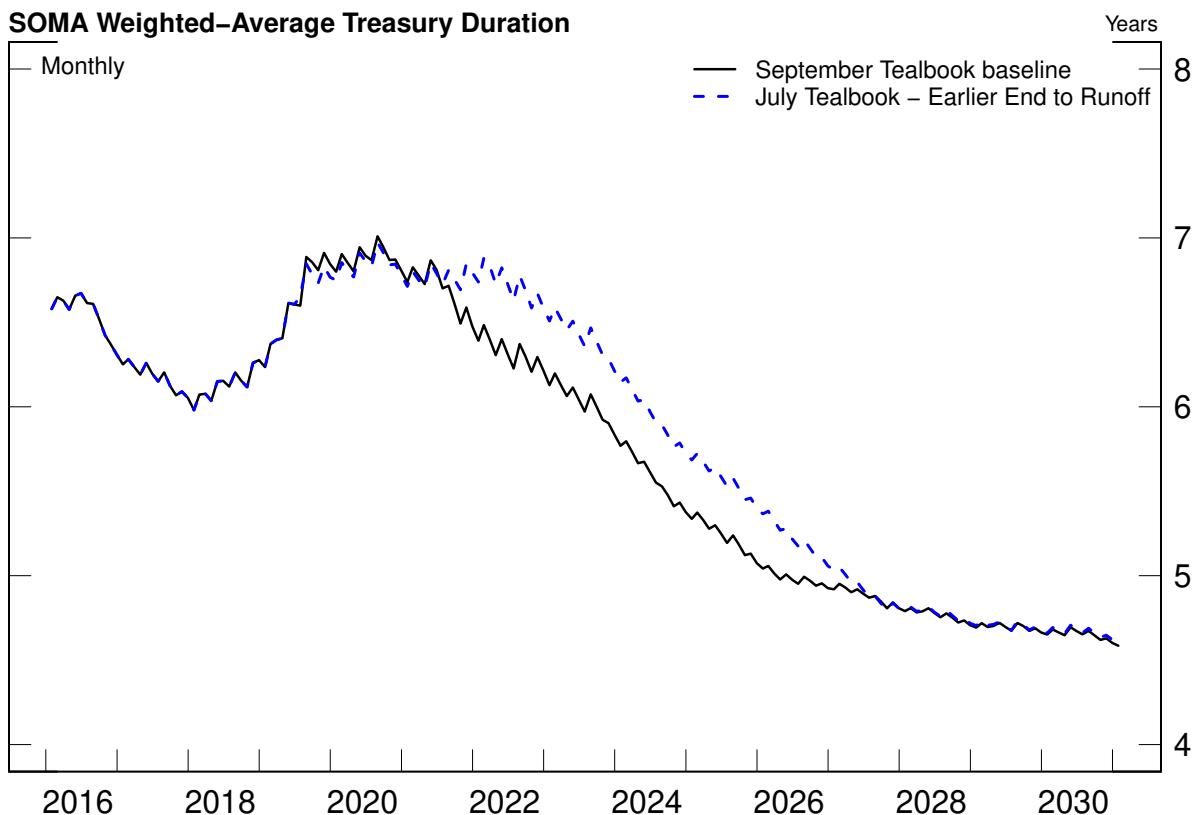
Note: Components may not sum to totals due to rounding.

\*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; August 2019 is the most recent historical value

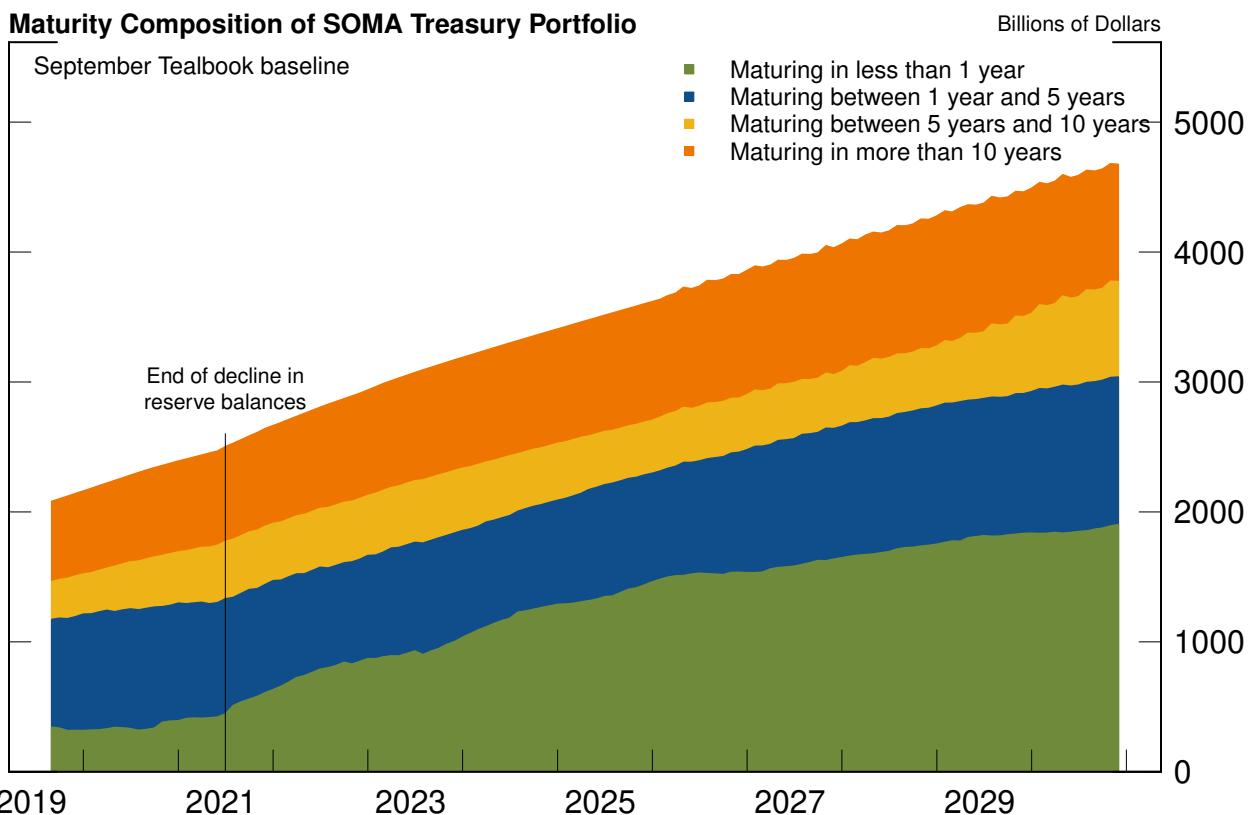
\*\*Loans and other credit extensions includes discount window credit; central bank liquidity swaps; and net portfolio holdings of Maiden Lane LLC.

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

## Projections for the Characteristics of SOMA Treasury Securities Holdings



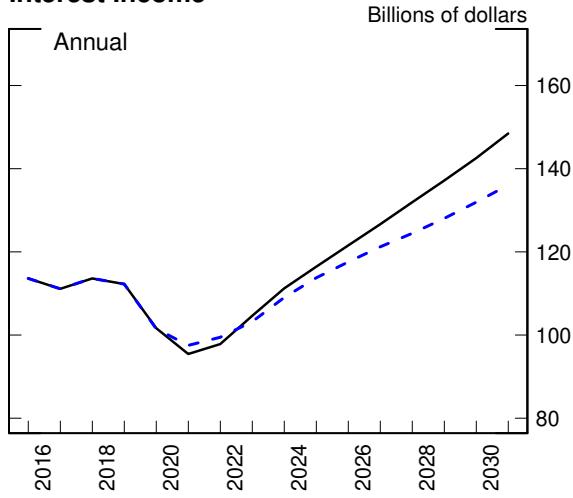
Balance Sheet &amp; Income



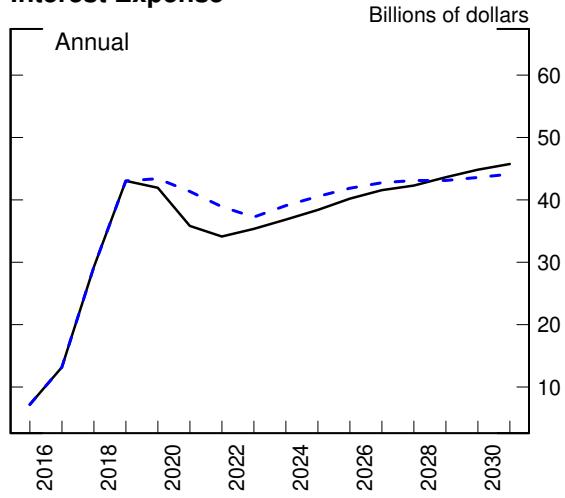
## Income Projections

— September Tealbook baseline      - - July Tealbook – Earlier End to Runoff

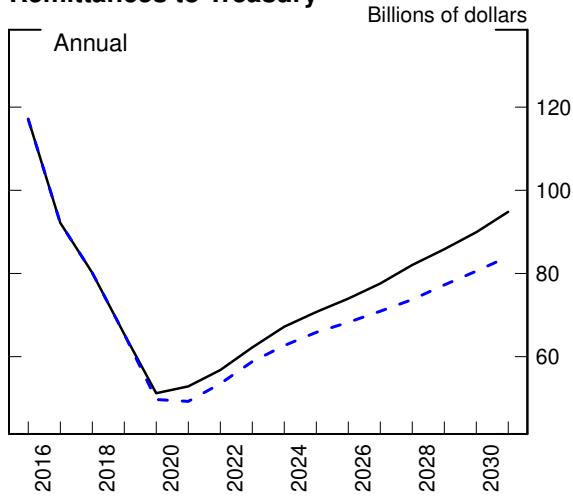
### Interest Income



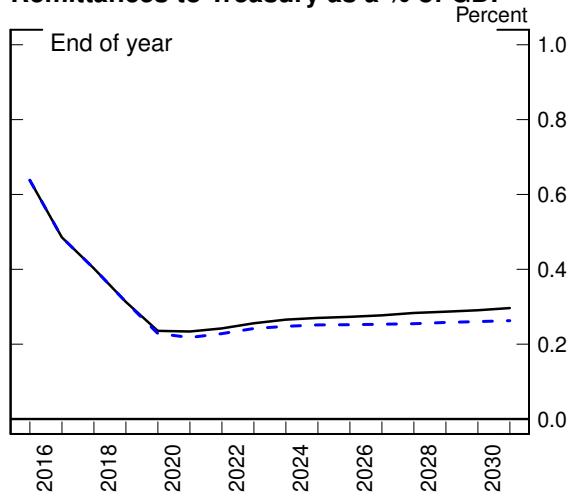
### Interest Expense



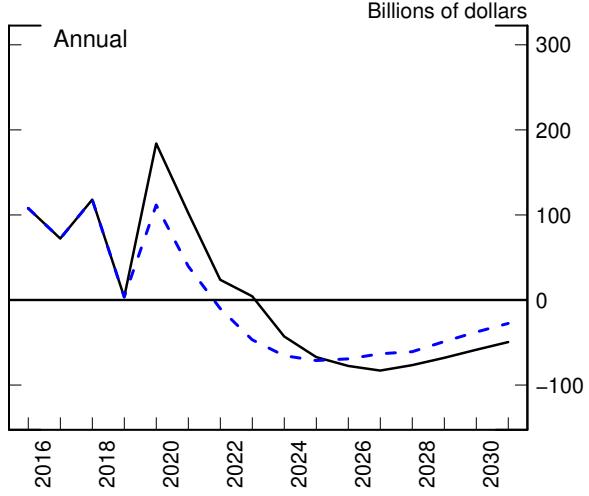
### Remittances to Treasury



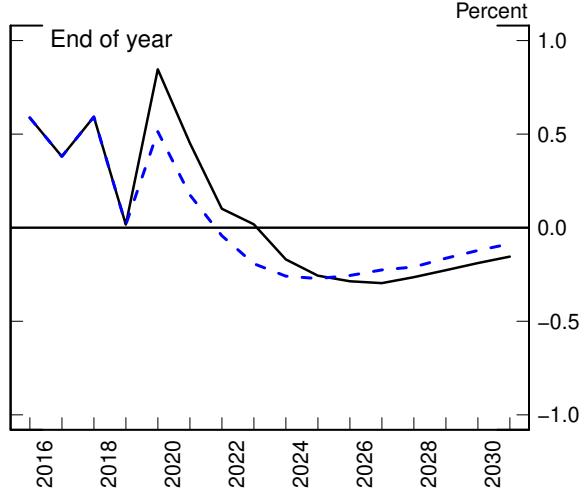
### Remittances to Treasury as a % of GDP



### Unrealized Gains/Losses



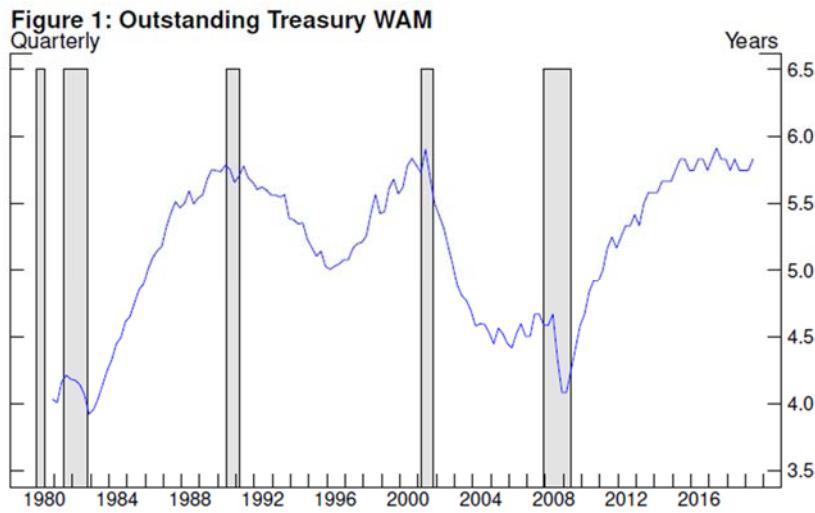
### Unrealized Gains/Losses as a % of GDP



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

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Date	September Tealbook	July Tealbook	- Earlier End to Runoff
Quarterly Averages			
2019:Q3	-131	-134	
Q4	-130	-133	
2020:Q4	-125	-128	
2021:Q4	-121	-123	
2022:Q4	-117	-118	
2023:Q4	-112	-113	
2024:Q4	-109	-108	
2025:Q4	-107	-105	
2026:Q4	-105	-102	
2027:Q4	-103	-100	
2028:Q4	-101	-98	
2029:Q4	-99	-97	
2030:Q4	-97	-95	



Note: Shaded areas indicate recessions.

The solid lines in Figure 2 show the TTPEs following major announcements of the asset purchase programs.<sup>3</sup> The staff's TTPE projections provide an indication of how the Federal Reserve's total securities holdings affect private-sector holdings and thus term premiums, keeping all other factors constant, including Treasury's debt management practices. However, Greenwood, Hanson, Rudolph, and Summers (2014) found that, as a result of the changes in the maturity distribution of Treasury debt issuance, private-sector holdings of longer-term securities were increased by an amount that offset about one-third of the reduction in term premiums resulting from the Federal Reserve's asset purchases of 2009-2014.<sup>4</sup>

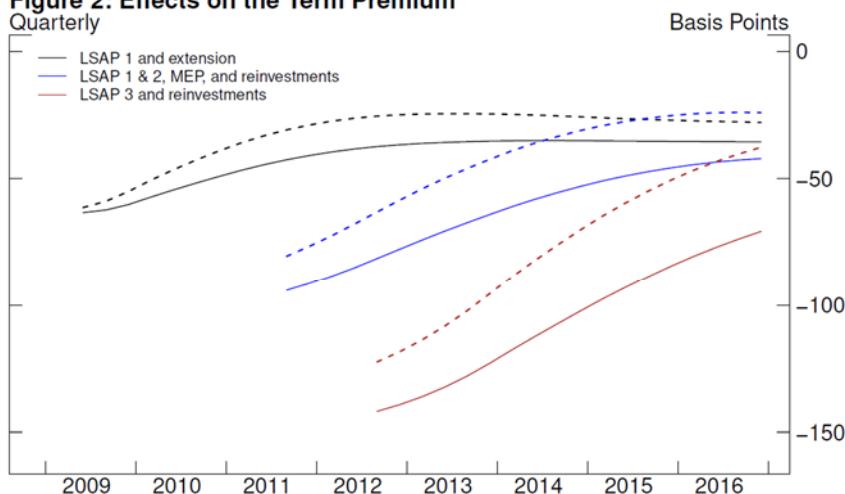
The dashed lines in Figure 2 show the combined effects on the term premium of the Federal Reserve's balance sheet policy announcements and the Treasury's decisions regarding the maturity of debt issuance. In line with the estimates by Greenwood et al. (2014), the projections that include the combined effects are associated with term premium effects that are, on average, one-third smaller than those of monetary policy alone.<sup>5</sup>

<sup>3</sup> In constructing projections for the asset purchase programs, we used the methodology from Jane Ihrig, Elizabeth Klee, Canlin Li, Min Wei, and Joe Kachovec (2018), "Expectations About the Federal Reserve's Balance Sheet and the Term Structure of Interest Rates," International Journal of Central Banking 14, no. 2: 341-391.

<sup>4</sup> See Robin Greenwood, Samuel G. Hanson, Joshua S. Rudolph, and Lawrence H. Summers (2014), "Government Debt Management at the Zero Lower Bound," Working Paper no.5, Hutchins Center on Fiscal and Monetary Policy at Brookings.

<sup>5</sup> The projections of the combined effects are subject to a great deal of uncertainty, as both the magnitude and the speed of Treasury's offset of the asset purchase programs' effects on the term premium are highly uncertain.

**Figure 2: Effects on the Term Premium  
Quarterly**



Note: Solid lines represent TTPEs (effect of monetary policy); Dashed lines show the combined effects of monetary policy and Treasury debt management.

As shown by the solid black line in Figure 2, the announcement of LSAP 1 and its subsequent extension are estimated to have initially reduced 10-year Treasury yields by about 60 basis points, abstracting from any change in the Treasury's debt management practices. In comparison with the solid black line, the dashed black line indicates that the estimated combined effects are, on average, about 10 basis points less negative over the whole projection.

As shown by the solid blue line, the cumulative effects of LSAPs 1 and 2, the MEP, and continued reinvestments are estimated to have further expanded the term premium effect to about negative 90 basis points. The dashed blue line shows that the cumulative effects of the Treasury's decision to lengthen the maturity of its debt widens the difference in magnitudes between the TTPE projection and the projection with the combined effect. The dashed red line, which captures the combined effects of LSAP 3, continued reinvestments, and Treasury's debt management, shows a similar pattern relative to the solid red line representing the baseline TTPE projection.

In a future recession during which the federal funds rate may be constrained by the ELB and the Committee decides to undertake asset purchases, Treasury may again increase the maturity of its debt issuance. In such circumstances, the Committee may need to take the Treasury's actions into account when determining the size and composition of a future asset purchase program. By reducing term premiums, asset purchases by the Federal Reserve may make it relatively more attractive for the Treasury to issue longer-term securities and lower debt-service costs, which would partially offset the effects of the Federal Reserve's actions. However, the Treasury Borrowing Advisory Committee has suggested that, in a future ELB episode, the Treasury might also want to give consideration to actions that would, instead, shorten the WAM of its outstanding debt, as such moves might help support economic activity.